

reports

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PARTLY CLOUDY
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19°
BACK PAGE

PENNSYLVANIA NEWSPAPER OF THE YEAR

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JUDGE JONES ON THE DOVER SCHOOL BOARD: "The students, parents, and teachers of the Dover Area School District deserved better than to be dragged into this legal maelstrom, with its resulting utter waste of monetary and personal resources."

THE DECISION: U.S. District Judge John E. Jones III, right, struck down Dover's intelligent design policy, saying the school board's real purpose was to promote religion.



JUDGE JONES ON INTELLIGENT DESIGN: "We have addressed the seminal question of whether ID is science. We have concluded that it is not, and moreover that ID cannot uncouple itself from its creationist, and thus religious, antecedents."

JUDGE RULES INTELLIGENT DESIGN IS 'NOT SCIENCE'

Area schools walk a fine line over religion

BY DIANA FISHLOCK
Of The Patriot-News

Religion still has a place in public schools, a fact in evidence during the holidays, but districts face a delicate balance in studying faith without promoting it or alienating students.

This time of year, midstate schools take different approaches. While some of the more religiously diverse communities revel in Christmas, Hanukkah and Kwanzaa, others avoid religious holidays altogether.

Religion can't be avoided when studying American history and culture, some area school officials say.

Derry Twp. teachers talk about traditions, including Christmas, Hanukkah and Kwanzaa, said Tom

FROM THE RULING:

"The citizens of the Dover area were poorly served by the members of the Board who voted for the [intelligent design] Policy. It is ironic that several of these individuals, who so staunchly and proudly touted their religious convictions in public, would time and again lie to cover their tracks and disguise the real purpose behind the ID Policy."



Historic ruling orders Dover to rescind policy

BY BILL SULON
Of The Patriot-News

In a sweeping and potentially landmark ruling, a federal judge yesterday said that the Dover Area School District's policy on intelligent design is unconstitutional and that the concept of intelligent design is unscientific and religious.

And in an unusually scathing rebuke, he called several former school board members who supported the policy liars.

U.S. Middle District Judge John E. Jones III, who presided over a six-week trial in Harrisburg, ruled that the intelligent design policy promotes religion and violates the

15 YEARS LATER THE FIGHT FOR SCIENCE CONTINUES

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EDITOR

Paul Oh

National Center for Science Education
1904 Franklin Street, Suite 600
Oakland CA 94612-2922
phone: (510) 601-7203
e-mail: editor@ncse.ngo

BOOK REVIEW EDITOR

Glenn Branch

PUBLISHER

Ann Reid

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ERRATA

Nathan H. Lents, interviewed for the
Random Samples column in *RNCSE* 40:3,
was accidentally misidentified in the print
edition as Nathaniel H. Lents. Apologies!

Sarah B. George, whose addition to
NCSE's board of directors was announced
in *RNCSE* 40:3, was incorrectly described
as the former executive director of the
National History Museum of Utah; it was
the Natural History Museum of Utah.

Dear NCSE members,

As a scientist married to a scientist, with lots of scientist and science teacher friends and a professional network chockablock with scientist colleagues, I hear an awful lot of despair about the current state of science literacy in our country. And it's not just from the scientistas (I just made that word up, but I kind of like it). Lots of non-scientists are concerned about how science is doing these days, too. I can certainly understand why—the rapidity with which inaccuracies and conspiracy theories about the coronavirus spread through the national conversation, and the apparent bottomless willingness to believe nonsense, boggles the mind. It can make you think that surely things have never been this bad before.

Okay, you may be right about that.

On the other hand, the past—even the fairly recent past—has had its own share of moments (or even years) when good science was embattled, if not outflanked. But good science has often won out and in this issue of *RNCSE* we celebrate one such example, one that is particularly dear to our hearts because we were there.

As you'll read in this issue's feature story, by NCSE's founding executive director Genie Scott, NCSE was intimately involved in preparing for the [Kitzmilller v. Dover](#) trial that concluded 15 years ago this December 20 (a day that, as Genie points out, we call Kitzmas around here). In a *tour de force* of clear and passionate descriptions of how legitimate science works, and how intelligent design fails, the many plaintiffs' expert witnesses—recruited and prepared by NCSE—convinced the judge to rule in favor of the teaching of evolution, and evolution alone.

There's more good news. As NCSE's deputy director Glenn Branch writes on page 4, the decade plus since the *Kitzmilller v. Dover* decision has seen significant improvements in how evolution is taught in U.S. public schools. NCSE is not solely responsible for all the improvement, but I'd argue that NCSE played a critical catalytic role in drawing the attention, and the involvement, of a crowd of like-minded organizations and individuals to what public school teachers need to teach evolution without compromise.

There's a lot of bad news out there. We have plenty of work to do to make sure that every student leaves high school understanding evolution and climate change, and also with a full tool kit to identify and resist science misinformation, disinformation, and hyperbole. But we know we can do it—we've done it before. With your support.

Thanks for all the ways you keep NCSE in the fight.

Ann Reid is the executive
director of NCSE. reid@ncse.ngo



Kitzmiller v. Dover: The last gasp of “balancing” evolution

Dover was on our radar early, right after Pennsylvania developed new science education standards in 2001 that required the teaching of evolution. (NCSE board member Andrew J. Petto was instrumental in helping to organize citizens to make that happen, by the way. NCSE on the job again!)

We opened the Dover file in 2002 when the high school custodian, objecting both to nudity and the theme of evolution, burned a student-painted mural of early hominids. (You were perhaps expecting Australopithecines to wear khakis?) A creationist member of the school board gloated that he “gleefully watched it burn.”

And then in 2003 biology textbooks were up for selection, beginning a confrontation between teachers and the school board over what would be taught about evolution and what instructional materials would be used to teach it. The teachers wanted to use the standard textbook *Biology*, authored by Kenneth R. Miller and Joseph S. Levine. But creationists on the school board delayed its adoption for a year, objecting to the fact that the book was “laced with Darwinism,” in the words of one school board member.

In June 2004, creationists on the school board sought instructional materials that would include both evolution and

**“STUDENTS WILL BE MADE AWARE OF GAPS/
PROBLEMS IN DARWIN’S THEORY AND OF
OTHER THEORIES OF EVOLUTION INCLUDING,
BUT NOT LIMITED, TO INTELLIGENT DESIGN.”**

**—FROM POLICY ADOPTED BY
SCHOOL BOARD, OCTOBER 2004**

creationism, and proposed the “intelligent design” textbook *Of Pandas and People* and an intelligent design videotape, *Icons of Evolution*. The teachers dutifully reviewed both the book and the video, and recommended against them: their science was bad, and neither was in alignment with the state science education standards for content or pedagogy.



Lead plaintiff Tammy Kitzmiller (center facing camera) and others outside the federal courthouse.

Viewing the teachers as uncooperative, the school board subsequently adopted an antievolution policy in mid-October 2004 which read in part: “Students will be made aware of gaps/problems in Darwin’s theory and of other theories of evolution including, but not limited, to intelligent design.” The explicit mention of “intelligent design” in the policy generated much public controversy.

Local citizens independently began contacting Americans United for Separation of Church and State (AU), the Pennsylvania branch of the American Civil Liberties Union (ACLU), and NCSE. A team of these three organizations plus the Philadelphia law firm Pepper Hamilton ended up representing eleven plaintiffs, parents with children in the Dover school system.

I go into such detail about the origin of [Kitzmiller v. Dover](#) to emphasize the fact that it was not a necessary conflict. Dover’s teachers tried for years to resolve the disagreement with the school board over the teaching of evolution, and AU, ACLU, and NCSE were not itching for a fight. Unfortunately, a dogmatic creationist faction on the school board insisted upon compromising the teaching of science, rather than compromising with teachers and parents who simply wanted their students and children to get a good education. The plaintiffs felt they had no choice but to sue.

The lawsuit was filed in federal court in December 2004; the trial began in October 2005; and the judge filed his opinion on December 20, 2005. In-house at NCSE, we like to refer to December 20 as Kitmas.

Do I need a spoiler alert? Probably not. The plaintiffs won. Glenn Branch explains more about the legal basis (p. 6), but let me just explain why *Kitzmiller v. Dover* was so important.

THE HISTORY OF THE CREATIONISM/EVOLUTION CONTROVERSY INVOLVES A SERIES OF SEQUENTIAL (AND SOMETIMES OVERLAPPING) WAVES OF ACTIVITY, TAKING THE FORM OF EFFORTS TO BAN, BALANCE, AND BELITTLE EVOLUTION.

The judge's decision in *Kitzmiller* significantly shifted the emphasis of the antievolutionist movement. How? The history of the creationism/evolution controversy involves a series of sequential (and sometimes overlapping) waves of activity, taking the form of efforts to ban, balance, and belittle evolution.

The first wave lasted from 1921, which saw the first proposed legislative ban on the teaching of evolution in the public schools, until 1968, when the Supreme Court declared such bans to be unconstitutional in [Epperson v. Arkansas](#).

The second wave, in which the teaching of evolution was supposed to be balanced with the teaching of a form of creationism, commenced soon thereafter. But it hit a roadblock after legal decisions, especially the Supreme Court's 1987 decision in [Edwards v. Aguillard](#), proclaimed the teaching of creation science in the public schools to be unconstitutional advocacy of religion.

It was not long thereafter that "intelligent design" emerged as a supposedly secular alternative with which to "balance" the teaching of evolution. But, as we showed in *Kitzmiller*, "intelligent design" was a direct descendent of creation science, with various traits lost in its evolution but the indelible stamp (to coin a phrase) of its sectarian origin visible nevertheless.

In the early 1990s, a series of bills emerged in state legislatures to encourage the teaching of creation science and/or "intelligent design" without mentioning them by name. They purported to provide "academic freedom" to teachers and students to learn "the full range of scientific views." But after *Kitzmiller*, the writing on the wall was even clearer: the First Amendment requires that schools be religiously neutral, and teaching any form of creationism is going to be judged to be religious advocacy—even if done with a wink and a nudge.

In his analysis of antievolution bills introduced between 1994 and 2015, published in *Science* in 2016, Nick Matzke used phylogenetic techniques to trace "ancestral" and "descendant" wording. The shift from bills calling for the "full range of scientific views" to be taught to bills calling for the "strengths and weaknesses" to be taught—from balancing to belittling—is very clear. It occurs right after *Kitzmiller*.

There's a reason for that. The *Kitzmiller* trial record clearly showed in great detail that "intelligent design" was a descen-

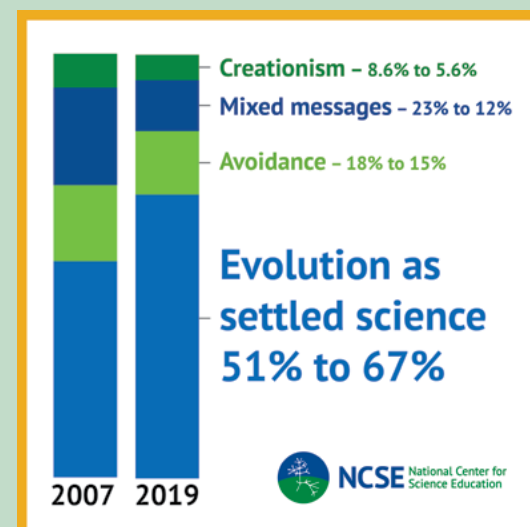
ENCOURAGING NEWS ABOUT

Who says there's no good news these days? In June 2020, the peer-reviewed journal *Evolution: Education and Outreach* published "[Teaching evolution in U.S. public schools: a continuing challenge](#)," by Eric Plutzer of Penn State University and Glenn Branch and Ann Reid of NCSE, which discussed the results of a rigorous national survey of public high school biology teachers. Conducted in 2019, the survey was designed to replicate a similar national survey conducted by Plutzer and his colleagues in 2007.

By the way, since 2020 is the fifteenth anniversary of the *Kitzmiller v. Dover* trial, it is worth noting that Plutzer and his colleagues were prompted to launch their survey in 2007 in part because they were intrigued by the events taking place a hundred miles to their southeast in Do-

ver and Harrisburg (where the trial itself was conducted) and wondered how evolution was taught in public high schools in general. So the *Kitzmiller* plaintiffs are partly to thank for the 2007 survey and for the 2019 replication!

Comparing the results of the two surveys is heartening. In particular, the proportion of teachers who reported emphasizing evolution while giving no credence to creationism rose from a bare majority, 51 percent, to a commanding majority, 67 percent. Meanwhile, the proportion of teachers who avoided endorsing evolution or creationism fell from 18 to 15 percent, the proportion of teachers who endorsed both evolution and creationism fell from 23 to 12 percent, and the proportion of teachers who endorsed only creationism fell from 8.6 to 5.6 percent.



What accounts for the improvement? Plutzer, Branch, and Reid argue that improvements in the treatment of evolution in state science standards, and in particular the debut of the [Next Generation Science Standards](#) in 2013, played a substantial role. The NGSS include "Biological Diversity: Unity and Diversity" as disciplinary

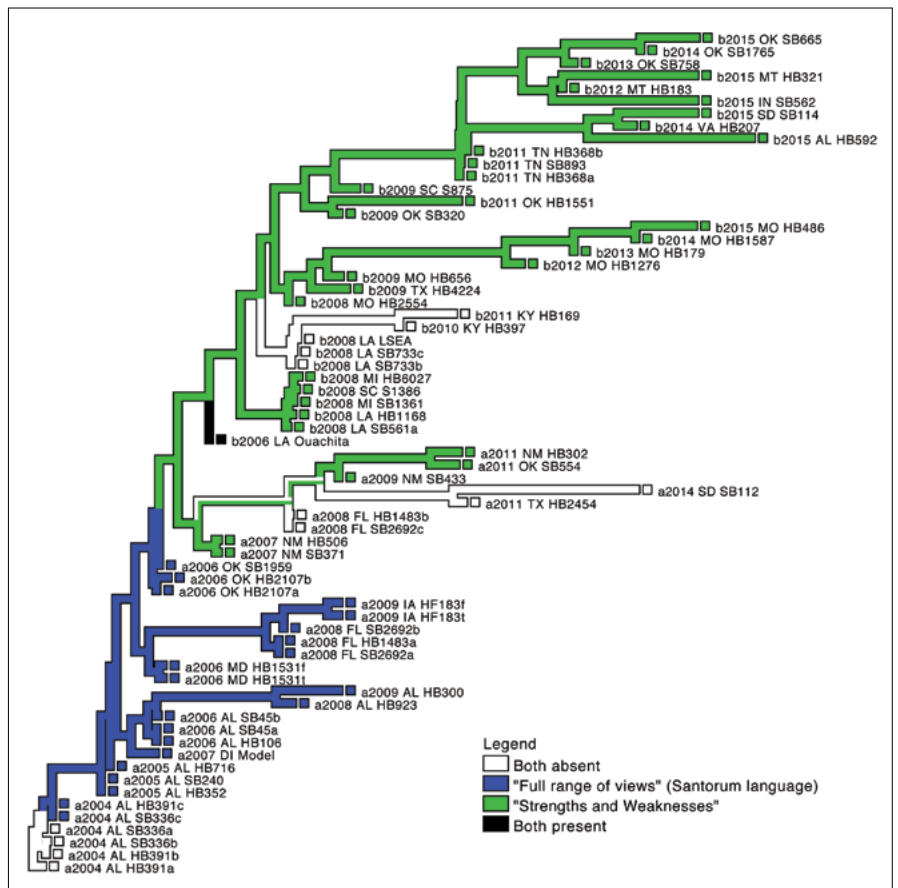
dent of creation science and its claims were a subset of creation science's, so it would be extremely unlikely that it or any similar (claimed) "scientific view" in the future would escape being declared unconstitutional for the public school classroom.

"The teaching of strengths and weaknesses" of evolution (or similar language found in other belittling approaches) has never been definitively tried in the courts. The history of antievolutionism shows that it is merely the latest iteration of the effort to get evolution out of, and creationism into, the public school science classroom. By now, none of the justices who signed the majority decision in *Edwards v. Aguillard* is still on the Supreme Court. Would a yet more disguised effort like "strengths and weaknesses" survive scrutiny by today's more conservative court? NCSE and its allies are not itching for that fight, either.

But we can take pride in and be glad of the *Kitzmiller* decision, which at least laid to rest the balancing strategy of undermining the teaching of evolution, even if we still need to be vigilant in opposing the belittling of this important principle of science.



Eugenie C. Scott is the founding executive director of NCSE. eugeniescott1@gmail.com



Nick Matzke's phylogeny of antievolution bills shows the post-Kitzmiller shift away from bills calling for "the full range of scientific views".

Visit ncse.org/remembering-kitzmiller-v-dover to read recollections of the trial from some of the participants.

EVOLUTION EDUCATION FROM A NEW NCSE/PENN STATE SURVEY

core idea of the life sciences at both the middle and high school levels. By now, 20 states (plus the District of Columbia) have adopted the NGSS.

Strikingly, although in 2007 the states that would later adopt the NGSS had the smallest proportion (49.7 percent) of teachers who reported endorsing evolution and not creationism, in 2019 they had the largest proportion (68.9 percent) of such teachers. Teachers in NGSS states reported having taken more pre-service and in-service coursework in evolution than their colleagues elsewhere. Evidently the increased expectations of the new standards impelled both novice and veteran teachers to upgrade their content knowledge of evolution.

NCSE was of course eager to spread the good news. Ann Reid contributed

a [commentary](#) to the journal *Nature*, in which she stressed the role of the scientific community in helping to support the development, adoption, and revision of improved state science standards, while Glenn Branch contributed a [special report](#) on the survey to *Skeptical Inquirer*. Reid and Branch also contributed posts to the blogs of the [American Society of Cell Biology](#), [BMC On Society](#), the [National Science Teaching Association](#), and [Scientific American](#).

There was bad news too, to be sure. After all, the survey revealed that more than one in six high school biology teachers, 17.6 percent, are presenting creationism as a scientifically credible alternative to evolution. Unsurprisingly, 60 percent of them turn out to be creationists themselves. And almost as many, 15 percent, are failing to emphasize the broad consensus on

evolution, despite the fact that their professional organizations such as the National Association of Biology Teachers regard evolution as indispensable in teaching biology.

Still, the attainability in a mere dozen years of substantial improvements in science education, even for a notoriously socially contentious topic like evolution, is encouraging. It shows that NCSE's efforts to defend and promote the teaching of evolution—aided, of course, by the work of our members, of allied organizations, and of uncounted scientists, educators, policymakers, administrators, and concerned citizens in general—are effective. And it suggests that, consistently pursued, they will continue to be effective in the future.



Glenn Branch is deputy director of NCSE. branch@ncse.org

THE LEGAL BASIS OF *KITZMILLER V. DOVER*

After the Dover Area School Board adopted a policy in 2004 requiring that “Students will be made aware of gaps/problems in Darwin’s theory and of other theories of evolution including, but not limited to, intelligent design,” and subsequently attempted to require its ninth-grade biology teachers to read a statement commending “intelligent design” and the “intelligent design” textbook *Of Pandas and People* to their students, eleven local parents filed suit in federal court, in what would become known as *Kitzmiller v. Dover*.

What was primarily at issue in the case was whether the board’s actions violated the [Establishment Clause](#) of the First Amendment to the United States Constitution. The plaintiffs argued, and the court agreed, that the relevant tests of whether the board’s actions were constitutional or not were the endorsement test, articulated in the Supreme Court’s 1984 decision in *Lynch v. Donnelly*, and the earlier three-prong Lemon test, articulated in the Supreme Court’s 1971 decision in *Lemon v. Kurtzman*.

In the endorsement test, the question is whether a reasonable objective observer familiar with the relevant facts would consider the challenged actions to have conveyed a message of approval or disapproval of religion. Examining both the board’s claims about “intelligent design” and about “gaps” and “problems” in evolutionary theory, the court concluded that the answer was yes: both members of the community and students in Dover’s public schools would have understood—and did understand—the board to have been endorsing a religious view.

In the “Lemon” test, there are three questions, relating to purpose, effect, and entanglement, but entanglement was not relevant to the case. So the questions were, first, whether the board’s actions lacked a secular purpose, and, second, whether the principal or primary effect of the board’s action was to promote or obstruct religion. In a lengthy discussion, the court found that the board’s actions were clearly motivated by a desire to promote a particular religious view and described “[a]ny asserted secular purposes by the Board” as a “sham.”

The court’s discussion of the effect test was substantially briefer, because the relevant issues were basically the same as for the endorsement test: the court wrote, “we will incorporate our extensive factual findings and legal conclusions made under the endorsement analysis by reference here.” The result was the same: “The effect of Defendants’ actions in adopting the cur-

riculum change were to impose a religious view of biological origins into the biology course, in violation of the Establishment Clause.”

The decision famously devoted a section to addressing whether “intelligent design” is science, finding that it is not. (The headline in the *Harrisburg Patriot-News* announcing the decision featured “NOT SCIENCE” in letters six centimeters high.) Despite the fulminations of the proponents of “intelligent design” to the contrary, the court was obligated to address the question, because the board sought to defend itself by contending “intelligent design” is science and thus that the purpose and the effect of its actions was to improve science education.

Accordingly, the plaintiffs tried to convince the court to adopt their views on whether “intelligent design” was science. A parade of expert witnesses (recruited by NCSE) [offered](#), in the words of *The New Yorker*, “the biology class you wish you could have taken,” with tutorials on the philosophy of science, the practicalities of science education, and the history of Western religion on the side. The defendants tried to mount a countereffort but were hampered by the withdrawal of a few of their expert witnesses as well as the implausibility of their position.



Journalists waiting outside the courthouse in Harrisburg.

Photos by Wesley Elsberry

The board’s actions were also challenged as violating the Pennsylvania Constitution, which states in relevant part that “no preference shall ever be given by law to any religious establishments or modes of worship.” The court was brief here as well, writing, “our discussion of the issues raised under the federal constitution applies with equal vigor to the issues raised by Plaintiffs that are grounded in our state constitution ... the Court likewise concludes that the [“intelligent design”] Policy is violative of Plaintiffs’ rights under the Pennsylvania Constitution.”

There was no appeal of the decision, issued on December 20, 2005, since in the election conducted six weeks before, all eight members of the Dover Area School Board who were running for re-election were defeated, and the newly constituted board voted not to pursue the case further. Although direct precedential only in the Middle District of Pennsylvania, the cogency and thoroughness of the decision guarantees that it was, and will continue to be, a discouragement to creationist activists in general.

Glenn Branch is deputy director of NCSE. branch@ncse.ngo



Random Samples

with Edward J. Larson

Edward J. Larson is the university professor of history and holds the Darling

Chair of Law at Pepperdine University. In 2017, he received NCSE's Friend of Darwin award. Among his many books is *Summer for the Gods: The Scopes Trial and American's Continuing Debate Over Science and Religion* (1997), which won the Pulitzer Prize for History in 1998 and was reissued with a new afterword in 2020.

Glenn Branch: *It's been twenty-three years since the original publication of Summer for the Gods. Why did you (and your publisher) think that it was a particularly good time to reissue the book?*

Edward Larson: Hachette Book Group acquired my original publisher, Basic Books, and installed a new editorial team. *Summer for the Gods* continues to sell well and, looking over the last edition, the new team wanted a fresher, more up-to-date afterword than appeared in the 2006 edition. After all, the purpose of the afterword is to bring the Scopes story forward to the present and, over the ensuing 14 years, that story continued to evolve. In some ways, the core issues in Scopes are more relevant today than in 2006 (or in 1997, when the book first appeared) because “conservative evangelicalism” or “fundamentalism,” whichever term you wish to use, is more like the fundamentalism of the Scopes era than the mid-20th-century evangelicalism of Billy Graham, Carl Henry, and Bernard Ramm. Reaching out to middle America, those evangelical leaders had softened the sharp edges of fundamentalism without weakening the core message of salvation through faith. Somewhat as in the 1920s, America has returned to an era of sharp edges and heightened partisanship, with that tone reflected in the debate over science and religion. We see it in the ongoing rise of the Christian school movement and partisan assaults on public education, a religious split over responses to climate change and the pandemic, and the confirmation of federal judges with a view of the Establishment Clause at odds

with *Epperson v. Arkansas* and *Edwards v. Aguillard*.

GB: *You discuss the “intelligent design” movement, including its defeat in Kitzmiller v. Dover, in the afterword to the 2006 edition of Summer for the Gods, but not in the new afterword. Why?*

EL: *Summer for the Gods* is about anti-evolutionism in all its forms and the overarching issues of individual liberty versus majoritarian democracy cast in the debate over science and religion, not about “intelligent design” in particular. I more profitably deal with “intelligent design” in my book *Evolution: The Remarkable History of a Scientific Theory* (2004). As with so many other post-Scopes decisions involving the teaching of evolution, few people still remember *Kitzmiller v. Dover* (which after all was a district court decision), while the Scopes trial remains front and center in the American mind. Media accounts of *Kitzmiller* and countless other lawsuits in the field inevitably refer to those cases as “Scopes II.” I’ve never seen one referred to as “Scopes III” or “Kitzmiller II.” *Summer for the Gods* was never a story about “intelligent design.” It is a story about American culture, religion, and science. For anyone interested in “intelligent design,” I recommend Barbara Forrest and Paul R. Gross’s *Creationism’s Trojan House: The Wedge of Intelligent Design* (2004).

GB: *You suggest that the Supreme Court’s ideological composition in 2012 may have discouraged a constitutional challenge to the “monkey bill” enacted in Tennessee that year. With Antonin Scalia and Anthony Kennedy replaced by Neil Gorsuch and Brett Kavanaugh, how do you assess the situation today?*

EL: In his dissent in *Edwards v. Aguillard*, Antonin Scalia expressed his reservations to the line of judicial decisions that exorcised creationism from American public schools. We do not know where Justices Gorsuch and Kavanaugh stand on this particular issue but, in several recent decisions, they join in reworking the Establishment Clause

from Justice Hugo Black’s wall between church and state reflected in *Epperson* to a more porous barrier. They also support a strong view of individual religious rights to dissent from the common culture and state mandates. I share the view that the courts would reject a facial challenge to the Tennessee statute.

GB: *In light of the changes in the Supreme Court’s ideological composition, you suggest that “winning over popular opinion may again become the best strategy for evolutionists.” What ways of doing so do you think have been, or would be, effective?*

EL: Ken Ham broadened the appeal of young-earth creationism with his kid-friendly accounts of a pre-fall utopian world of dinosaurs playing with early humans and his adult-frightening tales of the horrors resulting from belief in human evolution—eugenics, racism, violence, drugs, and despair. Creationists in general proved adept at linking the teaching of their ideas to freedom and choice rather than indoctrination. Now flip this on its head. What kid-friendly accounts are possible about evolution? What adult-frightening warnings exist to the rejection of mainstream science in an age of climate change, systemic racism, and a global pandemic? How can teaching about evolution be associated with individual liberty and choice? Popular music, stand-up comedy, engaging books, YouTube videos could take up these themes. Survey data by the Pew Research Center and other polling firms show softening support for both creationism and evangelicalism, especially among Americans in their twenties and thirties. I attribute this at least in part to the politicization of the evangelical movement and its association with the Trump administration, which is particularly unpopular with that age group. In the Scopes era, Clarence Darrow and H. L. Mencken reached out to a popular audience to counter anti-evolutionism. It worked for them and, in an updated form, it could work today.

Glenn Branch is deputy director of NCSE. branch@ncse.ngo

UPDATES

Are there threats to effective science education near you? Do you have a story of success or cause for celebration to share? E-mail any member of staff or info@ncse.ngo.

IDAHO

The Idaho House Education Committee voted 10–5 on February 5, 2020, to repeal the state’s science education standards. Although the specific content of the standards was not discussed, the hostility of the committee to the inclusion of climate change in the standards in 2016, 2017, and 2018 suggests a possible motivation for the vote. On February 12, 2020, however, the Senate Education Committee voted unanimously to approve the standards, so they remain in place despite the earlier vote.

NEW HAMPSHIRE

House Bill 1635 would have required climate education, including anthropogenic climate change, in the state’s public schools. At the high school level, no less than ten hours of classroom time would have been allotted to climate education per year. New Hampshire adopted the Next Generation Science Standards in 2016, so climate change is presumably already taught there. The chief sponsor of the bill was Chris Balch (D–District 38); the bill was ultimately referred for interim study.

NEW YORK

Senate Bill 7341, introduced in the New York Senate on January 21, 2020, by Andrew Gounardes (D–District 22) and referred to the Senate Committee on Education, would, if enacted, require the establishment of “a model environmental curriculum on climate change to be taught in all public elementary and secondary schools.” The curriculum would be developed by the state department of education, which would also “develop age-appropriate curriculum resources and technical assistance” to help schools implement it.

RHODE ISLAND

Citing the importance of climate change education, House Resolution 7471 and Senate Resolution 2626 would, if approved, have expressed support for increased environmental and climate education in, and requested the development of “a set of key environmental principles and concepts” for, the state’s public schools. The House resolution was ultimately held in committee for further study; the Senate resolution apparently died in committee. A similar resolution, House Resolution 5563, was introduced in 2019 but died in committee.

SOUTH DAKOTA

Senate Bill 59, which would have allowed the misrepresentation of science in the classroom, was introduced on January 21, 2020, and promptly tabled on a 7–0 vote in the Senate Education Committee nine days later. If enacted, SB 59 would have encouraged the presentation of “the strengths and weaknesses of scientific information.” Although no specific topics were mentioned, the language of the bill matched the language in previous bills explicitly aimed at disputing evolution and/or climate change.

TEXAS, SOMERSET

The Somerset Independent School District promptly but grudgingly removed a religious display which included the text “In the beginning, God created ...” from an elementary school library in December 2019 after receiving a letter from the American Humanist Association’s Appignani Humanist Legal Center, which had been notified of the display by a concerned parent. Among the case law cited in the letter was the string of cases about the unconstitutionality of teaching creationism in the public schools.

BRAZIL

Benedito Guimarães Aguiar Neto, the former rector of “intelligent design”-friendly Mackenzie Presbyterian University, was appointed to head CAPES, the agency within the federal ministry of education responsible for graduate-level programs at Brazilian universities. He recently recommended the addition of “intelligent design” to Brazil’s public school science curriculum. *Science* quoted evolutionary biologist Antonio Carlos Marques of the University of São Paulo as describing the appointment of “someone who has promoted actions contrary to scientific consensus” to such a position as “completely illogical.”



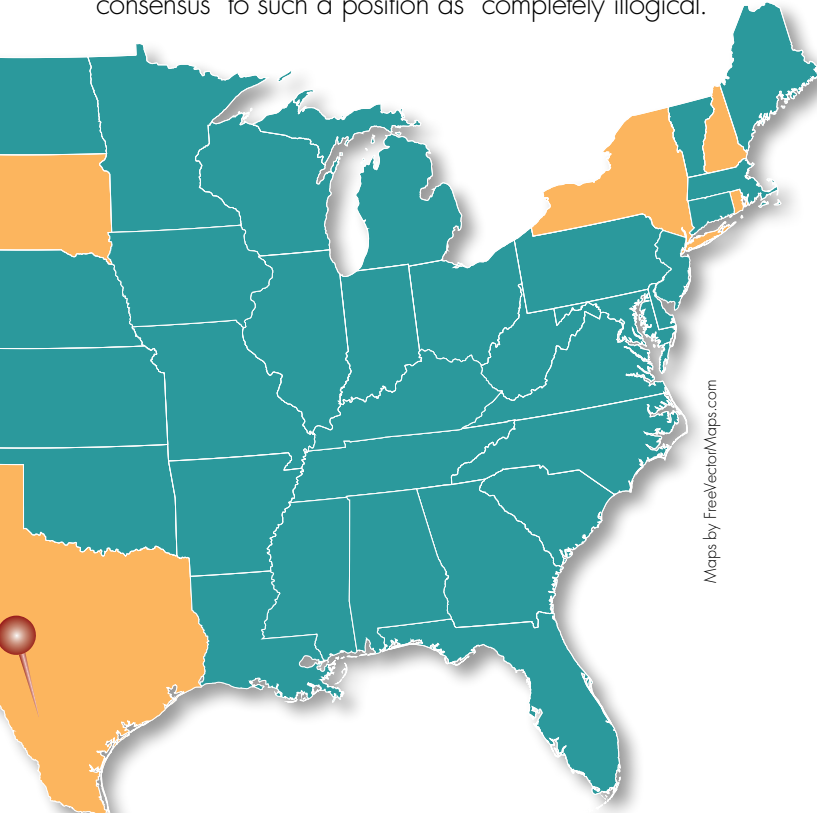
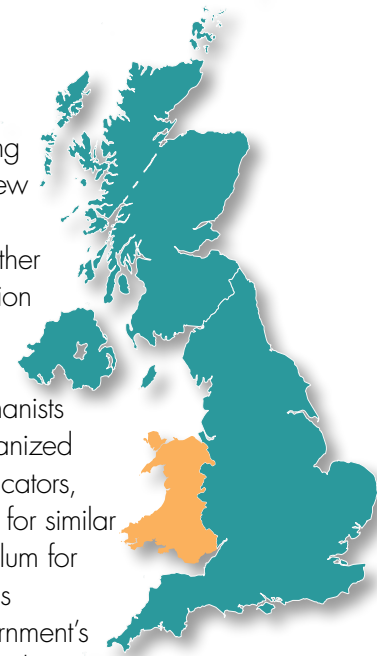
NEW ZEALAND

In January 2020, the New Zealand government announced that “Climate Change—Prepare Today, Live Well Tomorrow,” a tool including texts, videos, and guidance for teachers, would be available to all schools. Chris Hipkins, the Minister of Education, said, “It explains the role science plays in understanding climate change, aids understanding of both the response to it and its impacts—globally, nationally, and locally—and explores opportunities to contribute to reducing and adapting to its impact on everyday life.”



UNITED KINGDOM, WALES

Despite the advice of a group of the United Kingdom’s leading scientists and educators, the new national curriculum for Wales, released in January 2020, neither increases the amount of evolution in the curriculum nor explicitly prohibits the teaching of creationism, according to Humanists UK. Humanists UK, which organized the group of scientists and educators, previously lobbied successfully for similar revisions to the national curriculum for England. The director of Wales Humanists described the government’s ignoring the advice as “hugely disappointing.”



Maps by FreeVectorMaps.com

CANADA, ALBERTA

The report of a panel appointed to provide advice on K–12 curricula in Alberta included the recommendation that the social studies curriculum reflect “a balance of perspectives with respect to the importance of Alberta’s resource-rich economic base,” suggesting that the teaching of climate change would be affected as a result. Adriana LaGrange, the education minister, told the Canadian Press that “Climate change is real, but we do want that presented to our children in a balanced way.”





Brian Alters of Chapman University was honored by the Association of College and University

Biology Educators with the highest award the organization bestows. At its 63rd annual meeting, held at Syracuse University in October 2019, ACUBE named Alters an Honorary Lifetime Member “in recognition of and gratitude for many years of excellent service and extraordinary contributions to the teaching and learning of biology and to the public understanding of science.” A former president of NCSE’s board of directors, Alters was among the expert witnesses for the plaintiffs in the *Kitzmiller v. Dover* trial in 2005.

Prompted by spotting billboards with antievolution messages around his home in northern Ohio, **Ken Baker**, a retired professor of biology and



environmental studies at Heidelberg College, contributed a column to the *Fremont News Messenger* (November 4, 2019)

reporting on the thirteen-year-old billboard program run by Christian Aid Ministries. The 645-odd proselytizing billboards come in eighteen varieties, two of which promote creationism. “What interests me here isn’t so much the veracity of these statements as how they underscore the whopping chasm separating the creationist’s understanding of the world from that of the evolutionary biologist,” Baker wrote. “Professional biologists rely on a firm understanding of evolutionary processes as a tool in addressing their workaday research problems.” He ended his column with a mention of NCSE’s work to support evolution education across the country.



Victor H. Hutchison of the University of Oklahoma was awarded the Henry S. Fitch Award

for Excellence in Herpetology for 2019 by the American Society of Ichthyologists and Herpetologists. “The prize is awarded to an individual for long-term excellence in the study of amphibian and/or reptile biology, based principally on the quality of the awardee’s research; consideration is also given to educational and service impacts of the individual’s career.” Hutchison was also the subject of a seven-page profile in the society’s journal *Copeia* (2019; 107[2]: 358–364), which noted that he “is a vocal opponent of anti-science efforts in Oklahoma” and mentioned that he received NCSE’s Friend of Darwin award in 2008 for defending science education in Oklahoma.

WHAT WE’RE UP AGAINST

The Answer to Lack of Preparation is False Balance?

After NCSE’s deputy director Glenn Branch was quoted by the [Hechinger Report](#) as saying, “Lots of teachers feel they don’t have the content knowledge or pedagogical know-how to teach climate change effectively,” Bonner Cohen, a “climate issues expert” at the National Center for Public Policy Research—a conservative and climate-change-denying think tank—offered a *non sequitur* by way of response to the American Family Association’s OneNewsNow. Rather than recommending that teachers are equipped to teach climate change effec-



Bonner Cohen
National Center for Public Policy Research

tively, as NCSE consistently urges, Bonner instead suggested, “So we need to make sure that what is taught is a relatively balanced approach to scientific issues that are by nature complicated rather than sheer indoctrination.” He added that teachers “are under an enormous amount of pressure through teachers[’] organizations, through the publishers of textbooks, to indoctrinate students,” and urged that parents bring their concerns about climate change education to their local school authorities.

—GLENN BRANCH

SCIENCE IS A WAY OF KNOWING



“Science is a way of knowing” is the title of the [first lesson](#) in NCSE’s newly launched five-part teaching unit on the nature of science. It’s a fitting declaration in this time of continual misinformation and disinformation, particularly when it comes to COVID-19. In fact, the novel coronavirus plays a starring role in the nature of science unit: it’s an “anchoring phenomenon” around which each of the five lessons is built.

“We wanted something that is really relevant to students,” explains NCSE’s Director of Teacher Support Lin Andrews and a lead author of the unit. “When teachers went back in the fall, they had not been with their students since March to answer their questions about coronavirus. Their students returned with a lot of questions—about the virus and about science—and needed help figuring out the answers.”

Like NCSE’s [climate change lessons](#) and soon-to-come evolution lessons, the nature of science unit takes a misconception-based approach to teaching and learning. To combat misconceptions, students are given opportunities to examine evidence—for example, an online interactive that shows how face coverings prevent particle dispersion—to answer everyday questions like, Why wear a mask? This not only helps them counter the misconception they may be exposed to—“Masks don’t help prevent COVID-19”—but also equips them with the skills needed to analyze, assess, and, if necessary, debunk future misinformation.

To determine how best to construct the nature of science unit, Andrews worked closely with [NCSE’s teacher ambassadors](#)—master science teachers from around the country. Together, they determined which misconceptions are most prevalent among their students, and then divided them into five thematic groups. The teacher ambassadors then contributed activity ideas for each of the five themes. The unit is not meant to be comprehensive—there are untold numbers of high-quality science resources available to teachers, online and off—but rather targeted specifically at inoculating students against misconceptions.

The unit has also been designed to be ultraflexible. Though there is a COVID-19 “storyline” that runs through the five lessons, teachers who are not interested in covering that topic can follow an alternate path that is also compelling to students. Additionally, the lessons do not necessarily have to be taught sequentially. Each can stand alone and be used at times during the school year convenient for the needs of the teacher. Finally, bearing the current situation in mind, the teacher ambassadors designed the lessons with virtual schooling options.

The five lessons in the Nature of Science unit are:

- Lesson One: Science is a Way of Knowing
- Lesson Two: Science is a Never-Ending Process
- Lesson Three: Science is an Inquiry-Based Process

- Lesson Four: Science is About the Evidence
- Lesson Five: Science Makes You Strong!

For more on each lesson, check them out online at <https://ncse.ngo/supporting-teachers/classroom-resources>.

(As we went to press, lessons one and two were posted and the rest were imminent.)

Up next for Andrews and the teacher ambassadors: the task of field-testing and refining the nature of science lessons while refreshing the current set of climate change lessons to make them better fit the “anchoring phenomenon” paradigm. After that comes evolution. The lesson plans for both climate change and evolution will again focus on giving students many opportunities to use the tools of science to recognize, challenge, and debunk misconceptions, misinformation, and disinformation.

“This is a critical skill today—not just for kids, but for everyone,” Andrews says of the ability to find, assess, and analyze scientific information. “I’m excited to put these units in the hands of our teachers. It can’t happen soon enough!”

Paul Oh is NCSE’s Director of Communications. oh@ncse.ngo



GRANTS FUEL SCIENCE OUTREACH BY NCSE FELLOWS

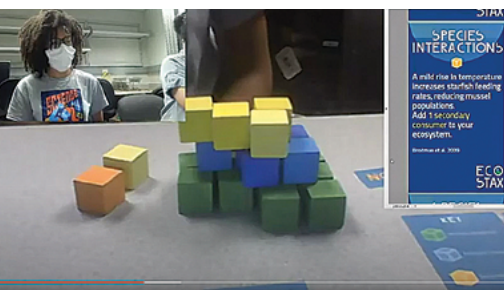
Creating effective moments in science outreach requires a lot of work behind the scenes.

That's why, as part of the [NCSE Graduate Student Outreach Fellowship](#), our fellows receive training in strategic planning, program evaluation and grant writing. While these components might not seem as important as practicing direct outreach skills, they are crucial for preparing the next generation of science communication leaders to create and evaluate outreach that is inclusive and responsive to the community needs.

Grant writing in particular is often an important part of academia, but students are usually given little, if any, formal training in that skill. So while many graduate students start the fellowship having written grants, they need help applying their skills in a new context. NCSE teaches our fellows to write outreach grants that answer four major questions:

1. What is the problem?
2. What's a solution to the problem?
3. How specifically will your work solve the problem?
4. How will you determine whether your solution is effective?

We also help the fellows develop their ability to search for appropriate grant opportunities and assess programmatic fit, and prepare them for pre-submission communication with program officers and foundations. After receiving training through in-class exercises, each fellow writes and submits a grant to fund his or her outreach efforts during their fellowship year and beyond.



Najev facilitates a livestream EcoStax activity

the NCSE activity [EcoStax](#) to help children in eastern Iowa understand systems thinking as it relates to climate change.

Our second cohort of fellows, all based at the University of Iowa, received grants this summer to further science outreach within the state. **Briante Najev**, an ecologist in the biology department, has been using

After COVID-19 made in-person outreach virtually impossible, she received a grant from the British Ecological Society to create online science engagement opportunities. During her livestream event on July 25, 2020, she was joined by many people—largely patrons of libraries in eastern Iowa—for an online EcoStax experience. During this time she also collected data for a research project about effective engagement strategies, which she will present at academic conferences later this year. Najev used additional grant dollars to develop dozens of EcoStax kits that local libraries can give to families that want to explore ecosystems further.

Rachel Larson, a geography doctoral student, received a \$3,500 grant from the Iowa Department of Natural Resources Conservation Education Program to develop a classroom game about human interactions with wildlife in urban areas. Larson studies human-wildlife interactions and wanted to help students understand the impact of policy and climate change science on humans and their backyard wildlife. As part of the fellowship, NCSE provides training in how science games can effectively help participants understand systems thinking; Larson was inspired to develop a game that showed all the conflicting priorities of urban wildlife management. In this game, which she likens to Frogger, players help animals safely navigate an urban environment, helping them find food and shelter and analyzing the different needs of different species. Her board game will be distributed by NCSE to both outreach partners and classrooms across the country.



Photo courtesy of Rachel Larson

NCSE is excited to be able to work with fellows who are interested in developing their science communication skills by crafting and evaluating interactive and engaging experiences.

Kate Carter is NCSE's Director of Community Science Education. carter@ncse.ngo



PLACE & TIME

Madrid 1995: A Sentence to Change the World



John Houghton (left), Bert Bolin, and the Madrid conference center

The Palacio Municipal de Congresos in Madrid is a typical convention center, a multi-story labyrinth of hallways and meeting rooms of every size, distinguished only by a spectacular mosaic by Joan Miró. Of many important meetings held here, the most epochal convened in November 1995.

The meeting's path was set in 1988 when climate scientists, worried about future global warming, began to call on the world's governments to consider restricting greenhouse gas emissions. The scientists admitted that a clear signal of warming might not emerge from the noise of daily weather until the start of the next century. But waiting to act would be costly.

Governments were not about to cramp their most powerful industries because a few obscure scientists were worried. For more solid advice, diplomats devised an Intergovernmental Panel on Climate Change (IPCC), a self-governing body composed of delegates appointed directly by each nation. Decisions would require consensus: any one delegate could veto anything. It looked like a design for inaction, and perhaps was meant to be.

In 1995 when hundreds of delegates assembled for three days of discussion in the huge hall of the Palacio de Congresos, their task was clear. On their desks was a tall stack of reports,

drafted by 400 scientists and reviewed by 500 more from 40 countries. Few people would ever read all that. What mattered was a brief "Summary for Policymakers." The delegates needed a final text that they could all formally approve.

The burden lay heavily on the scientist who chaired the discussions, John Houghton, a Welsh meteorologist. A devout evangelical Christian, Houghton was equally devoted to science, "the means by which I would be able to explore and describe God's creative work." Unfailingly polite but immovable in his principles, he labored to keep the discussions centered on the scientific evidence. If global warming was coming, the world needed to know it.

That was poison to the representatives of fossil fuel industries who had descended in a swarm upon the conference. Openly served by the delegations from Saudi Arabia and Kuwait, they pounced on any doubt that could be raised about the science or how to describe it. Yet the science was clear. Among other evidence, there was a regional pattern of rising temperatures which neatly matched the pattern that computer models had calculated as a "signature" of the greenhouse effect. Greenhouse warming was a fact. But how certain a fact?

Debate continued until the last hour of the last day ... and beyond, into the evening past the scheduled end. The key sentence was this: "The [??] evidence [??] that there is a [??] human influence on global climate." Was it the *weight* or the *preponderance* of evidence? Under Houghton's judicious guidance the conference eventually

bowed to the Saudis and accepted the weaker *balance* of evidence. Did that *indicate* or *demonstrate* a human influence? A more weaselly word was finally accepted, *suggests*. But was human influence *significant* or *identifiable* or, as the first draft had it, *appreciable*? As the hours dragged on, consensus seemed out of reach. The dinner break was cancelled and delegates grabbed sandwiches. The exhausted translators went home. Midnight came—the conference center would close in half an hour.

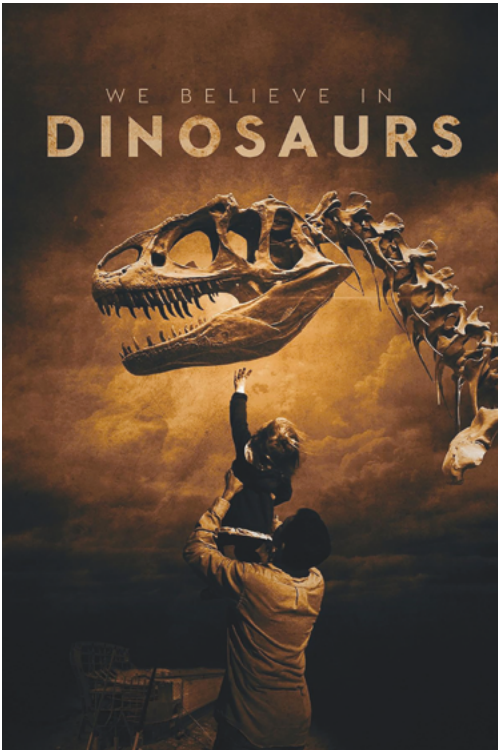
Bert Bolin, the IPCC's chair and elder statesman, had scarcely spoken. But he circulated through the crowd to hold intimate conversations with every faction. A pioneering Swedish meteorologist, Bolin had deep scientific savvy, but what mattered now were his exceptional diplomatic skills. Like Houghton he was self-effacing, soft-spoken, and universally respected. When the United Kingdom's delegate mentioned a subtle English word to Bolin, he spoke up to make one last proposal: "The balance of evidence suggests that there is a *discernible* human influence on global climate." Desperate and groggy, the delegates applauded vehemently. The Saudis did not dare rise to object. Consensus!

Some of the famished delegates went out for a meal. As they were eating one of them turned to his neighbor and remarked, "This sentence will change the world." The message was modest but unmistakable: humans must accept responsibility for altering their planet's climate.

Spencer Weart was Director of the Center for History of Physics at the American Institute of Physics from 1974 to 2009; he is the author of *The Discovery of Global Warming* (second edition, 2008) and maintains a website of the same name: <https://history.aip.org/climate/index.htm>. swear1@gmail.com



THE RNCSE REVIEW



We Believe in Dinosaurs

directors: **Clayton Brown and
Monica Long Ross**

studio: **137 Films**

reviewed by: **Jason Rosenhouse**

We Believe in Dinosaurs is an engaging, skillfully-made [documentary](#) about the opening of the Ark Encounter theme park in Williamstown, Kentucky, in 2016. The park was created by Answers in Genesis, the most prominent young-earth creationist (YEC) organization in the United States, as a sister attraction to its Creation Museum, which opened in Petersburg, Kentucky, in 2007. Visitors enter a massive, supposedly full-size, replica of Noah's Ark and are led through a labyrinth of displays touting a literal interpretation of the story of Noah from the book of Genesis.

Though the documentary has no narrator and no obvious bias, the filmmakers seem skeptical of the park's intellectual seriousness, whether viewed scientifically or theologically. The story is told by juxtaposing be-

hind-the-scenes footage of the park's design team with interviews of people critical of the project. The critics are represented mostly by Dan Phelps, President of the Kentucky Paleontological Society, and David MacMillan, a former young-earth creationist and charter member of the Creation Museum who later came to reject fundamentalist Christianity.

For viewers not accustomed to YEC argumentation, it can be jarring to see people who argue, with complete seriousness, that the Noah story is plausible. After all, the park's designers required a large team of engineers and builders, modern construction equipment, and years of work to build their replica. How was Noah supposed to accomplish it on his own? There is a scene in the film in which a creationist speaker empha-

sizes that it was merely thousands of animals, as opposed to millions, that were on board the Ark. This was meant to make the story seem more credible. The speaker was apparently untroubled by the image of eight people floating for a year in a windowless boat playing caretaker to thousands of animals. Can thoughtful people really find that reasonable?

There are numerous scenes of the artists and designers who worked on the park's exhibits. These are talented people who, it must be admitted, did excellent work. I found these scenes to be difficult to watch, since it made me sad to see such talent wasted in this way. More often, however, I felt anger toward the charlatans who masterminded the park and the supporters who cheered them on and provided the funds. In one scene, filmed at the opening of Ark Encounter, Answers in Genesis leader Ken Ham, speaking from a podium, says, "[People] haven't been taught genetics properly, they haven't been taught about speciation and natural selection correctly. We're going to correct that in here, and undo the brainwashing that's occurred ..." and at this point he was cut off by the enthusiastic applause of his audience. The people cheering this routinely boast of their single-minded devotion to an idiosyncratic interpretation of Genesis, and they have the gall to lecture others about being brainwashed?

What are we to make of the mother who, while browsing the exhibits with her young daughter, pauses before a gruesome display of the drowning unsaved and says, “And all these people who were still doing all this sin, and they didn’t believe, all got taken over by all this flooding water and destruction”? In other words, better be good, kid, or God might do this to you. There is a poignant aspect to all of this. The film includes interviews with various local officials from Williamstown, a once thriving community that has fallen on hard economic times. They welcomed Ark Encounter with open arms, seeing it as an opportunity to revitalize their downtown. You can readily understand their perspective. Is scientific accuracy really the most pressing concern when your town is dying? A year after the park’s opening, however, these same officials were forced to concede that it did nothing to revitalize the town. It gave me no satisfaction to see that, despite my conviction that the Creation Museum and Ark Encounter are national embarrassments.

Viewers who pay close attention to the issues surrounding evolution and creationism will probably learn little from this film they did not already know, but there is value nonetheless in seeing the principals express themselves in their own words. I might have preferred a bit more time allocated to scholarly critics of the park, both scientific and religious, but other

“The speaker was apparently untroubled by the image of eight people floating for a year in a windowless boat playing caretaker to thousands of animals.”

viewers might have found that to be too on the nose. After all, people sympathetic to creationism often revel in the disdain of societal elites. Perhaps the sheer spectacle of YECs bluntly expressing their eccentric beliefs is sufficient to make the point, without some Ph.D. explicitly calling attention to their fallacious, and frequently just silly, arguments and rationales.

In the end, this is a solid and enjoyable film that never drags. It is well worth the ninety minutes or so it takes to watch it.

Jason Rosenhouse is a professor of mathematics at James Madison University. He is the author of *Among the Creationists: Dispatches from the Anti-Evolutionist Front Line* (Oxford University Press, 2012). rosenhjd@jmu.edu



CHANGE SERVICE REQUESTED

Kitzmiller v. Dover: 15-Year Anniversary

Together, we kept “intelligent design” out of the classroom.



Photo by Wesley Ebberry

Help us keep up the fight

[NCSE.ngo/donate](https://www.ncse.ngo/donate)