



GUEST COMMENTARY

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All Aboard the Evolution Bus!

Evolution is the latest stop on the itinerary of the Magic School Bus. Speaking to *PBS NewsHour* about her new book *The Magic School Bus Explores Human Evolution*, Joanna Cole affirmed the centrality of evolution in biology, borrowing Theodosius Dobzhansky's famous dictum "Nothing in biology makes sense except in the light of evolution." As Ms. Frizzle would have cheered, "Excellent observation, Joanna!"

Ms. Frizzle, of course, is the enthusiastic if eccentric elementary school science teacher who is the star of the Magic School Bus series, taking her students – even the timorous Arnold Perlstein – on magical field trips to increase their understanding and appreciation of topics throughout science. Whether Ms. Frizzle is a member of NABT or not is unclear, but she certainly is on board with NABT's important, and recently updated, statement on the teaching of evolution.

Why is NABT's statement on the teaching of evolution so important? In the first place, the statement demonstrates that NABT is aligned with the consensus of the scientific community – a consensus that is both genuine and substantial. According to a 2014 survey conducted by the Pew Research Center, for example, 98% of scientists – and a whopping 99% of active research scientists – accept evolution.

Reflecting the scientific consensus, the nation's leading scientific organizations, including the American Association for the Advancement of Science and the National Academy of Sciences, have issued statements affirming the scientific credibility of evolution (collected in *Voices for Evolution*, a publication of the National Center for Science Education). It is obviously in order for NABT to follow their lead.

So NABT's statement is important as a signal that NABT – the professional society that represents the interests, establishes the standards, and expresses the values of life science educators in the United States – is wholeheartedly committed to the central role of evolution in biology education, as part of its mission to provide the best possible biology and life science education for all students.

Such a strong signal is vital to teachers who are embroiled in a controversy over evolution education – a reminder that NABT is ready, willing, and able to support teachers under pressure to compromise their teaching of evolution. Such pressure is sadly common: over one in five public high school biology teachers reported experiencing it, according to a national survey conducted in 2007 by Michael B. Berkman and Eric Plutzer.

NABT was not founded until 1938, so it could not aid John T. Scopes in 1925. But it provided valuable support to such teachers as Susan Epperson, who successfully challenged Arkansas's ban on the teaching of evolution; Donald W. Aguillard, who successfully opposed Louisiana's law requiring the teaching of creation science; and the teachers in Dover, Pennsylvania, who successfully resisted a local policy requiring the teaching of intelligent design.

Teachers under pressure to compromise their teaching of evolution are not the only audience addressed by NABT's statement. Analyzing the

results from the same survey, Berkman and Plutzer distinguished three groups of high school biology teachers by their responses to questions about how they present evolution (as well as supposed alternatives to it) in their classrooms. NABT's statement speaks to each group.

To the 13% of teachers who present creationist perspectives favorably, NABT's statement provides a firm rebuke. The statement unequivocally rejects creation science, scientific creationism, and intelligent design as outside the scope of science and unsuitable for inclusion in the science curriculum, warning against "confusing nonscientific with scientific explanations in science instruction."

More numerous but of equal concern are the 60% of teachers who downplay evolution in the classroom. Wanting to avoid controversy and often not confident of their ability to teach evolution effectively, they are the Arnold Perlstains of their profession. Berkman and Plutzer identified three major ways in which these teachers downplay evolution, and again NABT's statement offers appropriate correction and guidance.

First, addressing those teachers who neglect the history of life by concentrating on microevolutionary patterns and processes to the exclusion of their macroevolutionary counterparts, NABT's statement reminds them of what ought to be a big idea in any biology classroom – that all living things share a common ancestor – and says, rightly, that multiple scientific disciplines provide extensive empirical support for it.

Second, addressing those teachers who imply that teaching evolution is a necessary evil, something to understand only because it is required by the state science standards, NABT's statement reminds them that evolution is foundational to biology, and as such should be a major theme throughout the life science curriculum and prominently included in standards, curricula, textbooks, and instructional materials generally.

Third, addressing those teachers who misrepresent evolution as scientifically controversial – often with the aid of such catchphrases as "teaching the controversy" or "critical analysis" or "studying the full range of scientific views" (which often appear also in legislation intended to undermine the teaching of evolution) – NABT's statement reminds them that in the scientific community, evolution is "neither 'controversial,' nor in need of 'critical analysis.'"

The remaining 28% of teachers who present evolution in accordance with the recommendations of the scientific and science education communities deserve the gratitude of anyone who wants evolution to be taught properly. The courage of these teachers is reinforced, justified, and inspired by NABT's statement on the teaching of evolution. Reading the latest update of it, they might cheer, with Ms. Frizzle, "I couldn't have said it better myself!"

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DOI: <https://doi.org/10.1525/abt.2020.82.2.69>