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Should We Teach Scientific Criticisms of Neo-Darwinism? Many Authorities Say YES!

1. **U.S. Congress:** "[A] quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. **Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help students to understand the full range of scientific views that exist**…"[1]

2. **The U.S. Department of Education:** "The department, of course, embraces the general principles – reflected in the Senate Resolution – of academic freedom and inquiry into scientific views and theories."[2]

3. **Various States and School Districts have successfully implemented such a policy:**

Texas: Students must "analyze, evaluate and critique scientific explanations … including examining all sides of scientific evidence of those scientific explanations so as to encourage critical thinking," and also "analyze and evaluate" core evolutionary claims, including "common ancestry," "natural selection," "mutation," "sudden appearance," the origin of the "complexity of the cell," and the formation of "long complex molecules having information such as the DNA molecule for self-replicating life."

Minnesota: "The student will be able to explain how scientific and technological innovations as well as new evidence can challenge portions of or entire accepted theories and models including... [the] theory of evolution...."[3]

New Mexico: Students will "critically analyze the data and observations supporting the conclusion that the species living on Earth today are related by descent from the ancestral one-celled organisms."[4]

Alabama: "[E]volution by natural selection is a controversial theory. ... Instructional material associated with controversy should be approached with an open mind, studied carefully, and critically considered."[5]

Pennsylvania: **"**Critically evaluate the status of existing theories (e.g., germ theory of disease, wave theory of light, classification of subatomic particles, theory of evolution, epidemiology of aids)."[6]

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[1] Conference Report to No Child Left Behind Act; House Committee of Conference, *Report to Accompany H.R. 1*, 107th Cong. 1st sess., 78 (2001) H. Rept. 334, 78 (emphasis added).
[2] Letter from Gene Hickok, Acting Deputy Secretary, U.S. Dept. of Education, March 8, 2004. The "Senate Resolution" formed the basis for the Congressional statement cited above.
[3] Minnesota Academic Standards, History and Nature of Science, Grades 9-12, *available at* tis.mpls.k12.mn.us/Science.html
[4] New Mexico Science Content Standards, Benchmarks and Performance Standards, Standard II (Life Science) (Biological Evolution) (9), *available at* http://sde.state.nm.us/MathScience/standards/science_standards.pdf
[5] Alabama State Board of Education, Resolution (Nov. 8, 2001), *available at* http://www.alsde.edu/html/boe_resolutions2.asp?id=309 This policy is stated on a sticker placed in textbooks.
[6] Pennsylvania, Academic Standards for Science and Technology, Standard 3.2.12., *available at* http://www.pacode.com/secure/data/022/chapter4/chap4toc.html

Missouri: "Identify and analyze current theories that are being questioned, and compare them to new theories that have emerged to challenge older ones (e.g., Theory of Evolution…)."[7]

South Carolina: "Summarize ways that scientists use data from a variety of sources to investigate and critically analyze aspects of evolutionary theory."[8]

Mississippi: "No local school board, school superintendent or school principal shall prohibit a public school classroom teacher from discussing and answering questions from individual students on the origin of life."[9]

Grantsburg, Wisconsin: "Students shall be able to explain the scientific strengths and weaknesses of evolutionary theory. This policy does not call for the teaching of Creationism or Intelligent Design."

Ouachita Parish, Louisiana: "[T]he teaching of some scientific subjects, such as biological evolution, the chemical origins of life, global warming, and human cloning, can cause controversy … [T]eachers shall be permitted to help students understand, analyze, critique, and review in an objective manner the scientific strengths and weaknesses of existing scientific theories pertinent to the course being taught."[10]

Louisiana Science Education Act: Louisiana schools shall "create and foster an environment...that promotes critical thinking skills, logical analysis, and open and objective discussion of scientific theories being studied including, but not limited to, evolution, the origins of life, global warming, and human cloning."[11]

Tennessee Academic Freedom Law: Students may "understand, analyze, critique, and review in an objective manner the scientific strengths and scientific weaknesses of existing scientific theories covered in the course being taught" such as topics "including, but not limited to, biological evolution, the chemical origins of life, global warming, and human cloning."[12]

4. **The United States Supreme Court has sanctioned such a policy:** "We do not imply that a legislature could never require that scientific critiques of prevailing scientific theories be taught."[13]

5. **Science Education Theorists:** A *Science* paper reflected the consensus by observing students learn science best when they "discriminate between evidence that ***supports*** (inclusive) ***or does not support*** (exclusive)" a concept.[14]

6. **Charles Darwin himself would have supported such a policy:** "A fair result can be obtained only by fully stating and balancing the facts and arguments on both sides of each question."[15]

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[7] Missouri Science Standards, at http://www.dese.mo.gov/divimprove/curriculum/GLE/SciGLE_FINAL-4.2005.pdf
[8] South Carolina Biology Science Standards, indicator B-5.6 available at: http://ed.sc.gov/agency/offices/cso/standards/science/documents/ScienceStandardsNov182005_001.doc
[9] http://billstatus.ls.state.ms.us/documents/2006/pdf/HB/0200-0299/HB0214SG.pdf
[10] http://www.opsb.net/downloads/forms/Ouachita_Parish_Science_Curriculum_Policy.pdf
[11] See Louisiana Science Education Act 473, at http://www.legis.state.la.us/billdata/streamdocument.asp?did=503483
[12] http://www.capitol.tn.gov/Bills/107/Amend/SA0901.pdf
[13] *Edwards v. Aguillard*, 482 U.S. 578, 593 (1987).
[14] See Jonathan Osborne, "Arguing to Learn in Science: The Role of Collaborative, Critical Discourse," *Science*, Vol. 328 (5977):463-466 (April 23, 2010) (emphases added).
[15] Charles Darwin, *Origin of Species* (1859).