

**IN THE UNITED STATES COURT OF APPEALS
FOR THE ELEVENTH CIRCUIT**

**NO. 05-10341-I
NO. 05-11725-II**

**COBB COUNTY SCHOOL DISTRICT,
COBB COUNTY BOARD OF EDUCATION,
JOSEPH REDDEN, SUPERINTENDENT,**

Appellants,

v.

**JEFFREY MICHAEL SELMAN, KATHLEEN CHAPMAN,
JEFF SILVER, PAUL MASON, and TERRY JACKSON,**

Appellees.

**On Appeal from the United States District Court
for the Northern District of Georgia, Atlanta Division**

**BRIEF OF *AMICI CURIAE* 56 PROFESSIONAL SCIENTIFIC
ORGANIZATIONS IN SUPPORT OF APPELLEES AND AFFIRMANCE**

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IN THE UNITED STATES COURT OF APPEALS
FOR THE ELEVENTH CIRCUIT

COBB COUNTY SCHOOL	)	
DISTRICT, et al.,	)	
	)	
Appellants,	)	
	)	CASE NO. 05-10341-I
v.	)	
	)	NO. 05-11725-II
JEFFREY MICHAEL SELMAN,	)	
et al.	)	
	)	
Appellees.	)	

**CORPORATE DISCLOSURE STATEMENT
AND CERTIFICATE OF INTERESTED PERSONS**

Corporate Disclosure Statement

Proposed *amici* are the Academy of Science of St. Louis, American Anthropological Association, American Association for the Advancement of Science, American Association of Anatomists, American Association of Physics Teachers, American Association of Physical Anthropologists, American Astronomical Society, American Crystallographic Association, American Geological Institute, American Geological Union, American Institute of Biological Sciences, American Institute of Chemists, American Institute of Physics, American Physical Society, American Physiological Society, American Society for Biochemistry and Molecular Biology, American Society for Bone and Mineral Research, American Society for Investigative Pathology, American Society of

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Agronomy, American Society of Human Genetics, American Society of Ichthyologists and Herpetologists, American Society of Plant Biologists, American Society of Plant Taxonomists, Association of American Geographers, Association of Anatomy, Cell Biology and Neurobiology Chairs, Association of College & University Biology Educators, Association of Southeastern Biologists, Association for Women in Science, The Biophysical Society, Botanical Society of America, Clay Minerals Society, Crop Science Society of America, Federation of American Societies for Experimental Biology, Foundation for Neuroscience and Society, Geological Society of America, Georgia Academy of Science, Indiana Academy of Science, Iowa Academy of Science, The Kentucky Academy of Science, National Academy of Sciences, Nebraska Academy of Sciences, New Mexico Academy of Science, New York Academy of Sciences, Ohio Academy of Science, Paleontological Society, Phi Sigma: The Biological Honors Society, Phycological Society of America, Sigma Xi -- The Scientific Research Society, Society of Economic Geologists, Society for Industrial and Applied Mathematics, Society for Developmental Biology, Society for Integrative and Comparative Biology, Society for Sedimentary Geology, Society for the Study of Evolution, Society for Systematic Botanists, Soil Science Society of America.

All of the 56 professional scientific organizations on whose behalf this brief is submitted are non-profit educational or research organizations. None of them

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has a parent corporation and no publicly-held corporation owns 10% or more of their stock.

Certificate of Interested Persons

Counsel for *Amici Curiae* 56 professional scientific organizations certify that pursuant to FRAP 26.1, the following parties, firms, partnerships, counsel, and judges have, or may have, an interest in the outcome of this case:

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Trial Judge

Honorable Clarence Cooper

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Academy of Science of St. Louis

American Anthropological Association

American Association for the Advancement of Science

American Association of Anatomists

American Association of Physics Teachers

American Association of Physical Anthropologists

American Astronomical Society

American Crystallographic Association

American Geological Institute

American Geological Union

American Institute of Biological Sciences

American Institute of Chemists

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American Institute of Physics

American Physical Society

American Physiological Society

American Society for Biochemistry and Molecular Biology

American Society for Bone and Mineral Research

American Society for Investigative Pathology

American Society of Agronomy

American Society of Human Genetics

American Society of Ichthyologists and Herpetologists

American Society of Plant Biologists

American Society of Plant Taxonomists

Association of American Geographers

Association of Anatomy, Cell Biology and Neurobiology
Chairs

Association of College & University Biology Educators

Association of Southeastern Biologists

Association for Women in Science

The Biophysical Society

Botanical Society of America

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Clay Minerals Society

Crop Science Society of America

Federation of American Societies for Experimental Biology

Foundation for Neuroscience and Society

Geological Society of America

Georgia Academy of Science

Indiana Academy of Science

Iowa Academy of Science

The Kentucky Academy of Science

National Academy of Sciences

Nebraska Academy of Sciences

New Mexico Academy of Science

New York Academy of Sciences

Ohio Academy of Science

Paleontological Society

Phi Sigma: The Biological Honors Society

Phycological Society of America

Sigma Xi -- The Scientific Research Society

Society of Economic Geologists

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Society for Industrial and Applied Mathematics

Society for Developmental Biology

Society for Integrative and Comparative Biology

Society for Sedimentary Geology

Society for the Study of Evolution

Society for Systematic Biologists

Soil Science Society of America

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Voices for Evolution (M. Matsumura, Nat'l Ctr. for Sci. Educ., ed., rev. ed. 2004).

Nat'l Acad. of Sciences, *Science and Creationism: A View from the National Academy of Sciences* (2d ed. 1999).

STATEMENT OF INTEREST OF THE PROFESSIONAL SCIENTIFIC ORGANIZATIONS

The *amici* are scientific organizations whose members are current and retired professional scientists. They are seriously concerned about the low level of science literacy in the United States and recognize that public school science education is a major way through which the public gains basic knowledge of science.

When the nature and content of science are erroneously presented in the public schools, the position of science in society is negatively affected, which directly affects the interests of scientists. The technological innovations that drive our economy and provide for our national security are dependent on sound scientific research. So too are the breakthroughs that will provide for the improved health of our population, for a dependable food supply, and for increasingly needed new energy sources. At no point in our nation's history has American leadership in science, technology, and medicine been more important. As professional scientists, the *amici* have a direct stake in sound science education.

AMICI PROFESSIONAL SCIENCE ORGANIZATIONS

Academy of Science of St. Louis, American Anthropological Association, American Association for the Advancement of Science, American Association of Anatomists, American Association of Physics Teachers, American Association of Physical Anthropologists, American Astronomical Society, American

Crystallographic Association, American Geological Institute, American Geological Union, American Institute of Biological Sciences, American Institute of Chemists, American Institute of Physics, American Physical Society, American Physiological Society, American Society for Biochemistry and Molecular Biology, American Society for Bone and Mineral Research, American Society for Investigative Pathology, American Society of Agronomy, American Society of Human Genetics, American Society of Ichthyologists and Herpetologists, American Society of Plant Biologists, American Society of Plant Taxonomists, Association of American Geographers, Association of Anatomy, Cell Biology and Neurobiology Chairs, Association of College & University Biology Educators, Association of Southeastern Biologists, Association for Women in Science, The Biophysical Society, Botanical Society of America, Clay Minerals Society, Crop Science Society of America, Federation of American Societies for Experimental Biology, Foundation for Neuroscience and Society, Geological Society of America, Georgia Academy of Science, Indiana Academy of Science, Iowa Academy of Science, The Kentucky Academy of Science, National Academy of Sciences, Nebraska Academy of Sciences, New Mexico Academy of Science, New York Academy of Sciences, Ohio Academy of Science, Paleontological Society, Phi Sigma: The Biological Honors Society, Phycological Society of America, Sigma Xi -- The Scientific Research Society, Society of Economic Geologists, Society for Industrial

and Applied Mathematics, Society for Developmental Biology, Society for Integrative and Comparative Biology, Society for Sedimentary Geology, Society for the Study of Evolution, Society for Systematic Biologists, and Soil Science Society of America.

STATEMENT OF THE ISSUE

Whether there is any pedagogical or scientific merit to the Cobb County School District's requirement that biology textbooks carry a disclaimer that singles out evolution as a theory.

ARGUMENT

Amici professional scientific organizations submit this brief for the limited purpose of expressing the view of the scientific community regarding the status of evolution as well-established science. The scientific community does not qualify evolution, or any other scientific theory, as “theory not fact”; it is, therefore, unnecessary and misleading to do so in the public schools.

I. THE DISCLAIMER MISUSES THE SCIENTIFIC TERMS “THEORY” AND “FACT”

In 2002, the Cobb County Board of Education required a sticker (hereafter, “the disclaimer”) to be placed in biology textbooks that read:

This textbook contains material on evolution. Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully and critically considered.

In the view of the scientific community, which the *amici* represent, the disclaimer employs the terms “theory” and “fact” in a manner both incorrect and misleading.

First, the phrasing of the disclaimer implies that a theory is a speculative or unsubstantiated proposition. This is fundamentally incorrect. In codified bodies of scientific knowledge such as textbooks, the word “theory” is reserved for our most well-substantiated and comprehensive explanations. The National Academy of Sciences, an organization of leading scientists in every field which advises the administration and Congress on scientific affairs, defines the synonym for theory as “explanation”:

In science, a well-substantiated explanation of some aspect of the natural world that can incorporate facts, laws, inferences, and tested hypotheses. Nat’l Acad. of Sciences., *Science and Creationism: A View from the National Academy of Sciences*, 2 (2d ed. 1999).

This definition also makes it clear that scientific theories “out-rank” facts by subsuming facts and laws within them. Well-known scientific theories include the atomic theory, the general theory of relativity, the theory of gravitation, the germ theory of disease, and the gene theory of heredity.

Even well-established scientific theories may be, and usually are, incomplete. Atomic theory, for example, expresses the general understanding that matter is composed of atoms. It does not mean that physicists fully understand everything about atoms; there are “gaps” in our knowledge of atomic theory.

Nonetheless, no reputable scientist doubts the basic proposition that matter is made of atoms or that atomic theory is a powerful framework for understanding natural phenomena.

Not only does the disclaimer use “theory” incorrectly, it also employs the word “fact” in a misleading way. In a non-scientific context, the word “fact” implies certainty, finality, and immutability; facts are permanent and unproblematic. In science, however, everything – including what we take to be facts – is in principle revisable in the light of more accurate instrumentation, further evidence, or changes in theory that cause us to look differently at phenomena.¹ By speciously opposing “theory” and “fact,” the disclaimer misleads its reader about the scientific use of those terms, and does so in such a way as to deprecate evolution.

Scientists do not doubt the basic proposition that living things share common ancestry. By using the terms “fact” and “theory” wrongly and misleadingly, the disclaimer serves to propagate an incorrect view of science and of evolution. Certainly, there is no valid pedagogical or scientific reason for using scientific terms incorrectly and thereby thwarting the purpose of science education.

¹“Fact: In science, an observation that has been repeatedly confirmed and for all practical purposes is accepted as ‘true’. Truth in science, however, is never final, and what is accepted as a fact today may be modified or even discarded tomorrow.” Nat’l Acad. of Sciences., *supra*, at 2.

II. THE DISCLAIMER INCORRECTLY DEFINES EVOLUTION

In its broadest sense, evolution is the idea that the universe has had a history, that astronomical, geological, biological and anthropological phenomena have changed through time, although different sciences may invoke different underlying mechanisms in their explanations. Biological evolution is a subset of this larger idea: it holds that living things have descended with modification from common ancestors. Biological evolution incorporates the idea that species are genealogically related: common ancestry is the key to understanding biological evolution.²

Evidence for common ancestry comes from many different scientific disciplines, including comparative anatomy, developmental biology, genetics, biogeography, biochemistry, and paleontology. Evolutionary biology includes the study of the patterns of evolution – how the tree of life has branched through time – and the various processes that affect or bring about evolution.

Thus, the Cobb County disclaimer does not use the term “evolution” correctly when it defines evolution as “regarding the origin of living things.” That definition is either too narrow or simply mistaken. Evolution in the broad sense is

² “Biological evolution concerns changes in living things during the history of life on Earth. It explains that living things share common ancestors. Over time, biological processes such as natural selection give rise to new species. Darwin called this process ‘descent with modification,’ which remains a good definition of biological evolution today.” Nat’l Acad. of Sciences, *supra*, at 27.

a complex topic studied by a number of disparate scientific disciplines and is not limited to “the origin of living things.” If the disclaimer means to refer only to biological evolution, as seems likely by its presence only in biology textbooks, it makes another error -- by using the phrase “origin of living things,” the disclaimer conflates the question of the evolution of living things with the very different question of the origin of life.

III. THE DISCLAIMER ERRONEOUSLY IMPLIES THAT BIOLOGICAL EVOLUTION IS NOT WELL-ESTABLISHED SCIENCE

Because it selects only evolution as a subject to be “critically considered,” the disclaimer implies that evolution is in special need of critical consideration. This is incorrect. Evolution is a well-established scientific theory with empirical validation and explanatory force. Not only is biological evolution the only scientific explanation for the presence and diversity of living things, the evidence for it is overwhelming. The National Academy of Sciences has written:

The concept of biological evolution is one of the most important ideas ever generated by the application of scientific methods to the natural world. The evolution of all the organisms that live on Earth today from ancestors that lived in the past is at the core of genetics, biochemistry, neurobiology, physiology, ecology, and other biological disciplines. It helps to explain the emergence of new infectious diseases, the development of antibiotic resistance in bacteria, the agricultural relationships among wild and domestic plants and animals, the composition of Earth's atmosphere, the molecular machinery of the cell, the similarities between human beings and other primates, and countless other features of the biological and physical world. Nat'l Acad. of Sciences, *supra*, at viii.

Because of its importance in science, evolution is taught matter-of-factly, without qualification or compromise, in secular universities and in prestigious religiously-affiliated universities such as Brigham Young, Baylor, and Notre Dame. The view of the scientific community is that evolution should not be singled out for special qualification and should be taught matter-of-factly at the secondary level, without qualification.

Opponents of evolution typically claim that evolution is weak or poorly-supported science, citing debates over the detailed pattern of life’s history and the role and interactions of various mechanisms of evolution. In reality, scientific debates about the details of the patterns and processes of evolution confirm the overwhelming consensus among scientists that living things have, indeed, evolved.³

By emphasizing that evolution – but no other scientific theory – is “a theory, not a fact,” the Cobb County school district disclaimer draws a distinction that the

³The Brief of *Amici Curiae* Biologists from the Discovery Institute incorrectly claims that a valid scientific debate is “raging” over whether evolution occurred. On the contrary, debate occurs over the *details* of evolution, not over *whether* evolution occurs. (D.I. Br. at 9). Typical is a statement from the American Institute of Biological Sciences: “As a community, biologists agree that evolution occurred and that the forces driving the evolutionary process are still active today. This consensus is based on more than a century of scientific data gathering and analysis.” *Voices for Evolution*, 33 (M. Matsumura, Nat’l Ctr. for Sci. Educ., ed., rev. ed. 2004).

scientific community does not make. The implication of the disclaimer is that evolution, among all other scientific principles, is particularly weak, controversial, or unsubstantiated. This is simply wrong.⁴

**CONCLUSION: DISCLAIMING EVOLUTION SERVES NO VALID
SCIENTIFIC OR PEDAGOGICAL PURPOSE**

The Cobb County disclaimer displays a serious lack of understanding of the nature of science and of biological evolution. By using the terms “fact”, “theory,” and “evolution” wrongly and misleadingly, the disclaimer serves to propagate an incorrect view of the status of scientific theories in general and of evolution in particular. No scientific or educational purpose is served by treating evolution differently from other theories. Rather, the disclaimer gives scientifically unwarranted support to religious opponents of evolution.

⁴ See e.g., *Voices for Evolution, supra* (reporting statements of scientific organizations, such as the Association of Southeastern Biologists: “[We strongly oppose attempts to undermine or compromise the teaching of evolution, whether by eliminating the word ‘evolution’ from state science standards, requiring textbook disclaimers that misleadingly describe evolution as ‘merely’ a theory, or by encouraging scientifically unwarranted criticism of evolution under the guise of ‘analysis,’ ‘objectivity,’ ‘balance,’ or ‘teaching the controversy.’ Such tactics are clearly intended to leave the false impression that evolution is scientifically precarious and will thus deprive students of a sound scientific education.”).

Given the great importance of evolution as a fundamental, unifying, explanatory theory and its well-established place in science education, there can be no valid pedagogical or scientific reason to disclaim or qualify its validity in public school science textbooks. For all of the above reasons, the *amici* professional scientific organizations urge the court to uphold the District Court's decision.

Dated: June 9, 2005

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CERTIFICATE OF COMPLIANCE

I certify that this brief complies with the type-volume limitation set forth in FRAP 32(a)(7)(B) because this brief contains 1,756 words.

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CERTIFICATE OF SERVICE

This is to certify that I have this date caused a true and correct copy of the **Brief of *Amici Curiae* of 56 Professional Scientific Organizations in Support of Appellees** foregoing to be served upon the following counsel of record by causing same to be deposited in the United States mail in an envelope with adequate postage affixed thereto addressed as follows:

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