

1 Ayesha N. Khan  
Richard B. Katskee  
2 Sara J. Rose  
(motions for admission *pro hac vice* pending)  
3 Heather L. Weaver (motion for admission to the Bar of this court pending)  
AMERICANS UNITED FOR SEPARATION OF  
4 CHURCH AND STATE  
518 C St., NE  
5 Washington, DC 20002  
Tel: (202) 466-3234  
6 Fax: (202) 466-2587  
*khan@au.org / katskee@au.org / rose@au.org / weaver@au.org*

7  
8 Maurice A. Leiter (Bar No. 123732)  
John Danos (Bar No. 210964)  
ARNOLD & PORTER LLP  
9 777 S. Figueroa St., 44th Floor  
Los Angeles, CA 90017  
10 Tel: (213) 243-4000  
Fax: (213) 243-4199  
11 *Maury\_Leiter@aporter.com / John\_Danos@aporter.com*

12 Attorneys for Plaintiffs  
13 HURST et al.

14 **UNITED STATES DISTRICT COURT**  
**EASTERN DISTRICT OF CALIFORNIA**

15 KENNETH HURST, JOAN BALCOME, ) NO. \_\_\_\_\_  
16 KIRK ROGER TINGBLAD, PHILIP JONES- )  
THOMAS, BARRY S. GOLDBERG, SOPHIE )  
17 GOLDBERG, JEANNIE PARENT, KEN and ) **DECLARATION OF EUGENIE C. SCOTT**  
JODY VALMASSY, and ANN and RICHARD ) **IN SUPPORT OF PLAINTIFFS' MOTION**  
18 HOWARD, ) **FOR TEMPORARY RESTRAINING**  
 ) **ORDER AND, IF NECESSARY,**  
19 *Plaintiffs,* ) **PRELIMINARY INJUNCTION**  
 )  
20 v. ) DATE:  
 ) TIME:  
21 STEVE NEWMAN, individually and in his ) COURT:  
official capacity as a member of the El Tejon )  
22 Unified School District Board of Trustees; )  
PAULA REGAN, individually and in her )  
23 official capacity as a member of the El Tejon )  
Unified School District Board of Trustees; )  
24 STACEY GUSTAFSON, individually and in )  
her official capacity as a member of the El )  
25 Tejon Unified School District Board of )  
Trustees; KITTY JO NELSON, individually )  
26 and in her official capacity as a member of the )  
El Tejon Unified School District Board of )  
27 Trustees; PHYLLIS THROCKMORTON, )  
individually and in her official capacity as a )  
28 member of the El Tejon Unified School District )  
Board of Trustees; JOHN WIGHT, individually )

1 and in his official capacity as superintendent of )  
the El Tejon Unified School District; DAN )  
2 PENNER, individually and in his official )  
capacity as principal of Frazier Mountain High )  
3 School; and SHARON LEMBURG, individu- )  
ally and in her official capacity as a teacher at )  
4 Frazier Mountain High School, )  
)  
)

5 *Defendants.* )  
)  
)

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10 I, Eugenie C. Scott, declare as follows in support of Plaintiffs' Motion for Temporary  
11 Restraining Order:  
12

13 **Qualifications**

- 14 1. My name is Eugenie C. Scott.  
15 2. My curriculum vitae is attached to this Declaration as Attachment A.  
16 3. I have a Ph.D. in physical anthropology from the University of Missouri and  
17 honorary doctorates (D.Sc). from McGill University and Ohio State University.  
18 4. Physical anthropology is the study of the biological aspects of *Homo sapiens*,  
19 including their evolution, adaptation, and distribution.  
20 5. I am the Executive Director of the National Center for Science Education (NCSE)  
21 in Oakland, California. NCSE is a nonprofit membership organization of scientists and others that  
22 advocates the objective teaching of the scientific theory of evolution in the public schools. NCSE  
23 is affiliated with the American Association for the Advancement of Science.  
24 6. Before becoming NCSE's executive director in late 1986, I taught science at the  
25 university level at the University of Colorado and at the University of Kentucky.  
26 7. Among other academic work, I have published articles about the  
27 creationism/evolution controversy in the scholarly literature, and I have been involved with  
28 community controversies involving the introduction of creationism into the classroom.  
8. I have taught human and non-human evolution at the university level.

1           9.       Since becoming executive director of NCSE, I have continued to publish scholarly  
2 work (available upon request) in journals such as *Science*, *The Quarterly Review of Biology*,  
3 *Bioscience*, *American Journal of Physical Anthropology*, *Nature*, and elsewhere.

4           10.      I am recognized by scientists and other scholars as an expert on the subject of the  
5 creationism/evolution controversy and have received recognition for my work in this area from  
6 several scientific and educational organizations and institutions, including receiving the  
7 aforementioned honorary degrees from McGill University and Ohio State University.<sup>1</sup>

8           11.      I am the author of a book on the creationism/evolution controversy, *Evolution vs.*  
9 *Creationism: An Introduction*, which was published in October 2005 by the University of  
10 California Press. The December 29 revised syllabus for the intercession course at issue in this case  
11 notes that, on the advice of Dr. Ken Hurst, the course instructor, Mrs. Lemburg, will refer to this  
12 treatise.

13          12.      Articles of mine have been reprinted in collections of scientific readings and  
14 anthologies on the creationism/evolution controversy.

15          13.      I consulted and appeared on several PBS documentaries that have dealt with the  
16 creationism/evolution controversy, including *In the Beginning* and NOVA's *Evolution* series  
17 (which appears on Mrs. Lemburg's revised course syllabus), and have consulted on other videos.  
18 I am even featured in one of the creationist videos Mrs. Lemburg lists for possible presentation.  
19 In addition, I consult with museums on the presentation of evolution in exhibits, and conduct  
20 workshops for interpreters at museums and other informal science institutions (zoos, national  
21 parks). I am featured in a video clip in the new American Museum of Natural History exhibit on  
22 Darwin, talking about science and religion, and the creationism/evolution controversy.

23          14.      I am frequently called upon by the media to provide expert commentary on the  
24 creationism/evolution controversy. Among other things, I have appeared on several national

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25  
26 <sup>1/</sup> I have also received recognition for my work on the creation/evolution controversy from the  
27 following scholarly organizations: the National Science Board (Public Service Award); the American  
28 Society for Cell Biology (Bruce Alberts Award); the American Institute of Biological Sciences (Outstanding  
Service Award); and the Geological Society of America (Public Service Award). I was selected  
Outstanding Alumna of the Arts and Sciences College of the University of Missouri. I also received the  
Distinguished Service Award from the California Science Teachers Association, and the highest honor of  
the National Association of Biology Teachers, Honorary Member. The American Association for the  
Advancement of Science made me a Fellow in 2003.

1 television and radio programs, including *Firing Line*, *Crossfire*, *Geraldo*, *Donohue*, and *Ancient*  
2 *Mysteries*. I regularly appear on network news, Fox, CNN, and other cable news programs. More  
3 generally, members of the press regularly cite and consult NCSE as the most important source for  
4 information on the creationism/evolution controversy.

5 15. I have acted as a consulting expert for the lawyers in *Kitzmiller v. Dover Area*  
6 *School Board*,<sup>2</sup> *Pelozo v. Capistrano Unified School District*,<sup>3</sup> and a case in Australia, all of which  
7 dealt with issues surrounding the teaching of creationism and evolution.

8 16. In this case, I have been asked to offer my opinions as an expert on the  
9 creationism/evolution controversy and on the teaching of creationism and evolution in public  
10 schools.

11 17. I believe that I am well-qualified to provide expert testimony on evolution, various  
12 forms of creationism (including young-earth creationism, creation science, and intelligent design),  
13 efforts to disparage evolution and advance creationism in the public schools, the social history of  
14 the religiously motivated anti-evolution movement, and other topics relating to the teaching of both  
15 evolution and creationism.

16 18. It is my expert opinion that Mrs. Lemburg's class purports to "teach the  
17 controversy" in a balanced way, but that it actually reflects a decided pro-creationism, anti-  
18 evolution stance. It does so in two principal ways: First, it treats creationism and evolution as  
19 equal "philosophies," thereby undermining the credibility of evolutionary theory; second, as  
20 between the two, it plainly favors the creationist perspective.

21 19. To understand why that is the case, one needs to become familiar with definitions  
22 of the key concepts and ideas with which the course deals. Most obviously, making sense of the  
23 syllabi and course materials requires understanding something about evolution and creationism,  
24 as well as the relationship of creationism to intelligent design. Accordingly, I will provide initial  
25 definitions of those concepts, then provide a more detailed account of their historical development  
26 and content before stating my expert opinions about the nature of the class at issue here.

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28 <sup>2/</sup> \_\_\_ F. Supp. 2d \_\_\_, 2005 WL 3465563 (M.D. Pa. Dec. 20, 2005).

<sup>3/</sup> 37 F.3d 517 (9th Cir. 1994).

## Definitions of Evolution, Creationism, Creation Science, and Intelligent Design

20. “Evolution,” broadly defined, is “a cumulative change through time.” It refers to the fact that the universe has had a history — that if we were able to go back in time, we would find different stars, galaxies, and planets, and different forms of life on Earth. Because stars, galaxies, planets, and living things have all changed through time, there is astronomical evolution, geological evolution, and biological evolution, and the concept of evolution is thus integral to the scientific disciplines of astronomy, geology, and biology. It is also relevant to physics and chemistry. But evolution needs to be defined more narrowly within each of the scientific disciplines because both the phenomena studied and the processes and mechanisms of cosmological, geological, and biological evolution are different. Astronomical evolution deals with cosmology: the origin of elements, stars, galaxies, and planets. Geological evolution is concerned with the evolution of our own planet: its origin and its cumulative changes through time. Mechanisms of astronomical and geological evolution involve the laws and principles of physics and chemistry, including thermodynamics, heat, cold, expansion, contraction, erosion, sedimentation, and the like. In biology, evolution is the claim that living things share common ancestors and have, in Darwin’s words, “descended with modification” from these ancestors. The main — but not the only — mechanism of biological evolution is natural selection. Mrs. Lemburg’s class deals with creationist objections to cosmology (astronomical evolution), geological evolution, and biological evolution.

21. “Creationism,” for present purposes, is the theological doctrine of “special creationism,” *i.e.*, that God created biological organisms or systems through a “special” creative act, and that those organisms or systems have not changed appreciably since they were created. Special creationism encompasses both “young-earth creationism” and “progressive creationism.”

22. Young-earth creationism arises out of a literalist view of the Bible. It entails the beliefs that the earth is only (roughly) 10,000 years old and that God created all animals and plants as independent “kinds” over six twenty-four-hour days. Within these “kinds” — which are not consistently defined — young-earth creationists may accept that evolution (which they call “microevolution”) can take place. So for example, within the specially created “cat kind,” there can be evolution of lions, tigers, pumas, house cats, bobcats, and so on. But there can never be

1 common ancestry of two “kinds,” such as cats and dogs. Young-earth creationists reject the  
2 possibility of evolution between kinds (which they call “macroevolution”). Young-earth  
3 creationists also believe that varied geological forms are the product of a worldwide flood (*i.e.*, the  
4 one in the story of Noah). According to Mrs. Lemburg’s revised course syllabus, instruction is  
5 planned in many of the “scientific” concepts of young-earth creationism, such as a young earth,  
6 the unreliability of radiometric dating as a guide to the age of the earth, and a worldwide flood.

7 23. “Creation science” is an endeavor associated with young-earth creationism. It is  
8 largely the descendent of ideas first presented in the 1960s by a hydraulic engineer, Henry M.  
9 Morris, who sought to use science to prove the literal truth of Bible stories. Creation science  
10 accepts the tenets of young-earth creationism, including that the earth is some 10,000 years old,  
11 that the “kinds” of plants and animals were created in six days, and that there was a worldwide  
12 flood. The organization that Morris founded, the Institute for Creation Research (“ICR”),  
13 continues to promulgate his views to the present day.

14 24. Progressive creationism is another type of special creationism. It entails the view  
15 that God creates things in their present form, but serially at different points over a long period of  
16 time and not over a six-day period. Progressive creationism might posit, for example, that God  
17 first created DNA, then later in time created a single cell, then later still create simple metazoa,  
18 then the invertebrate body plans of the Cambrian, and so on. Progressive creationism does not  
19 assume that the Earth is only 10,000 years old, but instead generally accepts the scientific evidence  
20 that the Earth is billions of years old, with God engaging in multiple acts of special creation  
21 throughout the Earth’s history. Progressive creationists, like young-earth creationists, reject  
22 common ancestry of created “kinds,” typically accepting that there can be “microevolution” within  
23 a kind — however a kind may be defined — but denying that there can be evolution from one such  
24 kind to another.

25 25. “Intelligent design” is a form of creationism, and specifically an offshoot of  
26 creation science. Its proponents tend to ignore issues such as the age of the Earth, and simply  
27 focus on the central claim of special creationism. Intelligent-design proponents believe that God  
28 (or, as they put it, “an intelligent agent” with powers greater than any known material agent)  
specially creates “irreducibly complex” biological structures or processes. The claim is that such

1 complex structures and processes are unexplainable through natural cause, and therefore, by  
2 default, God must have created them specially. The majority of intelligent-design creationists are  
3 progressive creationists, though some are young-earth creationists. Some claim to accept  
4 evolution, but what they inevitably are referring to is evolution within the “kind,” or  
5 “microevolution,” which is a common creationist position.

6 26. To many Christians, Jews, and others, “God created” includes the idea of evolution.  
7 Mainstream Christian theology, for example, proposes varieties of “theistic evolution” — the view  
8 that evolution occurred, but that it was part of God’s plan.<sup>4</sup> Theistic evolution is presented in, for  
9 example, Catholic high schools, and is expressed in statements on creationism and evolution from  
10 officials representing Episcopalians, Methodists, Presbyterians, the United Church of Christ, and  
11 other denominations.<sup>5</sup> Some forms of theistic evolution involve different degrees of God’s  
12 intervention, but none are special creationist, for none hold that God creates things in their present  
13 forms. Theistic evolution is specifically rejected by intelligent-design creationists; as leading  
14 intelligent-design proponent William Dembski has said, “Intelligent design is no friend of theistic  
15 evolution.”<sup>6</sup> That is because theistic evolution accepts common ancestry, while intelligent design’s  
16 proponents do not. Nevertheless, both theistic evolution and intelligent design are religious  
17 propositions, not scientific ones. So neither should be taught in public schools.

### 18 **History of the Religiously Motivated Anti-Evolution Movement** 19 **and the Rise of Creation Science and Intelligent Design**

20 27. Religiously motivated hostility toward the teaching of evolution has its roots in the  
21 religious tradition of Christian Fundamentalism, which itself arose in the early 20th Century in part  
22 as a cultural response to Charles Darwin’s exposition of evolutionary theory as the scientific  
23 explanation for the diversity of species.

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26 <sup>4/</sup> See Ted Peters and Hewlett, Martinez. 2002. *Evolution From Creation to New Creation*.  
Nashville, TN: Abingdon Press.

27 <sup>5/</sup> Matsumura, M., Ed. 1995. *Voices for Evolution* . Berkeley CA, National Center for Science  
28 Education.

<sup>6/</sup> Dembski, William 1995. What Every Theologian Should Know About Creation, Evolution, and  
Design. *Center for Interdisciplinary Studies Transactions* 3(2):1-8 (p. 3).

1           28.     Initially, anti-evolutionists who for religious reasons objected to the scientific  
2 theory of evolution attempted to ban the teaching of that theory altogether. Most famously, in  
3 1925 John Scopes was convicted of violating a Tennessee statute prohibiting the teaching of  
4 evolution. Following his conviction, many other states and local school boards adopted laws or  
5 policies similar to Tennessee's, with the result that evolution disappeared from the curricula of  
6 public schools throughout the country.

7           29.     In 1968, however, the Supreme Court ruled in *Epperson v. Arkansas*<sup>7</sup> that such  
8 prohibitions against teaching evolution violated the Establishment Clause of the First Amendment.

9           30.     The *Epperson* decision ushered in a second era of the anti-evolution movement, in  
10 which religiously motivated opponents of evolution (who could no longer prohibit the teaching of  
11 evolution) instead required that, where evolution *was* taught, schools must give "equal time" to  
12 teaching creationism. In order to make creationism appear more like a counterpart to evolution,  
13 they began developing "creation science," which, as I will explain more fully below, was intended  
14 both to attempt to prove the truth of Bible stories using science, and to clothe the Biblical account  
15 of creation in scientific terms.

16           31.     In 1982, the district court in *McLean v. Arkansas Board of Education*<sup>8</sup> found that  
17 creation science was a religious concept, not a scientific one, and therefore held that teaching it  
18 in the public schools was unconstitutional. The court thus struck down Arkansas' balanced-  
19 treatment law.

20           32.     In 1987, the Supreme Court reached a similar conclusion in *Edwards v. Aguillard*,<sup>9</sup>  
21 holding that Louisiana's balanced-treatment law violated the Establishment Clause because it  
22 required Louisiana's public schools to teach a religious concept.

23           33.     The *Edwards* decision ushered in the third, current era of the anti-evolution  
24 movement, in which more sophisticated anti-evolutionists are trying to find new ways to  
25 undermine the teaching of evolution that will survive constitutional scrutiny. Attempts to  
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27 <sup>7/</sup>       393 U.S. 97 (1968).

28 <sup>8/</sup>       529 F. Supp. 1255 (E.D. Ark. 1982).

<sup>9/</sup>       482 U.S. 578 (1987).

1 incorporate “evidence against evolution” and intelligent design into public-school curricula are the  
2 most recent of these.

### 3 **“Evidence Against Evolution” And Creation Science**

4 34. The attempt to re-cast creationism as “evidence against evolution” (also frequently  
5 phrased as the “teach the controversy” approach) primarily is an attempt to reduce the appearance  
6 of religious content in creationist views so that they will appear more legally and constitutionally  
7 palatable. But all forms of creationism are inherently religious, and so is the “evidence against  
8 evolution” approach.

9 35. This approach was first tried during the period between the *Epperson* and *Edwards*  
10 decisions, when anti-evolutionists pressed for “equal time” for creation science. Supporters of  
11 creation science conceive of the creationism/evolution controversy as a dichotomy, with a literal  
12 special creationist reading of the creation story in the Book of Genesis as one alternative and  
13 “godless evolution” as the other. The idea is that, with only two choices (evolution and special  
14 creation), evidence against one would logically constitute evidence supporting the other. It is  
15 therefore not necessary to “prove” (or even support) creationism, merely to disprove evolution.  
16 With evolution out of the way, students would default to accepting special creationism.

17 36. So creation-science proponents scoured (and continue to scour) the scientific  
18 literature seeking anomalies that they can proclaim “prove” that evolution did not happen, arguing  
19 that therefore the account of creation in Genesis must be true.

20 37. The “evidence against evolution” approach has been around for decades:  
21 Arguments concerning gaps in the fossil record, the Cambrian explosion, the second law of  
22 thermodynamics, the inadequacy of mutation and natural selection to produce major body plans,  
23 and so on, are mainstays of the creation-science literature. Arguably, creation science consists  
24 almost entirely of “evidence against evolution.”

25 38. The “evidence against evolution equals evidence for creationism” argument has a  
26 flawed premise: Evolution and a literal reading of the Book of Genesis are not the only two  
27 possible explanations for biological origins. On the contrary, there are many different versions of  
28 creationism, and there are many religious views that acknowledge evolution. Thus, evidence  
against evolution is not affirmative evidence for creation science, even though that is how creation

1 science’s proponents misleadingly present it. In my experience, many members of the public are  
2 persuaded by this poor logic, believing that evolution and special creationism are the only two  
3 alternatives; this shows a lack of religious as well as scientific literacy.

4 39. Although there are many different *religious* views, there is only one truly *scientific*  
5 explanation for biological origins and the diversity of species: Evolution as understood by  
6 scientists — the scientific inference that living things share common ancestors, and the scientific  
7 mechanisms that produce evolution’s branching tree of life.

8 40. Lacking any positive evidence to support the sudden appearance of the universe in  
9 six twenty-four-hour days less than ten thousand years ago, creation science’s proponents must  
10 cling to the position that finding “evidence against evolution” will suffice as scientific support for  
11 special creationism, *i.e.*, the belief that God separately created each individual species.

12 41. The lawsuit *McLean v. Arkansas* dealt directly with this argument. *McLean*  
13 included a full trial with plaintiffs arguing that an Arkansas law, which required “equal time” for  
14 creation science when evolution was taught, was unconstitutional. The issue of creation science  
15 as science, and the logic of the “evidence against evolution” strategy, were directly addressed by  
16 Judge Overton in deciding for the plaintiffs:

17 The two-model approach of the creationists is simply a contrived dualism which  
18 has no scientific factual basis or legitimate educational purpose. It assumes only  
19 two explanations for the origins of life and existence of man, plants and animals:  
20 it was either the work of a creator or it was not. Application of these two models,  
21 according to creationists, and the defendants, dictates that all scientific evidence  
22 which fails to support the theory of evolution is necessarily scientific evidence in  
23 support of creationism and is, therefore, creation science “evidence” in support of  
24 Section 4(a) [of the Arkansas “Balanced Treatment for Creation-Science and  
25 Evolution-Science Act”].<sup>10</sup>

26 42. After the Supreme Court in *Edwards* put an end to “balancing” evolution with  
27 creation science, the attention of creationists shifted even more dramatically to teaching “the  
28 evidence against evolution” without overtly pointing to creationism or creation science as the  
29 alternative, since the religious motivation would then be less obvious.

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<sup>10/</sup> *McLean v. Arkansas* (1982) 529 F. Supp. 1255.



1           45.     Although intelligent-design creationism arguably began with the 1984 publication  
2 of a book criticizing origin-of-life research,<sup>14</sup> it started to become a more serious focus of anti-  
3 evolutionists' attention immediately after the *Edwards* decision was issued. At that time, Dean  
4 Kenyon, who had supplied an expert affidavit in *Edwards* claiming that creation science was the  
5 only alternative to the scientific theory of evolution, took the creationist textbook he was then  
6 preparing and substituted the term "intelligent design" for the terms "creationism" and "creation  
7 science." (That book, which was published two years later under the title *Of Pandas and People*,  
8 was at the center of the recent legal controversy over intelligent design in the *Kitzmiller* case.)

9           46.     The intelligent-design movement developed and gained importance among  
10 religiously motivated opponents of evolution in the early to mid-1990s; and since the late 1990s,  
11 its supporters have actively lobbied to have it taught in public schools. Recently (since roughly  
12 2002), the chief think-tank for intelligent-design creationism, the Discovery Institute, has moved  
13 away from affirmative efforts to teach intelligent design toward a "teach the controversy" or  
14 "evidence against evolution" approach. In my opinion, this was because the Institute recognized  
15 the substantial risk of legal liability attendant with teaching a perspective that relies on an  
16 "intelligent agent" that everyone (including federal judges) would recognize as God. But, as Mrs.  
17 Lemburg's course indicates, events on the ground have not necessarily caught up with this new  
18 strategy.

19           47.     Proponents of intelligent design contend that intelligent design is a scientific  
20 endeavor to detect "design" in nature, with no necessary connections to religion. But, by  
21 definition, the perspective posits the existence of a designer.

22           48.     Intelligent design's proponents recognize that if the designer is supernatural, then  
23 intelligent design is a religious ideology.

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27 <sup>14/</sup> Charles B. Thaxton, Walter L. Bradley, and Roger B. Olsen, *The Mystery of Life's Origin*, New  
28 York: Philosophical Library, 1984. The book was shopped to 176 secular publishers before Philosophical  
Library accepted it; "We were determined the book would not be published by a Christian publisher, and  
therefore be ignored," Buell recalls. "It was the first book favorable to creation by a reputable secular  
publisher in over five decades" (Larry Witham, *Where Darwin Meets the Bible*, New York: Oxford  
University Press, 2002:220).

1           49.     Accordingly, they claim to be agnostic as to the identity of the “designer.” The  
2 designer, they say, could be supernatural or it could be material.<sup>15</sup> A recent news article regarding  
3 a creationism/evolution dispute in Roseville, California, cited the public information officer for  
4 the intelligent-design think-tank the Discovery Institute as actually offering three choices: God,  
5 extraterrestrials, or a time-traveler from the future. The Discovery Institute’s representative “said  
6 most people affiliated with the institute believe that the designer is God. ‘But a person could  
7 logically argue that some sort of human has been able to design features of life working through  
8 time travel,’ he said. ‘And some people say aliens are the designer.’” Of course, it is doubtful that  
9 any of them truly believe that space aliens created life on earth, but this subterfuge is necessary  
10 in order to create the appearance that they have avoided Establishment clause proscriptions against  
11 promoting a religious view in the public schools.

12           50.     Although the intelligent-design movement proclaims itself to be a scientific  
13 alternative to evolution, it is actually an effort to promote a sectarian religious ideology. Indeed,  
14 prominent intelligent-design supporters such as Phillip Johnson have recognized that intelligent  
15 design does not meet the definition of science, and he has therefore contended that scientific  
16 practice should be changed and methodological naturalism should be abandoned.

17           51.     Intelligent design reduces to an assumption at odds with modern science: that there  
18 are some phenomena that by their nature are unexplainable through natural causes. Intelligent  
19 design assumes not just that there are some phenomena that are yet *unexplained* by science, but  
20 that there are phenomena that are forever outside of the possibility of explanation through science.  
21 Intelligent design assumes that such phenomena must be attributed to the direct action of an  
22 “intelligence,” and intelligent-design proponents believe that this agent is God. In other words,  
23 intelligent design is a dressed-up version of saying “God did it.”

24           52.     Although many scientists believe in God, we all restrict ourselves to natural causes  
25 *when doing science*. The reason is simple. Natural causes are the only ones that we can test.  
26 Science is a way of knowing that involves the testing of explanations against the natural world.  
27 A scientific test requires the ability to predict an outcome that is consistent with the explanation  
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<sup>15/</sup> Laurel Rosen, “Darwin Faces a New Rival,” *Sacramento Bee*, June 22, 2003.

1 being proposed. Part of the testability of a scientific explanation is, therefore, that some variables  
2 are held constant (“controlled”) in order to test claims of causation. Because it is impossible to  
3 hold constant the acts of a supernatural agent, *any* outcome is compatible with the actions of an  
4 omnipotent being. Thus, if scientists were permitted, in their capacity as scientists, to consider  
5 supernatural causes, they could never draw conclusions about the natural causes for observed  
6 phenomena because they could never rule out the possibility that “God did it.” Allowing for  
7 supernatural causes would be a science stopper.

8 53. Accordingly, scientists *qua* scientists must reject intelligent design’s proposition  
9 that some phenomena cannot be explained except by reference to the supernatural; we must reject  
10 the supposition that the as-yet unexplained is *unexplainable*.

11 54. The methodological limitation that restricts science to natural causes does not mean  
12 that there cannot in reality be supernatural causes, nor does it say anything about whether a  
13 supernatural agent (*e.g.*, God) does or does not exist. It simply means that, as scientists conducting  
14 scientific inquiry, we exclude the supernatural and work to develop the best natural explanations  
15 that our observations and test-data permit. To do otherwise would be to cease engaging in science.

16 55. The restriction of science to natural cause is sometimes referred to as “naturalism.”  
17 That term generates confusion, however, because there is also a philosophical view called  
18 “naturalism” that makes claims that the supernatural does not exist and that reality consists only  
19 of material (matter and energy) causes. The philosophical view is a claim that exists outside  
20 science because science cannot say whether supernatural causes do or do not exist; science is  
21 agnostic on this question.<sup>16</sup>

22 56. Creationists commonly confuse these two uses of the term naturalism because they  
23 view evolution as being an antireligious philosophical view.<sup>17</sup> They oppose evolution because they

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25 <sup>16/</sup> In the attempt to avoid confusion, philosophers of science often refer to the restriction of science  
26 to natural causes as “methodological naturalism,” and the philosophical view as “philosophical (or  
27 metaphysical) naturalism.” Pennock, Robert 2003. *Creationism and Intelligent Design*, Annual. Rev.  
28 Genomics Hum. Genet. 2003. 4:143–63.

<sup>17/</sup> Religious conservatives are not the only ones who confuse philosophical with methodological  
naturalism and thus misunderstand the nature of science. Some scientists have written that evolution and  
faith are incompatible, and creationists love to cite them to support the creationist view. But philosophical  
(continued...)

1 believe that acceptance of evolution requires abandonment of faith — a belief that is refuted by  
2 the fact that many scientists are also people of faith.<sup>18</sup>

3 57. The district court in the *Kitzmiller* case considered testimony from some of  
4 intelligent design’s chief proponents, as well as experts in evolutionary science and science  
5 education. The court correctly found that, whereas evolution is a scientific theory that respects  
6 these necessary methodological limitations, intelligent design is a non-scientific religious view that  
7 assumes there are unexplainable supernatural causes.

8 58. Not only is intelligent design’s methodology unscientific, but its specific claims  
9 have been examined and rejected by scientists.

10 59. Moreover, there are no known articles in the peer-reviewed scientific literature  
11 where the principle of intelligent design is being used in the biological sciences to help gain a  
12 better understanding of the natural world.

13 60. Intelligent design is also recognized by its proponents and the public as positing the  
14 religious view that God directly designs (and creates) certain natural phenomena that are allegedly  
15 incapable of being produced through natural causes.<sup>19</sup>

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17 <sup>17/</sup> (...continued)  
18 materialists (such as Richard Dawkins and William Provine) who are also scientists do not speak for the  
19 scientific community. Their claims about science have been strongly criticized even by fellow materialists.  
20 Scott, Eugenie C. 2004. *Evolution vs Creationism: An Introduction*. Berkeley, CA: University of California  
21 Press and references therein.

22 <sup>18/</sup> Much of the objection to evolution found among conservative Christians stems from the belief that  
23 acceptance of evolution entails the abandonment of faith. That belief depends on a misunderstanding of  
24 the nature of science. Science is a limited way of knowing that consists of attempting to explain the natural  
25 world in terms of natural causes, but it does not claim to be the only possible way of understanding the  
26 world. There are evangelical Christians who accept evolution; they are frequent contributors to the website  
27 and annual meetings of an esteemed organization of evangelical Christians called the American Scientific  
28 Affiliation ([www.asa3.org](http://www.asa3.org)).

29 <sup>19/</sup> A few examples here will suffice to make the point that the public recognizes that intelligent design  
30 constitutes a religious perspective. A citizen in Cobb County, Georgia, wrote in a letter to the editor:

31 The complexities of the human body and the incredible way the earth supports the  
32 life upon it are just two examples that make it difficult to believe we simply  
33 erupted from nothing. These complexities require an intelligent designer, and that  
34 intelligent designer is God.

35 Kip Howard, letter to the editor, *Atlanta Journal Constitution*, August 22, 2002. An intelligent-design  
36 supporter in Ohio explained the identity of the “intelligent designer” this way:

(continued...)

1           61.     Moreover, it is clear both from what intelligent design’s proponents do and from  
2 what they say that the intelligent design movement is motivated by a religious purpose.

3           62.     A major spokesperson for intelligent design, philosopher and mathematician  
4 William Dembski, has written, “Intelligent design is three things: a scientific research program that  
5 investigates the effects of intelligent causes; an intellectual movement that challenges Darwinism  
6 and its naturalistic legacy; and a way of understanding divine action.”<sup>20</sup> Two of Dembski’s three  
7 identifying qualities of intelligent design are thus expressly religious in nature: combating  
8 naturalism (which Dembski and other ID proponents understand to involve atheism), and  
9 understanding divine action. As for the third, intelligent design has not made any contributions  
10 to the scientific research literature at all, contrary to Dembski’s claim that intelligent design is a  
11 “scientific research program.”

12           63.     Although many of its proponents purport to disavow any religious motivations, the  
13 religious purpose of intelligent design is found in much of the published and on-line intelligent-  
14 design literature.

15           64.     The Discovery Institute houses the central think tank of the intelligent-design  
16 movement, the Center for Renewal of Science and Culture (now the Center for Science and  
17 Culture). The president of the Discovery Institute, in announcing the founding of the CRSC in  
18 1996, stated that the CRSC’s goals included: “To defeat scientific materialism and its destructive  
19 moral, cultural and political legacies. To replace materialistic explanations with the theistic  
20

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21 <sup>19/</sup>           (...continued)  
22           “It’s God, sure,” he answers when pressed for his own belief. “But everyone doesn’t have to say  
23 that. I suppose it goes back to the status of the legal situation, that if they can pin down [who ID  
24 proponents think the designer is], it might affect whether the courts view ID as an attempt to  
endorse a religious belief.”

25 John Mangels and Scott Stephens, “Ohio’s Intelligent Design Crusader,” *Cleveland Plain Dealer*, June 13,  
26 2002. And as Judge Jones explained in the *Kitzmiller* decision, “numerous letters to the editor and  
27 editorials” published in the local newspapers in the Dover, Pennsylvania, area “reveal that the entire  
28 community has consistently and unwaveringly understood the controversy [over including intelligent design  
in the high-school biology curriculum] to concern whether a religious view should be taught as science,”  
and therefore that “the community and hence the objective observer who personifies it, cannot help but see  
that the ID policy implicates and thus endorses religion.” 2005 WL 3455563, at \*22-\*23.

<sup>20/</sup>           William A. Dembski, *Intelligent Design: The Bridge between Science and Theology* (Downers  
Grove, IL: InterVarsity Press, 1999).

1 understanding that nature and human beings are created by God.”<sup>21</sup> A few years later, he again  
2 underscored the essentially religious purpose of the CRSC, writing, “our Center for the Renewal  
3 of Science and Culture seeks to show that science supports the concept of design and meaning in  
4 the universe — and that that design points to a knowable moral order.”<sup>22</sup>

5 65. Science does not deal with “theistic understanding[s]” or attempt to make claims  
6 about God. Nor is the task of science to “defeat \* \* \* moral, cultural and political legacies.”  
7 Those objectives are the province of religion, theology, and perhaps ethics.

8 66. To the extent that it may be useful to the Court, I am prepared to provide many  
9 more examples of the religious purpose underlying intelligent design. Those examples come from  
10 Discovery Institute literature, the writings of Discovery Institute fellows and other nationally-  
11 known supporters of intelligent design (such as Phillip Johnson, William Dembski, Michael Behe,  
12 and Stephen Meyer).

13 67. In sum, intelligent design, like creation science, principally involves presenting  
14 “evidence against evolution,” positing that there are only two explanations for the origins of  
15 biological entities — evolution in accordance with natural processes on the one hand, and “design”  
16 (*i.e.*, creation) by a supernatural entity on the other. Like creation science, it posits that any  
17 evidence tending to cast doubt on evolution must perforce be evidence in favor of the creationist  
18 alternative. And like creation science, it is a religious view, not a scientific theory; neither are  
19 testable, and neither are restricted to natural causes.

20 68. When creation scientists and intelligent-design proponents have been defeated in  
21 their attempts to have creationism incorporated into a public-school curriculum, they have  
22 historically adopted a “fall-back” position of seeking to have the teaching of evolution “balanced”  
23 against the presentation of supposed evidence against evolution. But because “evidence against  
24 evolution” is the core concept in both creation science and intelligent design, doing so requires  
25 them to give up little more than the “creation science” and “intelligent design” labels. And  
26 because students are highly likely to share the “contrived dualism” dichotomous view that

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27 <sup>21/</sup> Bruce Chapman, Discovery Institute web page, October 1999. This page is no longer available on  
28 the web site.

<sup>22/</sup> Bruce Chapman, “Letter from the President,” *Discovery Institute Journal* (Spring 1998), p. 3.

1 evidence against evolution is evidence for creationism, disparaging evolution is likely to promote  
2 the default creationist view, even if “God” formally goes unmentioned.

### 3 **Problems With The Intersession Course**

4 69. In my expert opinion, the purpose and effect of the course at issue in this lawsuit  
5 are not to present a comparative treatment of the various philosophical issues surrounding  
6 evolution and creationism.

7 70. Rather, the purpose and effect of the class are to disparage the scientific status of  
8 evolution and to present as superior to evolution the religious ideas of creation science and  
9 intelligent design. In other words, the course advocates on behalf of a particular religious view,  
10 and a sectarian one at that; special creationism is a minority view in American Christianity.

11 71. The evidence on which I base that conclusion pervades the course description, the  
12 original syllabus, and the revised syllabus — and turns on four general observations.

13 72. First, although the revised syllabus for the class asserts that the course will present  
14 the “world views on origins,” the course does not even begin to provide students with the diversity  
15 of viewpoints on this matter.<sup>23</sup> Instead, the course presents a single religious viewpoint namely  
16 creationism (whether as creation science or intelligent design).

17 73. Despite the original course title “Philosophy of Intelligent Design,” the original  
18 version of the syllabus was dominated by creation science — the same view that the Supreme  
19 Court in *Edwards* held could not be taught in public schools.

20 74. The course description, which I understand has remained unchanged, emphasizes  
21 creation science by, for example, advocating the belief that there is scientific evidence that “the  
22 earth is thousands of years old, not billions.” It also states that the course will “take a close look  
23 at evolution as a theory and will discuss the scientific, biological, and *Biblical* aspects that suggest  
24 why Darwin’s philosophy is not rock solid.” (my emphasis).

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27  
28 <sup>23/</sup> It is worth noting that among the other intersession classes are a class specifically on “Comparative  
Religion” and another on “Mythology.” The first is truly comparative, covering five major religions, and  
the second is on ancient myths and their influence on books movies, *e.g.*, Star Wars. This shows that there  
is at least an awareness at the school of how to treat religious views in a comparative fashion.

1           75.     The revised version of the syllabus emphasizes intelligent design, but traces of  
2 creation science still appear, especially in such course materials as the video *Chemicals to Living*  
3 *Cells: Fantasy or Science*, which is sold by the creation-science ministry Answers in Genesis.

4           76.     The syllabi, course description, and course materials make no mention of any non-  
5 Western religious viewpoints on the origins of life and its history. In any class purporting to  
6 provide a comparative treatment of cultural phenomena, that omission is remarkable.  
7 Anthropologists regard origin myths — stories about the ways in which the world and its  
8 inhabitants were formed (usually as the work of supernatural beings or forces) — as a cultural  
9 universal. There is certainly no shortage of origin myths available for discussion. Yet the course  
10 description and the original syllabus here reflect a narrow focus on a particular sectarian account  
11 of origins.

12           77.     Similarly, there is no mention in the course materials of any religious viewpoints,  
13 Western or non-Western, that accept evolution. An example of these would be any of the many  
14 varieties of Christian theology known as theistic evolution: A number of mainline Christian  
15 denominations in the United States regard evolution as no threat to their theological views. For  
16 example, a number of prominent religious figures, including the late Pope John Paul II, have  
17 expressed the view that evolution is compatible with, or even enriches, their faith. A number of  
18 prominent scientists, including Francis Collins (the leader of the Human Genome Project), have  
19 made similar claims. But students in this course will not learn about any of these views. Instead,  
20 they will be told that evolution and religion are involved in (in the words of one of the videos on  
21 the original syllabus) a “War of the Worldviews.”

22           78.     The absence of the viewpoints of other religious traditions from the course materials  
23 belies any claim that the course’s aim is to present a balanced, comparative, or objective treatment.  
24 Moreover, since the only religious viewpoint presented is in opposition to evolution, the effect is  
25 to present evolution as intrinsically antireligious. The course thus employs the “two-model”  
26 approach (beloved of proponents of creation science and intelligent design) that Judge Overton  
27 aptly described in the *McLean* case as a “contrived dualism.”

28           79.     Second, the course materials make clear that the class is being taught from an anti-  
evolution, pro-creationist and pro-intelligent design perspective.

1           80.     The course description promises that the course will present evidence that  
2 “Darwin’s philosophy is not rock solid” and to present evidence “suggesting the earth is thousands  
3 of years old, not billions,” thereby plainly reflecting a manifestly pro-creationist perspective.  
4 Furthermore, the course description’s reference to treatment of “the age of the earth, a world wide  
5 flood, dinosaurs, pre-human fossils, dating methods, DNA, radioisotopes, and geological evidence”  
6 bespeaks a plainly religious agenda, as these are topics repeatedly singled out by proponents of  
7 creationism and intelligent design as reflecting areas on which evolutionary theory is flawed.

8           81.     Twenty-three of the 24 videos listed on the original syllabus are one-sided  
9 presentations, produced by creation-science ministries and advocating a pro-creationism  
10 perspective, without any critical treatment of the arguments or other rebuttal. (See Attachment B  
11 for a detailed listing.) These videos are not ordinarily regarded as suitable material for the public  
12 schools because of their poor scientific quality as well as their religious advocacy. The twenty-  
13 fourth video, *The Fire Below Us*, pertains to volcanic activity rather than evolution, and can  
14 scarcely bear the weight of holding up the “pro-evolution perspective.”

15           82.     The video selections – including *Unlocking the Mystery of Life* – also advocate the  
16 view that scientific practice should be changed and methodological naturalism should be  
17 abandoned in order to accommodate reference to the supernatural.

18           83.     Similarly, the original syllabus devoted two days each to the “Laws of  
19 Thermodynamics” and “Fossil Records and Dating Methods.” These are areas of scientific inquiry  
20 that proponents of creation science have traditionally attacked, with the scientific community  
21 regarding the attacks as lacking any scientific merit.

22           84.     On the original syllabus, two of the five prospective speakers (Anderson and  
23 Francis) are identifiable proponents of creation science; a third, “David Kopich,” is probably meant  
24 to refer to a local proponent of creation science named David Coppedge. Of the two prospective  
25 speakers on the original syllabus who were supposed to present the case for evolution, one is a  
26 local parent who opposed the class. The other is the Nobel laureate Francis Crick (misspelled  
27 “Krich”), *who died in 2004*.

28           85.     The revised syllabus appears to have been revised to de-emphasize creation science  
in favor of intelligent design, presumably in the hope that the course would better be able to

1 survive constitutional scrutiny. The revision is thus a microcosm of the national debate, in which  
2 intelligent design emerged in the wake of *Edwards v. Aguillard* as a form of creationism intended  
3 to avoid the Supreme Court’s decision declaring the teaching of creation science in schools to be  
4 unconstitutional.

5       86. As explained above, intelligent design was recently recognized in *Kitzmiller v.*  
6 *Dover* as unconstitutional for the same reasons as creation science was in *Edwards*. Although the  
7 erroneous scientific claims distinctive of creation science, such as those involving the age of the  
8 earth and thermodynamics, are no longer explicitly mentioned in the revised syllabus, intelligent  
9 design, as the progeny of creation science, retains many of the same erroneous scientific flaws.  
10 All but one of the videos listed on the revised syllabus are the products of the intelligent-design  
11 movement. (See Attachment B for a detailed listing.) Those videos, like the creation-science ones,  
12 are not ordinarily regarded as suitable material for the public schools.

13       87. Both the original and revised syllabi include numerous videos purporting to address  
14 the “evidence against evolution,” but not a single video on either list addresses the gaps/problems  
15 with creationism or intelligent design.

16       88. Because creation science and intelligent design are religious rather than scientific  
17 viewpoints, *advocating* the tenets of these viewpoints — as opposed to addressing them in an  
18 appropriate context and in an objective manner — amounts to religious advocacy that cannot have  
19 a valid secular purpose.

20       89. Third, the course materials present a distorted view of the scientific standing of  
21 evolution.

22       90. Throughout those materials, evolution is presented as a “worldview” or  
23 “philosophy.” In the anti-evolution movement, these terms are often used synonymously with  
24 “religion,” in order to suggest that evolution is accepted only on faith, thus converting evolution  
25 from a scientific theory (which has a particular meaning and special status in the scientific  
26 community) to a belief system (which does not).

27       91. In that regard, the very first sentence of the course description reads, “This class . . .  
28 will discuss the scientific, biological, and Biblical aspects that suggest why Darwin’s *philosophy*  
is not rock solid” (emphasis added).

1           92.     Topics in the original syllabus include “Is Evolution a science or a philosophy?,”  
2 “Is Evolution based on a religion?,” and “Is evolution based on philosophy?” Although those  
3 questions are not explicitly answered in the syllabus, the fact that these questions are raised  
4 repeatedly in a course entitled “Philosophy of Intelligent Design” strongly implies that the  
5 instructor intends to teach or suggest that evolution is based on a “philosophy.”

6           93.     The videos on the syllabi, such as “War of the Worldviews,” further support that  
7 conclusion.

8           94.     In the revised syllabus, although one topic is “How does the Philosophy of  
9 Intelligent Design differ from the Theory of Evolution?” (a formulation that might suggest  
10 evolution is no longer going to be presented as based on “philosophy”), the very next topic on that  
11 syllabus demonstrates otherwise by referring to “this debate concerning philosophies,” *i.e.*,  
12 evolution and “intelligent design.”

13          95.     Similarly, the revised syllabus states that “Equal and balanced instructions will be  
14 given on all philosophies.” Because the only concepts taught are a religious view and evolution,  
15 this statement has the effect of labeling both concepts as “philosophies.”

16          96.     Neither the original nor the revised syllabus calls for informing the students that the  
17 scientific community overwhelmingly accepts evolution.

18          97.     Fourth, and related to the third consideration, is the fact that the course materials  
19 do not treat evolution in ways that are either scientifically accurate or pedagogically responsible.

20          98.     A genuine comparative treatment of cultural ideas concerning the origin and history  
21 of life would not necessarily have to discuss scientific ideas at all. It would be sufficient, for  
22 example, to describe the origin myths of a number of different cultures, to compare and contrast  
23 them, and to discuss the role that the origin myths play with respect to the rest of their cultures.  
24 But if scientific ideas like evolution are to be discussed in such a course, they should be discussed  
25 in a scientifically accurate and pedagogically responsible way. That is not the case with the course  
26 at issue here.

27          99.     As noted, the original syllabus devoted two days to “Laws of Thermodynamics,”  
28 which is a topic from physics. It is primarily proponents of creation science, and not physicists  
or other scientists, who regard that topic as relevant to the scientific study of evolution, for

1 creationists incorrectly maintain that the Second Law of Thermodynamics renders evolution  
2 impossible.

3 100. The revised syllabus describes evolution as a view “on the origin of life.” In the  
4 sense most common in modern biology, “evolution” denotes descent with modification — the  
5 scientific theory that living things have descended, with modification, from common ancestors.  
6 The origin of life is a separate question and a separate area of research.

7 101. Additionally, there is reason to doubt that the course presents evolution in a way  
8 appropriate to the students’ ages and level of preparation. In the original syllabus, *no* scientifically  
9 credible and pedagogically appropriate instructional materials about evolution are listed.  
10 Apparently Mrs. Lemburg was content to have the students learn about evolution almost entirely  
11 from creationist sources. Since evolution is typically presented in California only in high-school  
12 biology, it is likely that the students in this course would have had, at most, one course in which  
13 they were formally exposed to evolution; and some of the students may not have had even that.  
14 They therefore would not have the prerequisite knowledge to enable them to evaluate critically the  
15 scientific claims contained in the creationist sources.

16 102. In the revised syllabus, non-creationist instructional material about evolution was  
17 added: the PBS series *Evolution*, the “Understanding Evolution” website, and *Evolution vs.*  
18 *Creationism*. As a consultant to the first two and the author of the third, I can certainly vouch for  
19 their scientific credibility. None of these materials was intended to provide a first exposure to  
20 evolution, however. The *Evolution* series was intended for a general adult audience, and (like any  
21 science documentary) was not intended to provide a complete education to its viewers. The parts  
22 of the Understanding Evolution website to which the revised syllabus refers are aimed at teachers  
23 who are striving to improve their ability to teach evolution effectively. They are not directed at  
24 or geared to students. While there is a section of the website that provides a basic introduction to  
25 evolution, it is not mentioned in the syllabus, and it would not in any case be appropriate as the  
26 students’ primary source of information about evolution. *Evolution vs. Creationism* is suitable for  
27 advanced high-school students and for college students, but certainly not for students who have  
28 not yet even taken a biology course at the high-school level. And like the Understanding Evolution

1 website, the book provides only the most rudimentary introduction to the science of evolution; it  
2 is no substitute for a real biology class with a competent teacher using a mainstream textbook.

3 103. If there were genuine scientific evidence against evolution, *i.e.*, if scientists had  
4 scientific debates over whether evolution actually occurred, there might be a secular pedagogic  
5 reason for teaching students “the controversy.” The scientific community, however,  
6 overwhelmingly views evolution (the inference of common descent of living things) as a solidly-  
7 supported scientific view.<sup>24</sup> Indeed, the consensus of the scientific community is that “[t]he  
8 contemporary theory of biological evolution is one of the most robust products of scientific  
9 inquiry.”<sup>25</sup>

10 104. Because there is no scientific “evidence against evolution” and there is no  
11 pedagogical value in teaching “evidence against evolution,” yet there are conspicuous religious  
12 motivations for promoting this practice, it is difficult to avoid the conclusion that the underlying  
13 purpose and the intended effect of efforts to require the teaching of “the evidence against  
14 evolution,” such as those in the course at issue here, are to protect or advance a particular set of  
15 religious beliefs.

16 105. Presenting evolution in a philosophy class as a philosophy or belief system on a par  
17 with the religious view of creationism misrepresents the nature of evolution. It confuses students  
18 about what evolutionary theory is, interfering with their education when they are presented with  
19 the concept of evolution in their science classes. There can be no valid secular purpose for  
20 misleading students about the nature of evolutionary theory in a public-school philosophy class  
21 any more than there can be in a public-school science class.

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22 <sup>24/</sup> The National Association of Biology Teachers writes, “Modern biologists constantly study, ponder  
23 and deliberate the patterns, mechanisms and pace of evolution, but they do not debate evolution’s  
24 occurrence.” National Association of Biology Teachers Statement on Teaching Evolution, in *Teaching  
25 About Evolution and the Nature of Science*, Washington DC: National Academy Press, 1998, p. 127.  
26 Similarly, the National Science Teachers Association has stated, “There is no longer a debate among  
27 scientists over whether evolution has taken place,” and specifically recommends that “[p]olicy-makers and  
28 administrators should not mandate policies requiring the teaching of creation science or related concepts  
such as ‘intelligent design’, ‘abrupt appearance’, and ‘arguments against evolution.’” NSTA (National  
Science Teachers Association) Position Statement on the Teaching of Evolution, in *Teaching About  
Evolution and the Nature of Science*, pp. 125, 124.

<sup>25/</sup> American Association for the Advancement of Science, AAAS Board Resolution on Intelligent  
Design Theory, 2002, available on-line at <http://www.aaas.org/news.releases/2002/1106id2.shtml>. The  
AAAS is the largest general scientific society in the world.

