BEFORE THE SCIENCE COMMITTEE OF THE KANSAS STATE BOARD OF EDUCATION

IN RE: HEARINGS HELD ON MAY 5,6,7 AND 11, 2005 CONCERNING KANSAS SCIENCE EDUCATION STANDARDS

PARTIES:

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THE AUTHORS' SUGGESTED FINDINGS OF FACT AND CONCLUSIONS OF LAW

Introduction And Summary Of Suggestions

These suggestions consist of two parts: Suggested Findings of Fact and Suggested Conclusions of Law. The Suggested Findings of Fact consist of the suggestions of the Authors to the Committee as to findings the Committee may reasonably adopt that are both relevant and well supported by the record.[1]

The Suggested Findings of Fact are divided into two sections. The first section covers findings relating to basic issues and process. The second section provides detailed findings with respect to the validity and propriety of each of the Proposed Revisions in the Report. In each case, the proposed revision is shown in bold italics and it is then followed by a recitation of factual conclusions that one may reasonably draw from the record of evidence supporting the proposed revision. The recitations also include detailed analysis of the Peer Review that was solicited by the leadership of the Writing Committee and posted on the DOE web site.

The Suggested Conclusions of Law reflect the opinion of counsel for the Authors as to the application of relevant law to the Suggested Findings of Fact. Thus, the legal opinions expressed may not apply if the findings of fact made by the Committee and the Board differ materially from the Suggested Findings.

The Suggested Conclusions of Law are divided into two major parts. The first part provides the lay reader with an overview of the Establishment Clause, the Free Exercise Clause, the Speech Clause, the meaning of the word "religion" in the First Amendment, the meaning and applicability of "secular, neutral and non-ideological," as used in the No Child Left Behind Act of 2001 ("NCLB") and the provisions of Section 7 of the Kansas Bill of Rights relevant to the science standards.

The second part of the Conclusions of Law is divided into two subsections that apply the law and facts to Draft 2 and the Proposed Revisions. The first section explains why the Proposed Revisions promote not only good science education, but also compliance with the relevant law. The second section explains why those revisions are necessary to cause Draft 2 to be in compliance with the applicable law.

The Committee asked that the hearings address the extent to which Draft 2 and the Proposed Revisions bring the Science Standards in alignment with the NCLB advice incorporated into the Proposed Revisions. Although this question is not always specifically mentioned as each of the Proposed Changes are addressed, the Authors believe that the spirit of that advice is imbued throughout the Proposed Revisions.

On behalf of the patrons of Kansas Public Education, the Authors wish to express their deep appreciation to the Board and the Committee for the opportunity to present these important issues for consideration by the Board.

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Dr. Angus Menuge, a Philosopher, who testified with respect to the effect of Methodological Naturalism, opened his remarks with this quote from *The Abolition of Man: How Education Develops Man's Sense of Morality.*[2]

He properly explained that the context of the quote was focused on English rather than a class in biology. However, he argued persuasively that its message is equally applicable to that venue.

> **"The very power of the [teachers] depends on the fact that they are dealing with a boy: a boy who thinks he is doing his [science] and has no notion that ethics, theology, and politics are all at stake. It is not a theory they put into his mind, but an assumption, which, ten years hence, its origins forgotten and its presence unconscious, will condition him to take one side in a controversy which he has never recognized as a controversy at all."**

TABLE OF CONTENTS

I. SUGGESTED FINDINGS OF FACT

A. SUGGESTED FINDINGS OF FACT REGARDING BASIC ISSUES AND PROCESS.

1. The proposed revisions contained in the Report are focused primarily on teachings that directly or indirectly implicate biological origins, the origin of life and its diversity ("origins").

2. Based on common knowledge, the extent of local, national and international interest in the hearings, logic, and the testimony adduced at the hearings, scientific explanations about origins unavoidably impacts religion and religious beliefs, at least in the following ways:

    a. Scientific explanations of origins, such as chemical and biological evolution, which postulate that life and its diversity result from unguided "natural," material, mechanistic or physical causes, ("Naturalistic Explanations"), give rise to implications that logically favor non-theistic religions and belief systems, such as Secular Humanism,[3] atheism and agnosticism, and that are logically inconsistent with traditional theistic religions, such as Christianity, Islam, and Judaism, it being understood that this finding is not intended to in any way imply that Naturalistic Explanations require or necessarily lead to non-theistic beliefs, it being recognized that many theists find no actual conflict between such scientific explanations and their own theistic beliefs.

    b. Scientific criticisms of Naturalistic Explanations, including scientific disagreements with the postulate that life results from unguided evolutionary change, gives rise to implications that logically favor theistic religions and belief systems, such as Christianity, Islam and Judaism, and that are logically inconsistent with non-theistic religions and belief systems, such as Secular Humanism, atheism and agnosticism, it being understood that this finding is not intended to in any way imply that such criticisms and disagreements require or necessarily lead to theistic beliefs, it being recognized that such criticisms and disagreements may be irrelevant to any individual's personal religious beliefs.

3. Given the impact of origins science on religion, we believe objectivity as discussed below is necessary for both teaching the scientific controversy and in actually deciding what to teach:

    a. An objective approach to teaching origins science is one that reasonably informs students about relevant competing scientific views. State endorsement of an objective approach that favors neither Naturalistic Explanations or the Scientific Criticism of those Explanations will more appropriately inform students about origins, will provide good and liberal science education, will cause the state to not take sides on the issue, and is a formula that is most likely lead to the best and religiously neutral origins science education.

    b. An objective approach to teaching origins science also involves a reasonable assessment of the current scientific consensus regarding the strengths of the

various competing theories as well as any biases that may affect that consensus and the presentation of these assessments.

c. Although public education should not discriminate against minority viewpoints, neither should it discriminate in favor of them and thereby: (a) offend the 70 to 80% of the patrons of public education, who, according to polling data introduced during the hearings, prefer reasonable and non-discriminatory and objective teaching of origins rather than a one-sided, "evolution only" paradigm, and (b) further erode economic, political and participatory support and confidence in Kansas public education.

d. Given the unavoidable impact of origins on religious belief, we find anyone promoting any side of the debate may be influenced in their advocacy by their own known or unknown theistic or non-theistic perspectives and that the duty of the Committee and members of the State Board is to (1) fully inform themselves about the issues, (2) ascertain the scientific validity, educational propriety and logical effect of proposals being made, (3) whether the effect of any given proposal is educationally and constitutionally appropriate and (4) in carrying out this duty, set aside as much as possible their own particular religious perspectives from their deliberations with decision making favoring those proposals that are most likely to produce effects that are scientifically, pedagogically and constitutionally sound.

4. Based on the testimony of Dr. William S. Harris during the hearings, and the Testimony of Mr. Greg Lassey before the State Board on April 13, 2005, drafts of the Report and letters of transmittal submitted to the Board on December 10 and March 29, 2005, and the testimony of other witnesses along with the documents and written submissions provided by them during the hearings, and the lack of any substantive rebuttal to any of the foregoing, the Committee finds as follows:

a. The Authors worked diligently within the process provided to the Science Writing Committee and made extensive efforts to seek consensus on their proposals within that Committee.

b. The Authors offered a number of proposals that have been embraced by the Committee as a whole, including, without limitation, the following:

(1) The elimination of the implication found in 4th Grade Benchmark 3 of Standard 5 that natural phenomena (including living systems) lack the attribute of design;

(2) The deletion of a reference to the natural world as being only a "material" world (12th Grade, Standard 1, Benchmark 1, Indicator 1);

(3) The addition of indicators which encourage students to understand personal bias and preconceptions that may influence scientific explanation [12th Grade, Standard 1, Benchmark 1, Example 4(c)];

(4) Revision of 8th Grade, Standard 6, Benchmark 1 to recognize that the role of teachers is to reinforce normative parental and legal expectations regarding unhealthy adolescent behaviors;

(5) Revision of 12th Grade, St. 3, Benchmark 6 to remove the suggestion that human behavior may be due to natural selection rather than choice; and

(6) Revision of Introduction to eliminate a mechanism that would suppress student discussion of questions deemed by a teacher to be "outside the realm of science."[4]

c. Dr. Harris and the other Authors are motivated by a genuine desire and belief that if state discussions with impressionable children about the origin of life and its diversity, a subject that unavoidably impacts a variety of religious beliefs, are conducted in a scientifically objective way, without institutional preconception or bias that would favor a particular side of scientific controversies inherent in the subject, the discussions will more likely lead to the best science education as well as education that is more nearly secular, neutral and non-ideological.[5]

d. That Dr. Harris and the Authors, do not seek to insert a religious perspective into the standards, rather they seek to replace a bias that favors particular religious perspectives with scientific objectivity.

e. That no evidence was introduced during the hearings that contradicted the conclusion expressed in the two preceding findings, but rather the evidence submitted per the Rules of the committee was wholly consistent with these conclusions.

f. That the boycott of the hearings had the effect of coercing silence, subverting the search for good solutions to a problem that plagues public education and denigrating the Authors, the Report, and the witnesses in a manner that was wholly undeserved, inappropriate and disrespectful.[6]

g. That because counsel for those opposing the Report did not permit their presentations (which amounted to no substantive testimony and only disrespectful rhetoric) to be tested through cross examination by opposing counsel and the Committee, knowing full well that they were required by the rules to do so as a condition of their right to speak, their presentations are being given little or no weight by this Committee in arriving at its conclusions of law and findings of fact, and should be given no weight by other members of the Kansas State Board of Education, members of the public, the media and the patrons of Kansas Public Education.[7]

B. SUGGESTED FINDINGS OF FACT REGARDING DRAFT 2 AND THE PROPOSED REVISIONS.

1. The Committee finds that the addition of the phrase "informed and" to the Mission Statement as proposed by the Report will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

> **"Mission Statement**
> "Kansas science education contributes to the preparation of **all** students as lifelong learners who can use science to make ***informed and*** reasoned decisions that contribute to their local, state, national and international communities."

a. This change is consistent with the purpose of any program of education, one of the goals of which is "**educate….** c: to provide with information: INFORM..."[8]

b. The idea that education should "inform" is entirely consistent with the overall goal of education standards to identify things students are to "know and be able to do," since to "know" is **"1.** to perceive or understand as fact or truth; to apprehend clearly and with certainty."[9]

c. Adding "informed" decision making will enhance the goal of many of the standards that students "understand" the concepts enumerated, given the following definitions of "understand:"

> "**1.** to perceive the meaning of; grasp the idea of; comprehend….
> **"2.** to be thoroughly familiar with; apprehend clearly the character, nature, or subtleties of…."[10]

d. This change is consistent with the goal of National Science Education Standards which "require scientific information and scientific ways of thinking for ***informed*** decision making."[11]

e All of the 23 witnesses which testified for the Report effectively endorsed this change and many spoke specifically in favor of it, including Dr. Warren Nord, an expert on Education. The Report explains the common sense rationale for the change. Reasoned decisions alone can lead to very bad decisions. Reasonably complete information is necessary for a good reasoned decision.

f. The "Peer Review" provided by 12 scientists solicited by leadership of the Science Writing Committee does not offer any cogent reason for rejecting this change:

> (1) The analysis of the Peer Review of the Report by Dr. Harris which was introduced during the hearings shows eight reviewers not objecting to the change,[12] two reviewers specifically agreeing with the change and two disagreeing with it. The objections of the two in disagreement, Dennison (the change will change all of science) and Hurd ("this creates several errors and hazards") offer no substantive basis for their disagreement.

(2) No evidence was submitted during the hearings that contradicted the analysis made by Dr. Harris.

g. The legitimate goal of seeking "informed" as well as reasoned decision making, will aid the Committee's analysis of other proposals contained in the Report - will those proposals enhance understanding and comprehension of the scientific concepts to be studied so as to enable not only "reasoned," but "informed" decision making?

h. The proposed addition to the mission statement enhances science education that is secular, neutral and non-ideological.

2. The Committee finds that the following revision to the Nature of Science Section of the Introduction as proposed by the Report will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"As an alternative to the Nature of Science section in Draft 2, this proposal recommends the retention of the existing material under the Nature of Science in the current standards except for a revision to the definition of science and the addition of two new paragraphs at the end of the section.

Nature of Science

"Science is a systematic method of continuing investigation, that uses observation, hypothesis testing, measurement, experimentation, logical argument and theory building, to lead to more adequate explanations of natural phenomena. ~~Science is the human activity of seeking natural explanations for what we observe in the world around us.~~ Science does so ~~through the use of observation, experimentation, and logical argument~~ while maintaining strict empirical standards and healthy skepticism. Scientific explanations are built on observations, hypotheses, and theories. A hypothesis is a testable statement about the natural world that can be used to build more complex inferences and explanations. A theory is a well-substantiated explanation of some aspect of the natural world that can incorporate observations, inferences, and tested hypotheses.

Scientific explanations must meet certain criteria. Scientific explanations are consistent with experimental and/or observational data and testable by scientists through additional experimentation and/or observation. Scientific explanations must meet criteria that govern the repeatability of observations and experiments. The effect of these criteria is to ensure that scientific explanations about the world are open to criticism and that they will be modified or abandoned in favor of new explanations if empirical evidence so warrants. Because all scientific explanations depend on observational and experimental confirmation, all scientific knowledge is, in principle, subject to change as new evidence becomes available. The core theories of science have been subjected to a wide variety of confirmations and have a high degree of reliability within the limits to which they have been tested. In areas where data or understanding are incomplete, new data may lead to changes in current theories or resolve current conflicts. In situations where information is still fragmentary, it is normal for scientific ideas to be incomplete, but this is also where the opportunity for making advances may be

greatest. Science has flourished in different regions during different time periods, and in history, diverse cultures have contributed scientific knowledge and technological inventions. Changes in scientific knowledge usually occur as gradual modifications, but the scientific enterprise also experiences periods of rapid advancement. The daily work of science and technology results in incremental advances in our understanding of the world about us.

a. The definition of science proposed by the Authors is a very objective and rigorous definition that emphasizes empiricism, is embedded in the context of other provisions that require scientific explanations be "consistent with experimental and/or observational data and testable by scientists through additional experimentation and/or observation." and "meet criteria that govern the repeatability of observations and experiments."

b. The definition proposed by the Authors does not implicitly or explicitly seek to subject science to the study of God, spirits or supernatural causes, given in particular the requirement that explanations be "testable by scientists through additional experimentation and/or observation."

c. The definition proposed by the Authors was embraced by a unanimous vote of the Ohio State Board of Education on December 10, 2002[13].

d. The Ohio definition was taken from a definition of science used by the Ohio Academy of Science.[14]

e. The definition proposed by the Authors is consistent with the description of scientific knowledge contained in the National Science Education Standards.[15]

f. Based on the report prepared by Dr. Jonathan Wells, a witness for the Authors, and submitted to the Committee, the definition proposed by the Authors is consistent with definitions of science and/or scientific knowledge used by the other forty-nine states of the Country.[16]

g. Although the objective definition was not approved by the Committee as a whole, the Committee's vote on the definition of 10 for, 12 against and one abstention shows that the Committee was nearly equally divided on this issue.

h. Based on the testimony of (a) Warren Nord, PhD, a highly credentialed professor of philosophy specializing in Education and Religion, (b) Angus Menuge, PhD, a professor of Philosophy, Philosopher of Science, and author of the book *Agents Under Fire: Materialism and the Rationality of Science*, (c) Stephen Meyer, PhD, a philosopher of science who has written extensively on failed attempts to demarcate science, (d) James Barham, MS, an independent scholar focused on *evolutionary epistemology,* (e) and John H. Calvert, J.D., a lawyer who has studied, lectured, written and advised State and Local School Boards regarding the problematic use of demarcation criteria in origins science,[17] the definition of science proposed by the Authors is objective and therefore neutral as to religion, particularly in the scientific study of the history of the origin of life and its diversity.

i. As discussed in the conclusions of law, the objective and therefore neutral character of the definition proposed by the Authors will more effectively guide state sponsored discussions of origins and other areas of science that touch religion toward discussions that are secular, neutral and non-ideological.

j. The objective definition of science offered by the Authors will increase the scope of relevant scientific information to be provided to students about scientific concepts we seek to have them "understand."

k. Based on the Study of Dr. Wells that was submitted to the committee referred to above, the definition of science contained in Draft 2 and in current standards that explains only by reference to so-called "natural causes" (The "Naturalistic Definition") that would be replaced by the proposals of the Authors is a narrow definition that is not found in any other Science Standards published by other states.[18]

l. The National Science Education Standards do not contain the Naturalistic Definition of science.[19]

m. Based on the testimony of Drs. Meyer, Menuge, Nord and Philosopher of Science James Barham, the Naturalistic Definition of science has the effect of importing Methodological Naturalism into the Kansas Standards.

n. The Peer Review of the Report shows that Dr. Bottaro, Dr. Hoffmann, Dr. Theobald and Dr.Wiley acknowledge that the definition imports Methodological Naturalism, acknowledge that it is improper for the standards to promote Philosophical Naturalism, but argue that Methodological Naturalism is not the same as Philosophical Naturalism.

o. Based on the testimony of Dr. Meyer, Dr. Menuge, Dr. Nord, Philosopher of Science James Barham, Mr. Mustafa Akyol, and John H. Calvert, Esq. and many other witnesses, any technical distinction between methodological naturalism and philosophical naturalism, in practice collapses into Philosophical Naturalism, particularly where the purpose and effect of this "method" in developing explanations about the origin of life and its diversity are not appropriately disclosed.

p. Philosophical Naturalism is "the doctrine that cause-and-effect laws (as of physics and chemistry) are adequate to account for all phenomena and that teleological[20] [design] conceptions of nature are invalid" (*Webster's Third New International Dictionary of the English Language, Unabridged,* 1993). Naturalism is a philosophy and not a proven scientific theory or fact.[21]

(1). The effect of methodological naturalism in practice is to suppress evidence of design and purpose in nature because of the implications of that evidence, rather than because of any objective consideration of the evidence per the scientific method.

(2) As evidenced by the opposition to any scientific criticisms of evolution, the effect of methodological naturalism in practice is to suppress not only

the evidence of design and purpose in nature, but also scientific criticisms of evolution.

(3) The effect of the use of methodological naturalism in origins science is to suppress both the testing and criticism of theories of chemical and biological evolution, with the tendency of converting those scientific theories into dogmas.

(4) The Peer Review does not comment on the purpose and effect of using methodological naturalism in explanations relating to the origin of life and its diversity and therefore does not rebut the conclusions of the witnesses that methodological naturalism collapses into philosophical naturalism in practice.

q. Humanist Manifesto III introduced during the hearings[22] and the testimony of Dr. Menuge, Mr. Barham and Mr. Akyol and Mr. Calvert and the Case of *Smith v. Board of School Commissioners of Mobile County*[23] show that Secular Humanism is a religion based on "modern naturalism and physical science."

r. Based on the testimony of Drs. Menuge, Dr. Nord, and Mr. Calvert, Philosophical Naturalism is a philosophy that supports non-theistic belief systems such as Secular Humanism, atheism, and agnosticism.

s. Relevant legal authorities in the Suggested Conclusions of Law show that Secular Humanism is a religion.

t. Public Education should not endorse or oppose Secular Humanism, but rather should remain neutral as between theistic and non-theistic religions and belief systems.

t. The promotion by the state of the philosophy of Naturalism would conflict with the theistic beliefs of parents and students, including in particular those holding traditional Christian, Jewish and Muslim views.

u. The fact that certain theistic sects find no fault with naturalism and evolution is irrelevant to the issue of the State's obligation to remain neutral with respect to the plethora of religious views that it must accommodate.

v. The best formula for resolving conflicting religious implications of scientific explanations about origins is to ensure that students are informed of all relevant scientific controversies regarding those explanations.

w. The objective definition of science will best promote the objective specified in the preceding finding, while the Naturalistic definition appears to have the effect of improperly promoting the Philosophy of naturalism.

x. We agree with the legal conclusions set forth below that state sponsored Naturalism conflicts with both religious rights and individual rights of conscience provided by Section 7 of the Kansas Bill of Rights and the Establishment, Free Exercise and Speech Clauses of the First Amendment of the US Constitution.

y. For the foregoing reasons we believe the objective definition of science will produce the best science education and will avoid problems regarding the neutrality of science education that affects explanations of the origin of life and its diversity.

3. The Committee finds that the following additions to the Nature of Science Section of the Introduction as proposed by the Report will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"According to many scientists a core claim of evolutionary theory is that the apparent design of living systems is an illusion. Other scientists disagree. These standards neither mandate nor prohibit teaching about this scientific disagreement. However, to promote good science, good pedagogy and a curriculum that is secular, neutral and non-ideological, school districts are urged to follow the advice provided by the House and Senate Conferees in enacting the No Child Left Behind Act of 2001:

"The Conferees recognize that 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, why such topics may generate controversy, and how scientific discoveries can profoundly affect society."

a. Based on the testimony of Dr. Harris, Dr. Menuge, Mr. Barham, as well as the testimony of many scientists regarding the fundamental tenets of evolutionary theory we find that the modern theory of biological evolution postulates an unguided process, that many scientists claim that the apparent design of many living systems is not objectively real, but is merely an illusion and that such postulates are scientific even though they have obvious philosophical and religious implications.

b. We also conclude based on the testimony of Dr. Harris and other scientists and the discussion in the Suggested Conclusions of Law that *intelligent design* is a hypothesis based on observation and logical analysis and inference from observed scientific data that seeks to scientifically contradict the claim of illusion and the claim of biological evolution that life results from unguided evolutionary change.

c. We take notice that there exists a national scientific controversy regarding intelligent design and biological evolution and that the controversy is one that unavoidably impacts both theistic and non-theistic religions.

d Based on the testimony of Dr. Warren Nord, a professor of education and religion at the University of North Carolina at Chapel Hill, we find that (a) there is a distinct difference between science and science education in that the role of science education is to not only teach science but to educate students as to its broader role within society and to expose students to critical controversies that

surround it, and that (b) this mode of instruction is one that best promotes a "liberal education."

e. Regardless of whether issues such as intelligent design are or are not science, they often rely on scientific knowledge for their explication and involve issues which are scientifically and culturally controversial.

f. Regardless of whether intelligent design is or is not science, it is an inference from the data that requires scientific expertise for evaluation and explication.

g.. Accordingly, where science instruction raises issues about origins that implicate differing and controversial scientific perspectives on a particular issue, we believe good science education requires that teaching both sides of the scientific controversy be encouraged within the class in which the issue is raised and at the time the issue is raised.

h. We find that a discussion of origins can not be effectively bifurcated between a science class which discusses only a naturalistic perspective and another class such as "comparative religion" which may or may not even exist, and which if it does exist is likely taught by a teacher who never addresses the issue, and who if asked to address the issue would likely not be qualified to discuss the scientific aspects of both sides of the issue.

i. We believe teachers and students should not be prohibited from discussing that controversy so long as the design hypothesis is treated simply as a hypothesis and not as a fact, that discussions are limited to the reasonable scientific inferences that may be drawn from scientific analyses of the data and so long as such discussions do not stray into speculations about the identity, nature or realty of any "designer" that may be implicated by any inference of design.

j. The Peer Review on these proposed revisions reflect one comment in agreement with the change, nine stating no disagreement with it and two opposed on the basis of broad unsupported generalizations that do not address the specifics of any of the language in this proposed change.

k. We find that the suggestions contained in the language quoted from the Report of the Conferees about the NCLB constitutes good advice for any science education and that teachers and school districts should be encouraged to follow that advice.

l. We do not find that the advice is in anyway legally binding, but merely conclude that it is good advice regarding science education, particularly as it addresses religiously charged issues such as origins.

4. The Committee finds that the following additions to the paragraph in the Introduction titled "Patterns of Cumulative Change, as proposed by the Report and as further modified will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Patterns of Cumulative Change: Accumulated changes through time, some gradual and some sporadic, account for the present form and function of objects, organisms, and natural systems. The general idea is that the present arises from materials and forms of the past. An example of cumulative change is the formation of galaxies, explained by cosmological theories involving (among other theories) gravitation and the behavior of gasses, and the present diversity of living organisms, ***which*** ~~explained by~~ the biological theory of evolution, or descent with modification of organisms from common ancestors ***seeks to explain*** . The present position of the continents is explained by the theories of continental drift, which involves plate tectonic theory, fossilization, uplift and erosion. Patterns of cumulative change also help to describe the current structure of the universe. ***Although science proposes theories to explain changes, the actual causes of many changes are currently unknown (e.g. the origin of the universe, the origin of fundamental laws, the origin of life and the genetic code, the origin of major body plans during the Cambrian explosion, etc.).***

a Based on the unrebutted testimony of numerous credentialed scientists during the hearings, we find that a genuine scientific controversy exists with respect to certain aspects of common ancestry and the extrapolation of microevolution to account for the origination of macroevolutionary changes such as new complex organs or body plans and new biological systems which appear irreducibly complex.

b. The discussion of cumulative change improperly implies that the present diversity of living organisms is, as a matter of fact, "explained by the biological theory of evolution." The testimony shows that it may not be adequately explained.

c. Given the controversy over evolution, we find that the sentence should be revised to indicate that evolution is merely a theory that seeks to explain the diversity of living organisms, rather than a theory that does in fact explain it.

d. We also find that the change is necessary to eliminate any possible Naturalistic implication that the present (i.e. Nature) in fact did arise solely from the materials and forms of the past.

e. Based on the unrebutted testimony of numerous expert witnesses we find that the addition to this paragraph which explains that the "actual causes of many changes are currently unknown" is scientifically valid.

f. The analysis of the Peer Review shows that eight of the 12 reviewers did not object or did not strongly object to the proposed addition regarding unknown actual causes, that three of the remaining four did not disagree with the scientific validity of the statement but believed it to be "unnecessary," that one disagreed without expressing the known causes of the listed events; and that any objections in the Peer Review to this change is unpersuasive.

g. We believe it helpful for teachers to recognize that science does not have the answer to many fundamental questions so that they will be better prepared to more accurately describe the current state of scientific knowledge to students.

5. The Committee finds that the following additions to The Teacher Notes to Benchmark 5, of Standard 3 for Grades 5-7 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"TEACHER NOTES:

"Millions of species of animals, plants and microorganisms are alive today. Animals and plants vary in body plans and internal structures. The theory of biological evolution ***is an explanation of*** ~~explains~~ how gradual changes of characteristics of organisms over many generations ***may*** have resulted in variations among populations and species. Therefore, a structural characteristic, process, or behavior that helps an organism survive in its environment is called an adaptation. When the environment changes and the adaptive characteristics are insufficient, the species becomes extinct.

a. Based on the testimony of Dr. Wells and other witnesses and the discussion in the Treatise regarding the Origination of Organismal form cited in the explanation for this change in the Report, there appears to be a scientific controversy over whether and how characteristics change "gradually over time."

b. The Peer Review is not helpful with respect to this change since it comments on an unrelated prior criticism of the Authors of the Report to Draft 1. This provision was revised in Draft 2 to be partially responsive to the Author's Draft 1 criticism.

c. Given that controversy over whether change occurs gradually or suddenly, the proposed change provides a more accurate description of the state of the science.

6. The Committee finds that the addition of a new Indicator 2 and related teacher note to Benchmark 2 of Standard 4 relating to Earth and Space Science for Grades 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

Indicator: 2. ***"2. Tests a hypothesis about the cause of a remote past event (historical hypothesis) by formulating competing hypotheses and then describing the kinds of data (evidence) that would support one and refute the others."***

Additional Specificity for Indicator 2: "***2. Develops a "best current explanation" of what caused dinosaur extinction by reviewing the evidence for the asteroid theory vs. disease, volcanism and other theories."***

Teachers Notes: ***"Students should understand that many aspects of paleontology and earth science are historical in nature where one seeks to explain the cause of singular unobserved remote past events from presently existing evidence. Techniques used in science to explain the cause of past events are similar to techniques used by archeologists, paleontologists, and forensic scientists. Like detectives, these scientists***

develop tentative competing hypotheses and then seek clues that will rule in one while ruling out others. In many cases historical hypotheses may not be confirmed by experiment due to unknown variables and the inability to replicate conditions in the laboratory. As new clues are developed, historical hypotheses frequently change or are discarded entirely. As a consequence, in historical sciences one generally seeks "an inference to the best current explanation," with the understanding that the explanation may not be the "best" in the future. [See Carol Cleland, Historical Science, Experimental Science and the Scientific Method, Vol 29 No. 11, 987-990 (Geology, November 2001)].

a. Based on the unrebutted testimony of Philosopher of Science Stephen Meyer who has experience and training in geology and who wrote his doctoral dissertation at Cambridge on this specific subject, the paper by Carol Cleland, the quotes attributed to Dr. Ernst Mayr, an icon of evolutionary biology, and the testimony of many other witnesses about the subjectivity of hypotheses about the cause of singular remote historical events, the proposed additions are scientifically valid, content appropriate and age appropriate for high school science.

b. Dr. Stephen Meyer's testimony and his referenced dissertation and the paper of Carol Cleland referred to in the Teacher's Note show significant distinctions between "historical sciences," such as many aspects of geology, paleontology, forensics, and evolutionary biology on the one hand and pure physics, chemistry and non-evolutionary biology on the other. The distinctions include (1) the purpose of the latter is to determine properties of objects and systems, regularities and laws, while the concern of the historical scientist is to determine the cause of singular and unrepeatable, unobserved and unobservable past events; (2) the historical scientist uses different modes of reasoning such as retroductive causal or "abductive reasoning" that does not yield logically complete conclusions like deductive reasoning; (3) the historical scientist uses logic and imagination to connect a series of past causal events into an historical narrative that seeks an inference to the best or most plausible current explanation rather than a "proof;" and (4) the historical scientist tests hypotheses through a process of eliminating other possible past causes that may have produced an effect rather than a wholly experimental process that seeks to test hypotheses through an experimental control of all known variables associated with an effect.

c. Although the distinctions between historical and experimental sciences are in some cases a matter of degree and do not in all cases apply, in general, the plausibility of explanations for the cause of singular, unrepeatable, unobserved and unobservable remote past events that amount to historical narratives developed with both logic and imagination are intrinsically and unavoidably less reliable then explanations developed about the present operation and properties of systems and objects through rigorous empirical (observable and experimental) methods.

d. A good science education requires that students understand the legitimate distinctions between claims about the cause of singular unobserved remote historical events and those about the properties and operational characteristics of objects and systems presently observable and experimentally testable. Recognizing the distinctions will also assist them in "distinguish[ing] the data and

testable theories of science from religious or philosophical claims that are made in the name of science."

e. The Peer Review of this reflects one Reviewer thinking it to be a "great idea," (Bartlett), one Reviewer not objecting but arguing that a better example could be provided (Wiley), three not objecting and seven disagreeing, with the disagreement based primarily on the claim that there is no distinction between historical and experimental sciences (Brande,[24] Bottaro,[25] Edis,[26] Heppert,[27] Miller,[28] and Theobald [29]), and that the distinction tends to "marginalize historical hypotheses (Dennison).

f. As shown in the notes in the preceding finding, the Peer Reviewers objecting to this change on the basis that there is no relevant distinction between a "hypothesis about the cause of a remote past event (historical hypothesis)" that has not and can not be observed under laboratory conditions and one relating to events that are repeatable and testable in the laboratory via direct observation and experiment, fail to articulate in their Peer Review any substantive basis for this objection, nor have they offered any evidence that refutes the following conclusion of one of the most recognized evolutionary biologists in history:

> ".....Darwin introduced historicity into science. Evolutionary biology, in contrast with physics and chemistry, is a historical science – the evolutionist attempts to explain events and processes that have already taken place. **Laws and experiments are inappropriate techniques for the explication of such events and processes.** Instead **one constructs a historical narrative**, consisting of a tentative reconstruction of the particular scenario that led to the events one is trying to explain." (emphasis added) [Ernst Mayr, "*Darwin's Influence on Modern Thought,"* p. 80, (July 2000, Scientific American)]..

h. We find that the objections of Mr. Dennison that the historical/experimental distinction tends to marginalize historical hypotheses, is not a valid objection given the obvious fact that the cause of a singular unobserved remote historical event is in fact often very speculative and subjective due to the lack of direct observation and experiment. In this case the marginalization he worries about occurs because of an actual absence of evidence and our inability to reproduce the event in the laboratory. There are many "unsolved mysteries" in the historical sciences because of a lack of evidence.

i. No testimony was adduced during the hearings that contradicts the scientific validity of the proposed additions to this benchmark.

j. We find that the distinction between historical and experimental science is a critically important part of science education because it helps the student put into proper context scientific explanations regarding the cause of remote, unobserved and unobservable, historical events.

7. The Committee finds that the deletion of the word "personal" to avoid any limitation on the recognition of biases and preconceptions that may affect conclusions as suggested for Additional Specificity 4.c. for Benchmark 1 of Standard 1, Grade 8-12, relating to Science as Inquiry will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"c. evaluates ~~personal~~ preconceptions and biases with respect to his/her conclusions."

a. Although this proposed change did not find its way into Draft 2, it did receive in excess of two-thirds support from all of those who actually voted on the proposal. That vote was 14 for and three against. Six chose not to vote.

b. Recognition of bias and preconception is critical to the Scientific Enterprise, as explained in *Science for All Americans,* a publication of the American Association for the Advancement of science, as quoted on page 6 of the Report.

c. Understanding the purpose, effect and evidentiary basis for bias, preconceptions and assumptions should also assist students in "distinguish[ing] the data and testable theories of science from religious or philosophical claims that are made in the name of science."

d. None of the Peer Reviewer's objected to this change.

8. The Committee finds that the addition of indicator 6 for Benchmark 1 of Standard 1, Grade 8-12, relating to Science as Inquiry will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

Indicator: "*6. understands methods used to test those historical hypotheses that cannot be confirmed by experiment and/or direct observation, including the development of multiple competing hypotheses and the collection of evidence that both rules in one hypothesis while ruling out others."*

Additional Specificity:

"6 a. Formulates multiple hypotheses about a singular historical event such as the origin of a formation of sandstone or the cause of a fire or death.
b. Postulates multiple competing explanations for the event
c. Predicts the kinds of circumstantial evidence that one would observe under each hypothesis.
d. Collect evidence and draw an inference as to the best explanation and whether the evidence fits either hypothesis. Explain why either explanation can not be entirely validated by a laboratory experiment."

a. The conclusions reached for item 6. above regarding the same subject are applicable to this proposed revision as well.

b. The addition of this indicator under Science As Inquiry, is particularly important because the focus of the entire discussion is only on testing with experimentation. It otherwise ignores the problems involved with the testing of claims about the cause of singular remote unobserved and unobservable events that are not amenable to direct observations and experimental testing.

c. The Peer Review reflects one Reviewer favoring the proposal, seven not objecting, and four objecting, one of which was on the ground that the standard was not wrong, but just not age appropriate for high school (Hurd).

d. Given the emphasis on earth science, much of which is historical, the indicator is very age appropriate and the other objections are not cogent since they appear to be conflicting (compare Bartlett with Theobald), non-substantive (Dennison) or inaccurate (Wiley incorrectly claims no legitimate distinction).

9. The Committee finds that the addition of Additional Specificity 1.d. relating to the structure of DNA under Benchmark 2 of Standard 3, Grade 8-12, relating to the Life Sciences will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"1.c. The sequence of the nucleotide bases within genes is not dictated by any known chemical or physical law."

a. Based on the unrebutted testimony of numerous highly qualified biochemists, biologists and a geneticist, and references contained in the Report this statement is deemed to be scientifically valid.

b. Because no law describes the sequence of the genetic "letters," Jacques Monod, argues that "it necessarily follows that chance *alone* is at the source of every innovation, of all creation in the biosphere."[30]

c. The Peer Review does not provide any substantive disagreement with the scientific validity of this statement as five reviewers did not object to it, while three specifically agreed with it (Miller - "nobody ever suggested otherwise," Wiley - "Yes, this is correct and it is one of the reasons that biology can never be reduced to chemistry and physics," and Bottaro - agrees but not relevant), while others did not disagree with the scientific validity (Dennison and Heppert) or argued that "natural selection" or unspecified "biological laws" which are not "chemical or physical" laws would qualify.

d. Based on the unrebutted testimony of numerous qualified witnesses this addition is found to be highly relevant to an understanding and comprehension of the structure of DNA.

10. The Committee finds that the addition of Additional Specificity 1.a. relating to the definition of biological evolution under Benchmark 3 of Standard 3, Grade 8-12 and the title to that Benchmark will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Benchmark 3: Students will understand ***major concepts of the theory of*** biological evolution.

Indicator:
"Biological evolution, descent with modification, is a scientific explanation for the history of the diversification of organisms from common ancestors.
Additional Specificity:
"1. a. Biological evolution postulates an unpredictable and unguided natural process that has no discernable direction or goal. It also assumes that life arose from an unguided natural process."

a. Based on the testimony of numerous witnesses, the changes proposed are scientifically valid.

b. The mechanisms of evolution consisting of random variation in replicating populations sorted by changing environmental circumstances is one which has "no discernable direction or goal," is unpredictable and is therefore, by definition, unguided.

c. The National Biology Teacher's statement on teaching evolution acknowledges the unguided nature of the evolutionary process by explaining that the process ***has no discernable direction or goal, including survival of a species.***[31]

d. We find the argument of those that oppose this change that "science" takes no position on whether the process is guided or unguided is disingenuous and hence unpersuasive given the mechanism it postulates to drive the process and given the ample evidence from leading evolutionary biologists that evolution is unguided, and finally, given their rigid opposition in many scientific circles to any teleology or purpose in the natural world.

e. The Peer Review actually supports this change in as much as half of the Reviewers had no objection to it while the remaining, without denying the fact that the process is unguided, simply voiced objections to the reference to the NABT statement because the statement does not contain the word "unguided."

f. The posture of Current Kansas Standards, the National Science Education Standards and the American Association for the Advancement of Science that natural objects, including living systems, lack the attribute of design is consistent with this description of chemical and biological evolution as being ***unguided.***[32]

g. Numerous experts in the field of evolutionary biology have uniformly taken the position that biological evolution is an unguided process, these include Ernst Mayr and Douglas Futuyma who are referenced in the current Kansas Science Standards as authorities on the subject.[33]

h. The fact that the NABT statement does not actually contain the word "unguided" is irrelevant given the stated mechanisms of evolution and the acknowledgment that it has no "goal," an object necessary for a guided process.

i. The position taken by Draft 2 is that evolution must be an unguided process because it describes scientific knowledge as that which is limited to the "physical

world in terms of matter, energy and forces," none of which include any mechanism that has any known capacity to establish a goal.[34]

j. Although it may be politically incorrect or religiously sensitive to acknowledge that biological evolution actually posits an unguided process, the role of science education is to "inform," to tell it like it is, not to simply provide a politically correct description that masks the true nature of the concept.

11. The Committee finds that the addition of Additional Specificity 1.c. and 1.f. relating to the discussion of scientific data that conflicts with evidence for biological evolution under Benchmark 3 of Standard 3, Grade 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Benchmark 3: Students will understand ***major concepts of the theory of*** biological evolution.

"1.c. Patterns of diversification and extinction of organisms are documented in the fossil record. Evidence ***also*** indicates that simple, bacteria-like life may have existed billions of years ago. ***However, in many cases the fossil record is not consistent with gradual, unbroken sequences postulated by biological evolution.***

f ***The view that living things in all the major kingdoms are modified descendants of a common ancestor (described in the pattern of a branching tree) has been challenged in recent years by:***

i. Discrepancies in the molecular evidence (e.g. differences in relatedness inferred from sequence studies of different proteins) previously thought to support that view.

ii. A fossil record that shows sudden bursts of increased complexity (the Cambrian Explosion), long periods of stasis and the absence of abundant transitional forms rather than steady gradual increases in complexity, and

iii. Studies that show animals follow different rather than identical early stages of embryological development

a. Based on the unrebutted testimony there is a scientific controversy regarding universal common ancestry, that is the idea that all of the diversity of life can be traced back to a single common ancestor through an unbroken chain of descent with modification.

b. Based on the unrebutted testimony of numerous witnesses, the changes proposed to inform students about that controversy is scientifically valid, age appropriate and necessary for student "understanding" and comprehension of the theory of biological evolution.

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c. Based on unrebutted testimony during the hearings we find that lesson plans developed by the Ohio State Board of education that support these additions are

being successfully used by public schools in that state and could provide guidance to Kansas for the development of similar teaching aids and teacher training.

d. The consensus of the Peer Review essentially supports the above conclusions in that seven of the 12 reviewers did not object to these changes, two gave them mixed reviews, while only three objected (Bartlett, Bottaro and Miller).

e. We find the testimony of Dr. Jonathan Wells credible given the evidence that revisions of biology textbooks since 2002 appear to be reflecting many of the criticisms expressed in his book *Icons of Evolution* published in 2000.

f. We also note that the testimony of many of the other witnesses, including three origin of life experts provided testimony supportive of the conclusions drawn in that book that challenge the idea of universal common ancestry.

12. The Committee finds that the revision of Indicator 2 and the addition of Additional Specificity 2b. relating to mutations and other mechanisms that produce new heritable trains under Benchmark 3 of Standard 3, Grade 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Benchmark 3: Students will understand ***major concepts of the theory of*** biological evolution.

Indicator:
2.Populations of organisms ***may*** adapt to environmental challenges and changes as a result of natural selection, genetic drift, and various mechanisms of genetic change

Additional Specificity:
2*.b. New heritable traits may result from new combinations of genes and from random mutations or changes in the reproductive cells. Except in very rare cases, mutations that may be inherited are, neutral, deleterious or fatal.*

a. Based on the unrebutted testimony, these proposed changes are scientifically valid, and are necessary and appropriate for student "understanding" of biological evolution.

b. The consensus of the Peer Review essentially supports the above conclusions in that eight of the 12 reviewers did not object to these changes, one gave them a mixed review, while only three provided non-substantive objections, Bottaro and Dennison (because the change would "weaken evolution,"), and Theobald (argues that Futuyma, who is cited as a reference does not make this claim, although Futuyma states in the referenced text: "This figure [a graph showing practically nonexistent beneficial mutations] reflects the widespread belief that the great majority of mutations are deleterious or nearly neutral (i.e. with nearly zero effect), and that only a very small proportion are beneficial.").

13. The Committee finds that the addition of Additional Specificity 2e., 3a and 3d relating to the scientific controversy regarding the issue of whether micro evolution can be extrapolated to explain macroevolution under Benchmark 3 of Standard 3, Grade 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Benchmark 3: Students will understand ***major concepts of the theory of*** biological evolution.

2e. Change within a species is called microevolution....

3. a. Separate populations within a species may become sufficiently different ~~enough~~ that new species develop. This process is called speciation, ***or the first step in macroevolution.***

3.d. Whether microevolution can be extrapolated to explain macroevolutionary changes (such as new complex organs or body plans and new biochemical systems which appear irreducibly complex) is controversial. These kinds of macroevolutionary explanations generally are not based on direct observations and often reflect historical narratives based on inferences from indirect or circumstantial evidence.

a. Based on the unrebutted testimony, there is a scientific controversy regarding whether microevolution can be extrapolated to explain macroevolutionary changes described in the proposed revision.

b. Based on the unrebutted testimony, the changes in 2.e, 3.a. and the second sentence in indicator 3.d. are scientifically valid, and necessary and appropriate for student "understanding" of evolutionary theory.

c. Based on the unrebutted testimony of numerous witnesses, the changes proposed to inform students about the controversy discussed in the first sentence in 3.d. is scientifically valid, age appropriate and necessary for student "understanding" and comprehension of the theory of biological evolution.

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d. Based on unrebutted testimony during the hearings we find that lesson plans developed by the Ohio State Board of education that supports these additions are being successfully used by public schools in that state and could provide guidance to Kansas for the development of similar teaching aids and teacher training.

e. The consensus of the Peer Review essentially supports the claim of controversy in that five of the 12 reviewers did not object to these changes, while seven objected without providing substantive bases for their objections.

14. The Committee finds that the change to Additional Specificity 6 c relating to the use of reverse engineering and end directed thinking under Benchmark 3 of Standard 3, Grade 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Benchmark 3: Students will understand ***major concepts of the theory of*** biological evolution.

"6. c. Natural selection, genetic drift, genomes, and the mechanisms of genetic change provide a context in which to ask research questions and help explain observed changes in populations. ***However, reverse engineering and end-directed thinking are used to understand the function of bio-systems and information.***"

a. Based on the unrebutted testimony this proposed addition is scientifically valid, and is necessary and appropriate for student "understanding" of biological evolution.

b. Furthermore, the Committee found it interesting that numerous witnesses testified to their own personal experience that evolutionary theory is seldom used in operational science and that design type thinking has significant predictive power.[35]

c. The Committee finds no basis in fact for unsupported assertions that have been made from time to time that the adoption of changes to the Standards proposed by the Authors would in any way drive bioscience out of the state, rather the record indicates that science education that expands understanding of biological evolution is likely to produce more well informed scientists that will be better equipped to engage in bioscience.

d. The consensus of the Peer Review essentially supports the above conclusions in that ten of the 2 reviewers did not object to this change, while one appeared to specifically agree with it if the word "sometime" was inserted after the word "thinking."

15. The Committee finds that the addition of Indicator 7 relating to current scientific thinking regarding the origin of life under Benchmark 3 of Standard 3, Grade 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

"Benchmark 3: Students will understand ***major concepts of the theory of*** biological evolution.

Indicator:
7. Students will be able to explain proposed scientific explanations of the origin of life as well as scientific criticisms of those explanations.

Additional Specificity:

7.a. Life is proposed to have arisen from organic molecules by chemical evolution in a "prebiotic soup" (whether hot springs, lagoons, hydrothermal vents, etc.).

b. Chemical evolutionary theory has encountered a number of difficulties, including:

i. A lack of empirical evidence for a "primordial soup" or a chemically hospitable pre-biotic atmosphere;

ii. The lack of adequate natural explanations for the genetic code, the sequences of genetic information necessary to specify life, the biochemical machinery needed to translate genetic information into functional biosystems, and the formation of proto-cells; and

iii. The sudden rather than gradual emergence of organisms near the time that the Earth first became habitable.

a. Based on the unrebutted testimony of two origin of life experts and the testimony of other scientists who have studied in the area, including Physical Chemist Nancy Bryson, PhD, there is a significant scientific controversy regarding the origin of life.

b. Based on the unrebutted testimony of numerous witnesses and a survey of high school biology textbooks produced by one witness, the origin of life is a major part of teaching regarding evolutionary theory in the science classroom.

c. Based on the unrebutted testimony of numerous witnesses, the textbook explanations of chemical evolution are generally one sided and avoid any explicit discussion of significant scientific criticisms of the various theories that have been postulated for chemical evolution.

d. Given the prevalence of teaching about chemical evolution, the fact that it appears to be exceedingly controversial, the fact that it is an issue that is addressed by theistic and non-theistic religion, we believe it necessary that state standards be developed to ensure that the subject is taught with scrupulous scientific objectivity and that the proposed indicator and additional specificity will provide

a good framework for the development of model lesson plans, which witnesses testified could be reasonably easily produced.

e. Based on the unrebutted testimony of numerous witnesses, Indicator 7 and its additional specificity is scientifically valid, age appropriate and necessary for student "understanding" and comprehension of the theory of chemical and biological evolution.

f. The consensus of the Peer Review essentially supports the above conclusions in that seven of the 12 reviewers did not object to these changes, one specifically agreed with the change so long as the criticisms are "scientific" (which we find to be the case) while four disagreed without any substantive criticism.

16. The Committee finds that the additions and revisions to the Teacher's Notes under Benchmark 3 of Standard 3, Grade 8-12 will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

Teacher Notes:

See NABT Statement on teaching evolution and supporting materials regarding the unguided nature of biological evolution under the additional specificity in 1(a).

For more information regarding the effect of mutation on fitness as discussed in the additional specificity in 2(b) see: Douglas J. Futuyma , Evolutionary Biology, p.278 (1999).

Regarding the reference to historical narratives in the additional specificity in 3.(d, see Ernst Mayr, "Darwin's Influence on Modern Thought," p. 80, (July 2000, Scientific American).

Regarding the reference to end-directed thinking in additional specificity in 6.(c) see: Michael Ruse, Darwin and Design: Does evolution have a purpose?, p. 268 (Harvard, 2003)]

"Understand" does not mandate "belief." ***However, if both sides of a science controversy that impacts theistic and non-theistic religion are not presented, instruction may have the effect of promoting a particular kind of religious belief. Science education should strive to be secular, neutral and nonideological.*** ~~—Science studies physical phenomena by formulating explanations that can be tested against the physical world. Some scientific concepts and theories may differ from the teachings of a student's religious community or their cultural beliefs. Compelling student to believe is inconsistent with the goal of education.~~

a. A review of the texts in question show that the references are accurate and helpful.

b. The addition to the discussion of "understand" is valid and helpful, particularly with respect to any scientific discussion of origins.

17. The Committee find that Draft 2 should be revised to substitute Benchmark 1 of Standard 7, Grade 8-12 of the Current Standards adopted February 14, 2001 after making the changes suggested by the Authors as shown below, which relate to the History and Nature of Science and Science as a human endeavor, and that such changes will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

Benchmark 1: Students will develop an understanding that science is a human endeavor ~~that uses models to describe and explain the physical universe.~~

Indicator:
"The student…
1 Recognizes that people engage in science as part of a vocation and/or of an avocation.

Additional Specificity:
1. ***Science is used by research scientists to develop new medicines and by parents to promote the health of their families.***

Indicator:
2. Recognizes that scientific knowledge is used for personal, community and cultural decisions that affect beliefs and attitudes about health, natural resources and the environment, global and national politics, moral and ethical standards, and religion.

Additional Specificity:
2. For example, decisions the culture makes about bioethics and the use and extraction of natural resources are significantly impacted by scientific knowledge.

Indicator:
3. Recognizes that personal and cultural beliefs about science influence ways of thinking that are required for scientific advances, both towards training scientists and towards educating the populace to utilize benefits of science, such as standards of hygiene~~,~~ attitudes toward forces of nature, etc.

Additional Specificity:
3. Members of the public are the patrons and beneficiaries of science and their support for scientific research may be influenced by the extent to which the institutions of science remain scientifically objective on matters relating to religion, politics and government.

a. Based on the unrebutted testimony, these proposed additions are scientifically valid, are necessary and appropriate for student "understanding" of the nature of science and reflect good common sense.

b. The Committee finds it particularly important that students understand that scientific knowledge can affect many areas of ones life, including aspects that relate to religion and that students therefore need to be well equipped to distinguish the data and testable theories of science from religious and philosophic claims made in the name of science.

c. The Committee has considered the alternatives included in Draft 2 for this benchmark, one of which states that students are to "understand[s] there are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain, but for which solid scientific literacy is useful."

d. The Committee does not disagree entirely with the statement but believes the statement proposed by the Authors is much more comprehensive, stated more accurately and is not laden with a variety of implications that one might find in the Draft 2 proposal, such as the highly controversial idea of non-overlapping magisteria, the suggestion that religion is limited to those holding beliefs in "spirits," the implication that none of science is faith based, and the idea that science is all about rationality while religion is only about spirituality, etc.

e. Given the conclusion that a part of science education is about portraying science in a proper cultural context, rather than as a method of advocating science and all of its controversial tenets as an enterprise, we find the suggestions provided by the Authors more appropriately achieve this objective.

f. The consensus of the Peer Review supports the proposals of the Authors given that ten found no objection to them, while those objecting had no substantive basis for the objection other than that the proposals would tend to "weaken science," but in reality they merely seek to inform students of the current state of scientific knowledge accurately and without an exaggerated sense of certainty.

18. The Committee find that Indicator 1 and 4 of Benchmark 2 of Standard 7, Grade 8-12 of Draft 2 be revised in the respects shown by the Authors as shown below, which relate to the Nature of Scientific Knowledge, and that such changes will enhance science education on the basis of and for the reasons set forth in the following subparagraphs:

Indicator
1. scientific knowledge describes and explains the ***natural*** ~~physical~~ world ~~in terms of matter, energy, and forces~~. Scientific knowledge is provisional and is subject to change as new evidence becomes available.

Additional Specificity:
~~b.The core theories of science have a high degree of reliability within the limits to which they have been tested and their scope of applicability.~~
~~c. The open-endedness of science is its greatest strength~~ ***Science that is truly open-ended and that allows evidence rather than preconceptions to guide explanation is the strongest*** and allows for constant refining and improvement of ***its*** explanations.

Indicator:
4. ***Where possible,*** a testable hypothesis or inference must be subject to confirmation by empirical evidence ***(experimentation and direct observation). The testing of hypotheses about the cause of remote historical events that cannot be confirmed by experimentation and direct observation uses forensic methods of investigation.***

Additional Specificity:

4. a. ***Generally***, a valid hypothesis or inference must ***in principle*** be ~~potentially~~ falsifiable.

c. Hypotheses about the cause of remote historical events depend heavily on circumstantial evidence, and thus conclusions are frequently less certain than those drawn from direct observation and experimentation.

d. Generally, peer review is important to the confirmation of scientific knowledge.

a. The proposed change to indicator 1 is consistent with National Science Education Standards[36] and the rest of the standards which seek to describe the "natural world," rather than the physical world.

b. Dr. Angus Menuge, suggested the change in 4.a that revises "must be potentially falsifiable" to "must ***in principle*** be falsifiable. He explains: "Technically it is redundant to say 'potentially falsifiable' since 'falsifiable' means potentially shown false. But to convey the idea that it is often difficult to falsify an idea, you might say: 'must, at least **in principle** be falsifiable.' This brings out what is wrong with methodological naturalism: it is a principled block to falsifying certain claims."

c. The proposed change is also consistent with modern science that recognizes that the true scope of scientific knowledge can not be reduced to "physical" entities "in terms of matter, energy and the forces, given the fact that many features of the natural world include non-physical characteristics that defy reduction to physics and chemistry, such as biological information as well as consciousness, intelligence and behavior.

d. If scientific knowledge is limited to the physical world, then we should retain only the physical science standards and eliminate the life science standards.

e. Although it may be very appropriate for individual scientists to limit their focus to the "physical world in terms of matter, energy and the forces," we believe it problematic for institutions of public education to do so as witnesses have provided unrebutted testimony that it appears to have the effect of causing those institutions to embrace a philosophy of Naturalism or scientific materialism which is problematic both for good science and for the role of government in discussing with children controversial issues that impact religion, ethics, morals and even government.

f. Based on the unrebutted testimony, these proposed additions are scientifically valid, and are necessary and appropriate for student "understanding" of the nature of scientific knowledge.

g. The Peer Review is not helpful on this issue as this change was not presented to in Draft 1.

h. The proposed changes to indicator 4 adds tentativeness to descriptions of scientific knowledge, based on the testimony of numerous witnesses that science

encounters many areas of inquiry that are not amenable to strict demarcation rules.

19. The Committee finds that the revisions to indicator 1 of Benchmark 3 of Standard 7, Grade 8-12 of Draft 2 should be revised in the respects shown by the Authors as shown below, which relate to the understanding science from an historical perspective on the basis of and for the reasons set forth in the following subparagraphs:

Indicator:

1. the history of science and ***how science has influenced culture in both positive and negative ways.***

Additional Specificity:

i. ***Science progresses by robust debate and analysis of existing theories and hypotheses, which can lead to major new scientific advances (e.g., relativity, plate tectonics, quantum theory, biological evolution).***

ii. ***Well-established scientific theories can sometimes blind the scientific community to the need for revisions in existing scientific explanations.***

iii. ***Science has led to significant improvements in physical health and economic growth; however, modern science can sometimes be abused by scientists and policymakers, leading to significant negative consequences for society and violations of human dignity (e.g., the eugenics movement in America and Germany; the Tuskegee syphilis experiments; scientific justifications of eugenics and racism; Social Darwinism).***

a. The foregoing proposals are common sense improvements that also reflect the goal of science education as an enterprise which seeks to have students ***"understand... how scientific discoveries can profoundly affect society."***

b. Subject to the change suggested by Dr. Bartlett as discussed in c. below, based on the unrebutted testimony, these proposed additions are scientifically valid, and are necessary and appropriate for student "understanding" of science from historical perspectives.

c. The Peer Review supports these changes in that eleven of the twelve reviewers offered no objections with one (Bartlett) lodging one minor comment that the phrase "critical analysis of properly collected data," be substituted for the word "debate"in subparagraph i, which we believe is a positive change that should be implemented.

20. The Committee finds that the Glossary should be revised in the respects shown by the Authors in the Report given those changes are consistent with the foregoing.

II. SUGGESTED CONCLUSIONS OF LAW

Summary

The Suggested conclusions of law consist of two parts. Part A consists of a general overview of the various laws applicable to public school teaching of origins science. This section provides an introduction to the First Amendment rights of parents and students under the Establishment Clause, the Free Exercise Clause and the Speech Clause. The discussion then moves to relevant provisions contained in No Child Left Behind, why Kansas Standards must be "secular, neutral and non-ideological," and the meaning of that phrase. The overview ends with a discussion of Section 7 of the Kansas Bill of Rights which protects student and parent rights regarding religion and conscience.

Part B then applies the law discussed in Part A to the Proposed Revisions to the Science Standards. Section 1 of Part B shows that the Proposed Revisions are not only consistent with that law, but that they actually serve to bring the state into compliance with it. Section 2 explains why Draft 2 is not consistent with the applicable law, assuming the Proposed Revisions are not made.

A brief outline of these parts is as follows: **Page**

A. Overview of the Relevant Law: The relevant law applicable to the proposed revisions to Draft 2 of the science standards that relate to origins consist primarily of The First Amendment to the US Constitution, Certain Provisions of the No Child Left Behind Act and Article 7 of the Kansas Bill of Rights.

1. The relevant provisions of the First Amendment are the Establishment, Free Exercise and Speech Clauses, which have been held to apply by virtue of the 14th Amendment to not only laws adopted by "Congress," but also to policies and actions of state and local governing bodies and agencies, including the state board of education.[37] The First Amendment provides:

> "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; of the right of the people peaceably to assemble, and to petition the Government for a redress of grievances."

a. "Religion" under the First Amendment has been defined very broadly to promote state neutrality and non-discrimination as between particular religious sects, as between theistic and non-theistic religions and belief systems and as between religion and non-religion.

The word "religion" as used in the First Amendment has not been defined by the Court with precision. Rather it has allowed that meaning to "evolve" on a case-by-case basis into a broad concept that encompasses not only "religion," but also "nonreligion."[38]

Religion includes not only traditional theistic religions, but also non-theistic religions such as "Buddhism, Taoism, Ethical Culture, Secular Humanism and others."[39] Recognizing the absence of the need for a deity in a "religion," the Ninth Circuit Court of Appeals has adopted the following broad description of a "religion:"

> "First, a religion addresses fundamental and ultimate questions having to do with deep and imponderable matters. Second, a religion is comprehensive in nature; it consists of a ***belief-system*** as opposed to an isolated teaching. Third, a religion often can be recognized by the presence of certain formal and external signs."[40]

An excellent analysis of Secular Humanism as a religion may be found in *Smith v. Board of School Commissioners of Mobile County*, which is discussed at length in an exhaustive law review article about the legal definition of religion published in 2001.[41] The Smith case is important to the Standards as discussed below, because "modern naturalism" is the fundamental tenet of Secular Humanism. It holds that due to **"the teachings of modern naturalism and physical science**" "**we have no reason to believe in a creator**" or any "**transcendent power at work in the world.**" Absent inherent purpose and a God that intervenes in the natural world, it urges its adherents to abandon "**traditional religion**," which claims we were made for a purpose, and use our human reason to "**develop a new ethics and a new method of moral order."**[42]

Although *Smith* was reversed on appeal, the Eleventh Circuit did not disagree with the conclusion of the lower court that Secular Humanism was a religion. It simply found that the books in question did not promote Secular Humanism.[43]

The breadth of the concept of "religion" becomes apparent when one considers that the First Amendment has been construed to regulate not only government practices that promote religion, but also those which denigrate it. Thus, secular concepts that are not inherently religious in and of themselves may be constitutionally proscribed because they are offensive to religion.[44] This is an important consideration in deciding whether the state should suppress discussions of scientific criticisms of Naturalistic Explanations of origins by adopting science standards that would apply methodological naturalism as the vehicle for that suppression. Although methodological naturalism itself may not be a "religion," it is in the nature of a doctrine rather than an evidentiary fact or scientific theory that has the effect of promoting non-theistic beliefs over theistic ones when used in connection with explanations about origins.

The scope of religion is further expanded when it is recognized that government neutrality is required not only between religion and religion, but also between "religion and nonreligion."[45] It cannot discriminate between "believers and nonbelievers."[46]

Nonreligion appears to cover "isms" that may not rise to the level of a true religion, such as "secularism,[47]" atheism[48], agnosticism, and scientism.[49]

Naturalism/materialism, to the extent that it is not a "religion," is at least a "nonreligious" belief system that the state cannot favor over theistic religious beliefs. It is the fundamental tenet of not only Secular Humanism, but also Scientism as described above, atheism and agnosticism. It is the lynchpin that supports all of those non-theistic belief systems. This is reflected in the following classification by C.S. Lewis, the highly regarded Christian philosopher:

> "The first big division of humanity is into the majority, who believe in some kind of God or gods, and the minority who do not. On this point, Christianity lines up with the majority — lines up with ancient Greeks, and Romans, modern savages, Stoics, Platonists, Hindus, Mohammedans, etc., ***against the modern Western European materialist."***[50] (emphasis added)

In recognition of this fact, those opposing the proposals and the leadership of the Writing Committee have agreed that it is inappropriate for the state to be promoting Naturalism. They just claim that state sponsorship of Methodological Naturalism is not the same. As discussed below and as explained by the testimony of a number of philosophers of science, although their may be a technical distinction between methodological naturalism and Naturalism, any such distinction collapses in practice. This is because methodological naturalism requires acceptance and is generally not disclosed, or if disclosed, not adequately disclosed.[51]

The conscientious objector cases illustrate the broad reach of both terms – "religion" and "nonreligion."[52] In those cases the objectors refused to comply with the draft during the Vietnam war due to a variety of "conscientious objections" that did not involve "religious training and belief ..**in a relation to a Supreme Being**.." as required by the exemption provided under § 6 (j) of the Universal Military Training and Service Act.[53] The court resolved the issue by construing religious belief to include "belief that is sincere and meaningful [and that]

occupies a place in the life of its possessor parallel to that filled by the orthodox belief in God ....."[54]

In a concurring opinion in the Welsh case, Justice Harlan noted that Welsh's beliefs could not even be characterized as non-theistic religious beliefs, but merely conscientious beliefs based on morals and ethics and that are more properly characterized as "nonreligious." He concluded that government may not discriminate between those beliefs that are merely based on conscience and those that are strictly religious, whether theistic or non-theistic.[55] Thus, government may not discriminate between "religion and nonreligion." This distinction is particularly relevant, because in the critical case dealing with origins, *Epperson v. Arkansas*,[56] the court found that a statute that would suppress a so-called secular theory of origins (evolution) would have the effect of causing the state to take sides between "religion and nonreligion." This is relevant to Draft 2, because the proposed naturalistic definition of science would exclude any evidence or analysis that would harmonize with, but not entail, supernatural explanations and that would undermine Naturalistic Explanations of origins.

In a variety of cases the Court has recognized that government may not discriminate between "religious and nonreligious publications,"[57] "religious and nonreligious" theories of origins,[58] "religious and nonreligious schools,"[59] "religious and nonreligious" groups seeking access to public school facilities,[60] and religious and nonreligious killing of animals.[61]

Thus, the phrase "respecting...religion" requires a posture of neutrality not only between religion and religion, but also between religion and nonreligion.

An inference of design is not religion. Just as it is not religious to observe patterns on rocks and then infer that they have been reshaped by intelligence for a purpose - designed for a particular end, it is not religious to observe patterns in living systems, find the same criteria used for discriminating between rocks and artifacts, and infer design.

William Dembski, a mathematician and philosopher, has articulated rigorous criteria for distinguishing between designs and occurrences.[62] The primary distinction between religion and science is that science is always tentative and theoretical, while religion must be dogmatic. A scientific inference of design in living systems is a very limited, tentative and theoretical claim that essentially is the scientific disagreement with the claim of evolution that life results without design through an unguided mechanistic process involving random mutations in replicating populations that produce new variations that are then sorted for survival through random changing environmental circumstances. A scientific inference of design is limited to the data. Because the data does not *require* a conclusion of design or contain a signature or copyright notice, it does not reveal the identity of the designer or even whether the system was in fact designed. An inference of design merely implies a possible intelligent cause, which may or may not be "supernatural." An inference of design is not absurd given the fact that intelligence is ubiquitous in the natural world, consisting not only of human intelligence, but animal intelligence and scientific programs that seek to discover alien intelligence.

In Jacques Monod's famous essay, *Chance and Necessity*[63] he concludes that the sequence of genetic letters in DNA are not dictated by any known chemical or physical law. Because his philosophy allows no other alternative, he concludes that the sequence must be due to chance alone:

> "We call these [mutation] events accidental; we say that they are random ***occurrences***. And since they constitute the *only* possible source of modifications in the genetic text, itself the sole repository of the organism's hereditary structures, it necessarily follows that chance *alone* is at the source of every innovation, of all creation in the biosphere. Pure chance, absolutely free and blind, at the very root of the stupendous edifice of evolution: this central concept of modern biology is no longer one among other possible or even conceivable hypotheses. It is today the sole conceivable hypothesis, the only one that squares with observed and tested fact. And nothing warrants the supposition --or the hope – that on this score our position is likely to be revised." (except for the bold italics on the word "occurrences," the emphasis has NOT BEEN ADDED)

If indeed evolution is a scientific theory and not an ideology, then Monod's bold assertion and that of modern evolutionary biology, that mutation is entirely random, must be subject to testing and challenge. Given the historical nature of this science, the claim of chance can be tested within the limits of that science. Those exploring design theory are engaged primarily in that endeavor. They are asking whether the chance hypothesis is the best explanation given the level of complexity being found in even the simplest biological system. They are also suggesting, given the data that questions the chance hypothesis, and given the fact that the data is consistent with an intelligent cause, that perhaps that is a hypothesis that should not be ignored merely because of its implications.

In *Daubert v. Merrill Dow Corporation Pharmaceuticals,*[64] the Supreme Court held that for an inference or assertion to qualify as "scientific knowledge" it must be derived per the scientific method. An inference of design arises due to an application of that method and not from any religious text. That method starts with a question: "what is the cause of the complexity we see in living systems." The next step is to collect data that bears on the question, which includes messages in DNA that are not ordered by any known law and appear to be so complex as to exhaust all of the probability resources in the entire universe since the beginning of the big bang, assuming it occurred a billion times 20 billion years ago. The complexity is also consistent with the kind of complexity that we only see in systems that are known to have been intelligently designed. The next step is to develop a hypothesis responsive to the question asked in step one. The design hypothesis leaps from the data and winds up being a competitor to Monod's claim of chance. The fourth step is to test the hypothesis. That is essentially what design theorists are doing today. They are testing Dr. Monod's chance hypothesis.

In *McLean v. Arkansas,*[65] the court explored a number of definitions of science. One of the definitions he embraced is that "science is what scientists do." It takes a number of scientific disciplines to address the question addressed by Monod and William Dembski. In addition to biologists one needs biochemists, molecular biologists, geologists, paleontologists, physicists, chemists, mathematician, statisticians, and information theorists. If design is declared not to be science, then the question posed in the preceding paragraph will never be scientifically answered simply because no one but scientists have the qualifications and experience necessary to investigate it. Ruling design out of science will cause Monod's claim of chance to be nothing more than a philosophy that renders evolution untestable, not falsifiable and nothing more than a speculative historical narrative that has achieved the status of an ideology that is key to a number of non-theistic religions and belief systems. Thus, the interesting fact is that for evolution to be science, then it must acknowledge that design is a legitimate scientific challenge to its claim of chance and it must accept that challenge.

It is true that evidence of design in living systems as opposed to rocks implies a significant intelligent cause. However, a similar but competing implication arises from Monod's claim of chance. However, teaching both as competing scientific theories does not entail religion because the Supreme Court has made clear that a teaching is not religious just "because the material to be taught happens to coincide or harmonize with the tenets of some or all religions."[66] Thus teaching about the testing of the chance and design hypotheses, although they both have religious implications, is not religion itself so long as the teaching is objective and not biased one way or the other. The religious problem arises only when the state adopts a bias that effectively suppresses one or the other of these religiously charged perspectives.

For the foregoing reasons, both design and evolution are science and not religion, so long as they remain honest scientific competitors.

b. The Establishment Clause: "Congress [and any state or local agency of government, including a state board of education] shall make no law [or policy] respecting an establishment of religion,". (bracketed material added [67])

(1) The establishment clause seeks to separate the state from religion through policies of non-discrimination and neutrality, rather than policies of exclusion.

Although some have said that the Establishment Clause erects a wall of separation between Church and State, it is very clear that the role of government is not to be aloof to religion, but rather to be "neutral." It achieves separation through neutrality, not through exclusion and discrimination.[68]

An image that comes to mind when considering the concept of neutrality is that of an umpire at a baseball game. We want him to be separate from, but to support the efforts of, both teams by being scrupulously neutral so that the game may be played. We want him to call the balls and strikes as he sees them, regardless of who is batting or pitching. If we used the wall metaphor, the religious team would not be allowed in the stadium. With religion excluded, the game would be played between two secular and irreligious teams. Religion would be banished from the public view. The culture would witness only an intellectually boring intramural sport. Secularism would lead the league in the market place of ideas and be declared the winner of the only game in town before it was even played. Without anything to do, the umpire would be reassigned to perform as a security guard to make sure the "Divine Foot" never enters the stadium.

(2) The establishment clause is applicable to the Standards because they call for students to be taught scientific theories about origins that unavoidably impact religion and religious beliefs.

In *Allegheny County v. Greater Pittsburgh ACLU*[69] the court held that the Establishment clause regulates a government practice if it merely "**touches** upon religion." That case involved a nativity scene on governmental property. Along similar lines, the Court in *Gillette v. United States* said: "[T]he Establishment Clause stands at least for the proposition that when government activities **touch on the religious sphere**, they must be secular in purpose, evenhanded in operation, and neutral in primary impact."[70]

The findings of fact, show that both textbooks and the Draft 2 standards open a discussion with students about the origin of life and its diversity. They also show that any discussion about those subjects necessarily "touches upon religion, on the religious sphere." That touching implicates not only the Establishment Clause but the Free Exercise Clause and Article 7 of the Kansas Bill of rights. The following discussion demonstrates both the fact that origins are being discussed and that the discussion unavoidably impacts religion.

The Standards call for a Discussion of Origins. Provisions relative to Draft 2 which particularly impinge upon the origins discussions consist of explicit provisions and certain critical omissions.

The explicit provisions that address origins begin with the introduction which explains unifying concepts, one of which is patterns of cumulative change.

> **"Patterns of Cumulative Change**: ***Accumulated changes through time***, some gradual and some sporadic, ***account for the present form and function of*** objects, ***organisms,*** and natural systems. ***The general idea is that the present arises from materials and forms of the past. An example of cumulative change is*** the formation of galaxies, explained by cosmological theories involving (among other theories) gravitation and the behavior of gasses, and ***the present diversity of living organisms, explained by the biological theory of evolution, or descent with modification of organisms from common ancestors.*** The present position of the continents is explained by the theories of continental drift, which involves plate tectonic theory, fossilization, uplift and erosion. Patterns of cumulative change also help to describe the current structure of the universe.

This statement explains that life arises from "cumulative change" that "is," "explained by" the theory of biological evolution. Although chemical evolution is not mentioned as an example, it is included because the paragraph explains that "accumulated change" accounts for the origin of all "objects, organisms and natural systems."

Standards must also be viewed in the context in which they will be used. During the hearings it was shown that all biology textbooks address chemical evolution as well as biological evolution. Accordingly, even though the Standards omit explicit mention of chemical evolution, the State knows that the origin of life itself will become involved in the discussion. In order to set standards for that particularly sensitive discussion, the Report adds a chemical evolution indicator that seeks to have the discussion conducted in a way that will more completely inform students of the current status of scientific thinking on that subject.

As discussed at length, biological evolution is covered by the standards in Standard 3, Benchmark 3, Grade 8-12, where it is made clear that the theory is one that seeks to explain the "history" of life, beginning with a first common ancestor after life has arisen:

> "Biological evolution, descent with modification, is a scientific explanation for the history of the diversification of organisms from common ancestors."

A journey through the Benchmark explains that life arose billions of years ago, that since then, change has resulted from adaptation "to environmental challenges and changes as a result of natural selection, genetic drift, and various mechanisms of genetic change."

A primary problem with the discussion is that it omits an accurate description of the mechanism of evolution. It fails to point out that the "mechanisms of genetic change" are primarily random mutations in replicating populations that are sorted for survival by random changing environmental circumstances in a wholly unguided and undirected process that has no discernable direction or goal. This fact of evolutionary theory is critical to both its explanatory power and its implications for theistic and non-theistic religion. However, the mechanisms are not mentioned.

Other omissions important to the origins "history" that is presented by Draft 2 include those described by the Report which seek to limit explanations to only certain kinds of explanations. Thus, in the introduction the definition of science limits all explanations to only those that may be explained by so-called "natural causes." Although "natural cause" is not precisely defined in the introduction, the description of "scientific knowledge" in Benchmark 2 of Standard 7, Grade 8-12, limits the description to the "physical world in terms of matter, energy and the forces." These limitations effectively guarantee that explanations for the origin of life and its diversity will be wholly naturalistic. Thus, Draft 2 does open the discussion of origins, but then proceeds to skew it so that only one side of the scientific controversy is presented.

The skewing is caused by an admitted construct used by Draft 2 called methodological naturalism.[71] It is the same bias that requires Monod to hold his chance hypothesis as an absolute. It is this subtle and generally undisclosed doctrine that requires acceptance that creates the religious problem.

Discussions of Origins Unavoidably Impact Religion. The Findings of Fact conclude, based on the testimony and evidence adduced at the hearings that both scientific explanations of origin of life and its diversity implicate religion because these are questions also addressed by both theistic[72] and nontheistic religions.[73] The impact of chemical and biological evolution on religion has been made clear by numerous scientists, including those referenced in the current science standards.[74]

> **Kenneth Miller:** "As Wise makes clear, he believes that the real danger of evolutionary biology to Christianity is not at all what most scientists might suspect. It is not that evolution's version of natural history threatens to unseat the central Biblical myths of unitary creation and the Flood. Rather, **it is the chilling prospect that evolution might succeed in convincing humanity of the fundamental purposeless of life. Without purpose** to the universe, **there is no [inherent] meaning, there are no [inherent] absolutes, and there is no [inherent] reason for existence."**[75] [Without "inherent" meaning and purpose, the meaning and purpose of life can only derive from the minds of men, as is the central claim of the Humanist Manifesto and Secular Humanism]. [emphasis and bracketed commentary added]

> **Scientific American/Michael Shermer:** "First, cosmology ***and evolutionary theory*** ask the ultimate origin questions that have traditionally been the province of religion and theology. Scientism is courageously proffering naturalistic answers that supplant supernaturalistic ones and in the process is providing spiritual sustenance for those whose needs are not being met by these ancient cultural traditions."[76] (emphasis added)

Ernst Mayr: "First, Darwinism rejects **all** supernatural phenomena and causations. The theory of evolution by natural selection explains the adaptedness and diversity of the world **solely materialistically**. It no longer requires God as creator or designer (although one is certainly still free to believe in God even if one accepts evolution). **Darwin pointed out that creation, as described in the Bible and other origin of accounts of other cultures, was contradicted by almost any aspect of the natural world.** Every aspect of the "wonderful design" so admired by the natural theologians could be explained by natural selection."[77] (emphasis added)

Douglas Futuyma: "Darwin's immeasurably important contribution to science was to show how mechanistic causes could also explain all biological phenomena, **despite their apparent evidence of design and purpose**. By coupling undirected, **purposeless** variation to the **blind, uncaring process** of natural selection, **Darwin made theological or spiritual explanations of the life processes superfluous**.[78] (emphasis added)

Alvin Plantaga on Gould, Simpson, Provine Dawkins, Futumya and Others: "There is a connected issue in the same area, but with a different twist. Prominent writers in the scientific community--for example, Dawkins, Futuyma, Gould, Provine, Simpson, and others--unite in declaring that evolutionary biology shows that there is a substantial element of randomness or chance involved in the origin and development of the human species; therefore, human beings (so they claim) have not been designed by God or anyone else. Gould writes: 'Before Darwin, we thought that a benevolent God had created us.' After Darwin, though, says Gould, we realize that 'No intervening spirit watches lovingly over the affairs of nature (though Newton's clock-winding god might have set up the machinery at the beginning of time and then let it run). No vital forces propel evolutionary change. And whatever we think of God, his existence is not manifest in the products of nature.'.....These writers, therefore, unite in declaring that modern evolutionary thought has shown or given us reason to believe that human beings are, in an important way, merely accidental; there wasn't any plan, any foresight, any mind, any mind's eye involved in their coming into being. But of course no Christian theist could take that seriously for a moment. Human beings have been created, and created in the image of God. No doubt God could have created us via evolutionary processes; if he did it that way, however, then he must have guided, orchestrated, directed the processes by which he brought about his designs. ....**Whether or not what we have here is science or only parascience, we have deep involvement with the spiritual struggle**."[79] (emphasis added)

Darrell Lambert: Darrell Lambert, a Boy Scout was recently asked to leave scouting because of his atheistic beliefs. Where did he get them? From "studying evolution in the ninth grade."[80]

American Association for the Advancement of Science resolution that seeks to ban any discussion of the scientific disagreement with the postulate that life arises and diversifies from an "unguided evolutionary process:" *"Therefore Be Further It Resolved,* that AAAS urges citizens across the nation to oppose the establishment of policies that would **permit** the teaching of "intelligent design theory" as a part of the science curricula of the public schools.."[81]

> **National Academy of Sciences National Science Education Standards: "Objects** can be categorized into two groups, **natural** and **designed**." [This is a dichotomy that is taught to fourth graders. The dichotomy divides all objects, including human made objects that are designed and made for a purpose, into two classes, with one class having an attribute that is not shared by the other. In this dichotomy, students learn that natural objects, which include living systems, lack the attribute of design. Only human made objects are designed. However, this is a philosophical conclusion, not one based on an evidentiary finding. It reflects the same philosophy used by Monod in using chance as the default explanation for the lack of any law that dictates the sequence of the genetic letters in DNA.] [82] (emphasis added)

Although evolutionary biology and a discussion of origins has a clear impact on theistic and nontheistic religious beliefs, we believe that impact is permissible so long as the core claims of evolutionary theory are subject to challenge, debate and scientific criticism. However, once steps are taken to artificially protect its claim from criticism, those steps effectively convert the theory into a dogma or ideology that then has the effect of favoring one particular kind of religion (nontheism) over another kind (theism.).

(3) The Establishment Clause requires that state activities regarding religion have a secular purpose.

Once, a state activity touches religion it must be shown that the activity has a secular purpose and a neutral effect on religion.

In the well known 1971 case of *Lemon v. Kurtzman*, the Supreme Court held that government practices which "touch" religion under the Establishment Clause:

> "must have **a secular legislative purpose**; second, its principal or primary **effect must be one that neither advances nor inhibits religion**, Board of Education v. Allen, 392 U.S. 236, 243 (1968); finally, the statute **must not foster 'an excessive government entanglement with religion**.'"[83]

Although the Lemon test has been criticized, the Court continues to decide cases based on its formulations and concepts, except that the "entanglement" prong appears to have been "folded ...into the primary effect inquiry."[84]

The secular purpose prong is violated if the government's **"actual purpose is to endorse or disapprove of religion:**"

> **"The purpose prong of the Lemon test asks whether government's actual purpose is to endorse or disapprove of religion. The effect prong asks whether, irrespective of government's actual purpose, the practice under review in fact conveys a message of endorsement or disapproval.** An affirmative answer to either question should render the challenged practice invalid.[85] (emphasis added)

To endorse means to approve, support or sustain, etc. As indicated under the discussion of neutrality, to avoid an endorsement of one religious idea over another or even an endorsement of "nonreligion over religion" the state must assume a "neutral" posture. Hence, so long as the

state remains neutral, just as is the case of an umpire or judge, it will not be engaging in an endorsement of either side that affects religion.

The Court has indicated that a practice which has both a valid secular and a religious purpose may satisfy the purpose prong of the Lemon test if the practice also has a neutral religious effect.[86]

In the discussion below we will consider whether (a) the changes proposed by the Report and (b) certain provisions of Draft 2 that are designed to (1) to keep supernatural explanations out of the discussion of origins and (2) to ensure that the evolution origins account is "not weakened," have a valid secular purpose.

(4) The Establishment Clause also requires that the primary effect of state activities that touch religion be neutral as to religion.

The core of the Establishment Clause is its focus on neutrality. The second prong of the Lemon test requires that the primary effect of the government practice in question be one that "neither **advances nor inhibits religion**." This has been interpreted by the Court as requiring government to be "neutral" as to religion – that it not discriminate for or against religion.

> " An attack founded on disparate treatment of "religious" claims invokes what is perhaps **the central purpose** of the Establishment Clause - **the purpose of ensuring governmental neutrality in matters of religion.....Necessarily the constitutional value at issue is "neutrality."**[87]

Neutrality derives in part from concepts of equality and equal protection, as explained by the Court in *Abington School Dist. v. Schempp*,

> "' Almost a hundred years ago in Minor v. Board of Education of Cincinnati, [7] Judge Alphonso Taft, father of the revered Chief Justice, in an unpublished opinion stated the ideal of our people as to religious freedom as one of '"**absolute equality** before the law, of all religious opinions and sects . . . . . The government is neutral, and, while **protecting all, it prefers none**, and **it disparages none**.**'"** (emphasis added)[88]

The definition of "neutrality" as reflected in Webster's means simply to not take sides: "1: not engaged on either side: not siding with or assisting either of two or more contending parties."[89] This definition is fairly consistent with the Establishment Clause jurisprudence.

Neutrality means that the primary effect of government action must not "prefer" or "disparage,"[90] "favor" or "disfavor,"[91] "promote" or "inhibit,"[92] "endorse"[93] or "disapprove,"[94] or "discriminate"[95] in favor of or against religion.

Neutrality is required not only as between religion and religion, but as to religion and nonreligion.[96] Discrimination is not permitted with respect to traditional religion and their various sects, but also with respect to other forms of belief, including, atheism, agnosticism, Secular Humanism, secularism and other non theistic sects.[97] This has been held to require neutrality as between theistic and secular beliefs.[98] In this respect the Court has recognized that "secularism" may not be promoted by government over traditional religion[99] and that "the

individual freedom of conscience protected by the First Amendment embraces the right to select any religious faith or none at all."[100]

The concept of neutrality effectively proscribes government from taking an official position on any form of **orthodoxy** affecting a variety of beliefs.[101]

The "neutrality" required by the Establishment Clause necessarily prohibits ***"religious gerrymandering***." A gerrymander is an attempt to divide a subject in a way that will necessarily exclude a particular viewpoint. One " must survey meticulously the circumstances of governmental categories to eliminate, as it were, religious gerrymanders."[102] Thus, government may not exempt Amish from the draft without also exempting atheists who share a similar conscientious aversion to war.[103] Nor may it exempt religious publications from a tax without also exempting nonreligious publications,[104] or draw a city ordinance in a way that excludes religious activities but not nonreligious ones.[105]

In the discussion below we will discuss whether (a) the changes proposed by the Report and (b) certain provisions of Draft 2 that are designed to (i) to keep supernatural explanations out of the discussion of origins and (2) to ensure that the evolution origins account is "not weakened" have a neutral effect on religion.

(5) The key establishment clause cases regarding science education about origins holds that government may not gerrymander the scientific discussion to promote a particular view point important to religion.

Welsh v. United States. Justice Harlan in *Welsh* explained that the Establishment Clause effectively proscribes religious gerrymandering. A gerrymander is a device to divide a subject so that a particular viewpoint or class of ideas is favored over some other class. Thus in *Welsh,* the Selective Service Act drew lines of distinction that would favor religious over nonreligious objectors. The statute was offensive because it was underinclusive. Similarly, in *Texas Monthly, Inc. v. Bullock,*[106] a statute which provided a tax exemption for religious publications was underinclusive in that it excluded nonreligious publications from the exemption, and in *Church of Lukumi Babalu Aye v. City of Hialeah*, a statute which outlawed the killing of animals for religious rituals but not for sporting and other incidental purposes effected an impermissible gerrymander against religion and in favor of nonreligion.[107]

The concept of gerrymandering between religion and nonreligion is more explicitly discussed in *Welsh:*

> "However, having chosen to exempt, ***it cannot draw the line between theistic or non-theistic religious beliefs on the one hand and secular beliefs on the other***. Any such distinctions are not, in my view, compatible with the Establishment Clause of the First Amendment. See my separate opinion in Walz v. Tax Comm'n, 397 U.S. 664, 694 (1970); **Epperson v. Arkansas, 393 U.S. 97 (1968);** School District of Abington Township v. Schempp, 374 U.S. 203, 305 (1963) (Goldberg, J., concurring); Engel v. Vitale, 370 U.S. 421 (1962); Torcaso v. Watkins, 367 U.S. 488, 495 (1961); Fowler v. Rhode Island, 345 U.S. 67 (1953). The implementation of the neutrality principle of these cases requires, in my view, as I stated in Walz v. Tax Comm'n, supra, "an equal protection mode of analysis. ***The Court must survey meticulously the circumstances of governmental categories***

> ***to eliminate***, as it were, ***religious gerrymanders***. In any particular case the critical question is whether the scope of legislation encircles a class so broad that it can be fairly concluded that [all groups that] could be thought to fall within the natural perimeter [are included].""[108] (citations omitted and emphasis added)

Epperson v. Arkansas. According to Justice Harlan, the classic case of a religious gerrymander is that found in *Epperson v. Arkansas*.[109] In *Epperson* the Arkansas legislature enacted a statute that prohibited the teaching of Darwin's theory of evolution because it conflicted with a literal interpretation of creation contained in the Bible.[110] The important part of the holding was that the Court found that the action was not neutral as to religion and non-religion because the statute did not exclude all discussions of origins, but only one side of the discussion:

> " Arkansas' law cannot be defended as an act of religious neutrality. Arkansas did not seek to excise from the curricula of its schools and universities all discussion of the origin of man."

In that case the class involved was "all discussions of the origins of man." The State law, excised evolution from the discussion instead of excising the entire discussion. Justice Harlan notes this in his discussion of impermissible religious gerrymandering:

> "The Establishment Clause case that comes most readily to mind as involving 'underinclusion' is Epperson v. Arkansas, 393 U.S. 97 (1968). There the State prohibited the teaching of evolutionist theory but "did not seek to excise from the curricula of its schools and universities all discussion of the origin of man."[111]

In Draft 2, a definition of science is proposed that would limit explanations to only "natural explanations." When this definition was proposed in 2001, Dr. John Staver, a current member of the writing team and then Chairman of the 2001 writing team explained to the state board that this definition had the effect of excluding any discussion of an inference of design based on an observation and analysis of the complexity that inheres in living systems.[112] Thus, the stated purpose of the current definition and the definition that inheres in Draft 2 is to gerrymander out of the discussion of origins scientific evidence and analysis of design so that only Naturalistic Explanations would be allowed.

As explained by counsel for "Draft 2" during the hearings, the gerrymander must also exclude scientific criticisms of evolution because that would be a way to get design in through the back door. Thus, the gerrymander not only excludes possible consideration of the alternative to evolution's claim that mutation is entirely random, it also philosophically excludes scientific criticisms of the positive case for evolution. The best evidence of an institutional gerrymander of criticisms is seen in the NABT statement introduced during the hearings which shows that association urging its members to do nothing that would "weaken" the theory of evolution, including discussing the idea that change occurs "suddenly," which the fossil record actually shows.

In this reverse scopes case involving the Kansas Standards, the philosophy that is being promoted by underinclusion is the philosophy of Naturalism, rather than the Genesis account. Naturalism, as has been pointed out is the fundamental tenet of Secular Humanism and other non-theistic isms. Eugenie Scott, the CEO of the National Center for Science whose mission is to see that evolution is not "weakened," is a signatory to Humanist Manifesto III and was

actively involved in the drafting of the Introduction and Nature of Science Section to Draft 2, as was shown during the hearings by Ms. Scott's notes embedded in Draft 2.

McLean v. Arkansas. The case of *McLean v. Arkansas*[113] reflects another example of efforts taken to gerrymander a scientific discussion of origins to promote a particular religious/philosophic perspective. In that case the Arkansas legislature sought to avoid the result in *Epperson* by requiring that "creation science" and evolution be taught side by side. Creation science was defined by the statute as science that seeks to validate various tenets of the creation account found in the book of Genesis. The court found the statute unconstitutional because creation science was a theory derived from a religious text. The court also was worried that teachers would not be equipped to teach this religious theory and the end result would limit the academic freedom of teachers to teach evolution. Thus, a particular religious philosophy would be injected into and have the effect of narrowing the scientific discussion.

Edwards v. Aguillard. During the litigation in *McLean v. Arkansas,* the Louisiana legislature introduced a similar creation science bill that would require the teaching of "creation science" whenever evolution was taught. Before the legislation was voted on, the judgement in McLean ruling against the definition of "creation science" was announced. In response, the Louisiana legislature removed from the bill the definition of "creation science" so that the term was left undefined. The legislation was subsequently challenged and brought before the Supreme Court in the famous case of *Edwards v. Aguillard.*[114]

The holding in Edwards has been thoroughly analyzed in a number of excellent books and articles.[115] However, the fundamental holding of the Court was that a scientific discussion of origins should not be conditioned upon a concurrent teaching of the genesis. This would essentially limit the academic freedom of teachers rather than expand it. In making this point the court stated:

> "If the Louisiana Legislature's purpose was solely to maximize the comprehensiveness and effectiveness of science instruction, ***it would have encouraged the teaching of all scientific theories about the origins of humankind.*** But under the Act's requirements, teachers ***who were once free to teach any and all facets of this subject*** are now unable to do so."[*Edwards v. Aguillard*, 482 U.S. 578, 588-9 (1987) (emphasis added)]

As discussed below, the Proposed Revisions implement this concept while Draft 2 violates it by gerrymandering the definition of science and scientific knowledge to exclude any scientific discussion that challenges one particular scientific theory of origins - evolution, both chemical and biological. By using a philosophy, rather than evidence, to effect the gerrymander, evolution is effectively converted into an ideology that is not secular or neutral. The gerrymander also limits rather than expands academic freedom. Teachers who seek to discuss the scientific evidence that conflicts with evolution face professional discrimination, as was demonstrated during the hearings. This creates a very unhealthy environment of fear in the biology classroom.

c. The Free Exercise Clause: "Congress [and any state or local agency of government, including a state board of education] shall make no law [or policy] respecting an establishment of religion, **or prohibiting the free exercise thereof;..."** (bracketed material and emphasis added)

The Free Exercise Clause has been applied in cases where a governmental regulation has effectively prohibited particular religious practices. Thus, in *Wisconsin v. Yoder,*[116] Amish students were not required to attend high school where their religion prohibited it; a Seventh Day Adventist was not required to work on Saturday to collect unemployment compensation, Jehova's Witnesses were not required to salute the flag[117] and Sikh prisoners were permitted to grow beards contrary to prison regulations requiring that they be shaved.[118]

However, under the holding in *Employment Div., Ore. Dept. Of Human Res. v. Smith,* a Free Exercise claim may be denied if the State can show that the law or regulation which impinges upon religious exercise is one of general applicability and is neutral as to religion.[119] Otherwise, it must clearly show both a compelling state need for the law or practice and that it is narrowly tailored to achieve that compelling interest.[120] The Smith defense does not appear available to the Board because, the Policy's discussion of origins is not neutral to religion and is not a law or practice of general applicability.

Perhaps the free exercise case of most relevance to Draft 2 is that of *Church of Lukumi Babalu Aye v. City of Hialeah.*[121] In that case an ordinance was narrowly drawn to prohibit a certain religious practice (ritual sacrifice of animals) but not proscribing other nonreligious forms of animal sacrifice for sporting purposes. Under Lukumi, once it is shown that a particular government regulation that impinges on free exercise is not of general applicability or neutral as to religion, then government must clearly show both a compelling state need for the law or practice and that it is narrowly tailored to achieve that compelling interest.

The burden on the state to show a compelling state interest once either neutrality or general applicability has not been demonstrated is severe. Only in rare cases will the analysis survive this scrutiny. This is made clear in both *Smith* and *Church of Lukumi Babalu Aye v. City of Hialeah,* 508 U.S. 520, 546 (1993) as follows:

> "To satisfy the commands of the First Amendment, a law restrictive of religious practice must advance `interests of the highest order,' and must be narrowly tailored in pursuit of those interests. McDaniel v. Paty, 435 U.S., at 628 , quoting Wisconsin v. Yoder, 406 U.S. 205, 215 (1972). The compelling interest standard that we apply once a law fails to meet the Smith requirements is not "water[ed] . . . down" but "really means what it says." Employment Div., Dept. of Human Resources of Ore. v. Smith, 494 U.S., at 888 . A law that targets religious conduct for distinctive treatment or advances legitimate governmental interests only against conduct with a religious motivation **will survive strict scrutiny only in rare cases**. It follows from what we have already said that these ordinances cannot withstand this scrutiny."

Kansas has applied the same test in *Wright v. Raines,*[122] where the court held that Sikh prisoners could not be required to shave without showing satisfaction of the following criteria:

> "But we are convinced that such restrictions are not to be imposed so as to deny the free exercise of an established religious faith without a proper determination of [1] compelling state interests in doing so, and without the further determination [2}that there are no less restrictive methods of achieving the object of the regulation. Only those interests of the highest order and those not otherwise served can overbalance legitimate claims to the free exercise of religion."

Under the Free Exercise Clause, parents have a right to instill theistic religious beliefs in their children. An official state policy that seeks to imbue students with a contrary non-theistic belief in naturalism or materialism would seem to prohibit or conflict with the free exercise of those rights. As stated by the Court in *Planned Parenthood v. Casey*, "[a]t the heart of liberty is the right to define one's own concept of existence, of meaning, of the universe, and of the mystery of human life. Beliefs about these matters could not define the attributes of personhood were they formed under compulsion of the State."[123]

So the issue under Draft 2 is whether state action that requires students to attend schools and thereby be required to "understand" only one side of the scientific debate on origins effectively prohibits or "infringes" upon the rights of parents to have their children understand the proscribed scientific side of the debate and not believe in the Naturalistic explanation of origins.

d. The Speech Clause: "Congress [and any state or local agency of government, including a state board of education] shall make no law [or policy] respecting an establishment of religion, or prohibiting the free exercise thereof; **or abridging the freedom of speech;."** (bracketed material and emphasis added)

"Generally, the government may not regulate speech based on its substantive content or the message it conveys."[124] However, where the government is the speaker it may regulate the content of speech when the government occupies a non-public forum.[125] Normally a school class room is deemed to be a non-public forum.[126] However, even in a non-public forum the state may not engage in viewpoint discrimination. Viewpoint discrimination occurs where there is no ban on a general subject matter [such as origins] but only on one or more of the relevant scientific perspectives:

> "If the topic of debate is, for example, racism, then exclusion of several views on that problem is just as offensive to the First Amendment as exclusion of only one. It is as objectionable to exclude both a theistic and an atheistic perspective on the debate as it is to exclude one, the other, or yet another political, economic, or social viewpoint."[127]

Generally, the speech clause is one that militates against state sponsored ideologies or orthodoxies. When a controversial subject is opened, but the state allows only one perspective, then the state effectively is promoting an orthodoxy or ideology. This idea is expressed well in the case of *Board of Education. v. Pico* where the Court held that the Speech Clause reflects a right of students to receive ideas.[128] In that case the court held that school officials violated the speech clause by causing the school library to remove certain books because those in authority did not agree with the ideas expressed by the books in question.

More particularly, in *Epperson v. Arkansas*,[129] the Court articulated this idea in voiding a statute that suppressed one of multiple perspectives on origins:

> ""As early as 1872, this Court said: 'The law knows no heresy and **is committed to the support of no dogma**, **the establishment of no sect**.'.....Judicial interposition in the operation of the public school system of the Nation raises problems requiring care and restraint. Our courts, however, have not failed to apply the First Amendment's mandate in our educational system where essential

to safeguard the fundamental values of freedom of speech and inquiry and of belief.....'[t]he vigilant protection of constitutional freedoms is nowhere more vital than in the community of American schools,' *Shelton v. Tucker,* 364 U.S. 479, 487 (1960). As this Court said in *Keishian v. Board of Regents,* **the First Amendment 'does not tolerate laws that cast a pall of orthodoxy over the classroom**.' 385 U.S. 589, 603 (1967)."

Assuming the standards are being published with the state as the speaker, are they being published in the context of a non-public forum or a limited public forum? In either case is it permissible for the state to seek to encourage districts within the state to open a science class to a discussion of origins that is scientifically controversial and then limit that discussion to only those scientific views that favor Naturalistic Explanations? Does this involve a form of impermissible viewpoint discrimination?

2. Requirements of the No Child Left Behind Act.

a. NCLB implicitly requires State Science Standards to be Secular, Neutral and Non-Ideological.

The idea that public education be secular, neutral and nonideological, is generally reflected in Supreme Court decisions discussed above interpreting the religion and speech clauses of the First and 14th Amendments to the Constitution. Although the Court may not have coined the phrase, in *Mitchell v. Helms,*[130] it implicitly recognized that the *secular, neutral and nonideological* formula was an appropriate standard for measuring the constitutionality of government provided educational services and materials. Consistent with this jurisprudence, Section 602 of NCLB amended Section 412 (e)(4) of the National Education Statistics Act of 1994 to explicitly require that "The Board take steps to ensure that all items selected for use in the National Assessment [of Educational Progress] are free from racial, cultural, gender or regional bias ***and are secular, neutral and nonideological***."

The implicit applicability of the "secular, neutral and non-ideological provision to state standards and assessments appears to follow from the foregoing, other First Amendment Jurisprudence and the application of Sections 1116(b)(5)(B) and 1116(e)(5)(B) and (D) of NCLB relating to School Improvement. These statutory provisions require schools which have failed to make adequate yearly progress to provide students with supplemental educational services from outside providers requested by parents. However, the services and materials provided by the provider must be ***both*** consistent with state standards and "secular, neutral and nonideological." This implicitly requires that the state standards themselves be secular, neutral and nonideological. Otherwise, meeting the statutory requirement would be an impossibility.

Similarly, services and materials provided by the State to private school students and teachers and certain immigrants under the Act are required to be "secular, neutral and nonideological." [See sections 1120(a)(1), 3245 (a)(7)(A), 9501 (a)(2); Section 5142(a)(1)]. If the state is required to provide children attending private religious schools with materials and services that must be secular, neutral and nonideological, one would expect them to obtain those materials and services from those developed for public school students per state academic content standards. One would not expect the state to have to develop new non-biased materials because those being provided to public school students are infected with a religious bias or anti-religious bias or because they tend to indoctrinate students in a particular ideology.

Accordingly, one must conclude that NCLB implicitly requires that academic content and assessment standards developed by the Kansas State Board and by Kansas educational agencies be secular, neutral and nonideological.

b. Secular, Neutral and Non-ideological effectively requires the state to teach the scientific controversy over origins.

The meaning of "secular, neutral and non-ideological" has been defined by the NAGB in its policy on NAEP Item Development and Review dated May 18, 2002, a copy of which is appended to these suggestions. The pertinent parts of that definition applicable to Kansas Science Standards include the following:

> **"Secular** — NAEP questions will not contain language that **advocates or opposes any particular religious views or beliefs**, nor will items compare one religion unfavorably to another. However, items may contain references to religions, religious symbolism, or members of religious groups where appropriate. .....
>
> **"Neutral and Non-ideological — Items will not advocate for** a particular political party or partisan issue, for any specific legislative or electoral result, or for **a single perspective on a controversial issue. An item may ask students to explain both sides of a debate, or it may ask them to analyze an issue, or to explain the arguments of proponents or opponents, without requiring students to endorse personally the position they are describing.** Item writers should have the flexibility to develop questions that measure important knowledge and skills without requiring both pro and con responses to every item. (Emphasis not contained in Appendix issued by NAGB)

Although the advice of the Conferees about science education referred to in the Report, is not contained in the Act itself, it does amount to legislative history that was voted on and adopted by Congress in connection with the Act that can be used to provide meaning to provisions of the act that are otherwise general in nature. In this regard, the advice arguably gives meaning to the application of "secular neutral and non-ideological" in the context of science education.

This interpretation seems reasonable given that the advice seeks to inform students in a more comprehensive way about origins in a manner that does not "advocate..or oppose any particular religious view" of origins and is thereby "secular." The advice also calls for the presentations of **multiple perspectives** rather than a "**single perspective"** on the scientific controversies surrounding origins education. This approach would satisfy the meaning of "neutral and non-ideological." Thus, the advice leads the state toward the best science education and at the same time religious neutrality. By promoting scientific objectivity that tends to educate and inform about the variety of scientific view on origins rather than the promotion of a single perspective it avoids student indoctrination in an ideology.

Clearly, the Report advances these concepts because it seeks an objective definition of science that will inform students of relevant multiple scientific perspectives about origins. Hence, the issue is whether Draft 2, without these provisions will effectively promote an educational paradigm that is not secular, neutral and non-ideological because it seeks to cause school districts to promote only a single perspective on a scientifically controversial topic that unavoidably impacts religion.

3. Section 7 of The Kansas Bill of Rights.

a. Section 7 of the Kansas Bill of Rights is much more specific than the First Amendment.

Section 7 of the Kansas Bill of Rights provides:

> § 7. Religious liberty. The right to worship God ***according to the dictates of conscience*** shall ***never be infringed***; nor shall any person be compelled to attend or support any form of worship; ***nor shall any control of or interference with the rights of conscience be permitted***, ***nor any preference be given*** by law ***to any religious establishment or mode of worship***. No religious test or property qualification shall be required for any office of public trust, nor for any vote at any elections, nor shall any person be incompetent to testify on account of religious belief. [emphasis added]

In *State v. Smith*,[131] 127 P2nd 518, 522 (Kansas 1942) the Kansas Supreme Court held that students who refuse to salute the flag and say the pledge may not be disciplined by expulsion as the regulation would be in violation of Section 7 of the Bill of Rights In so holding the Court found that when Section 7 was enacted on January 29, 1861 there was no federal constitutional provision applicable to the new state respecting religion,[132] and that section 7 is actually much more detailed than the First Amendment:

> "It will be observed that the wording of this section of our Bill of Rights is much more in detail respecting religious freedom than is the First Amendment to the Federal Constitution."

Furthermore, *State v. Smith* holds that in the establishment of a system of schools under Article 6, the legislature, and presumably the State Board, may not adopt regulations or statutes that in any way violate Section 7.[133]

The extent of the detail is interesting because Section 7 (a) explicitly prohibits state "control of or interference with the rights of conscience," (b) and not only forbids any "prohibition" of the "right to worship according to the dictates of conscience" but states explicitly that the right "shall never be infringed," and (c) forbids the giving of "any preference" to "any" "mode of worship."

The question raised by Section 7, is whether the mechanisms of Draft 2 that have been designed to suppress scientific criticism of Naturalistic Explanations of origins offends any of these provisions?

B. Application of Legal Principles to the Proposed Revisions and Draft 2

1. The Proposed Revisions offered by the Report Implement the requirements of the First Amendment, No Child Left Behind and the Kansas Constitution.

a. The Proposed Revisions do not violate the Establishment Clause because they do not seek to endorse a particular religion and have valid secular purposes. and are religiously neutral.

(1) The Proposed Revisions seek wholly secular purposes in that they are designed to (a) enhance student "understanding" of science and scientific explanations of biological origins, (b) promote a discussion of origins that is secular, neutral and non-ideological, (c) increase academic freedom and remove fear from the biology class room, and (d) promote origins education that is responsive to the legitimate desire of most of the patrons of public education for a more objective and religiously neutral discussion of origins.

The findings show that the all of the Proposed Revisions are focused on producing a scientifically objective discussion of origins and other aspects of science. It has been argued that a proposed revision of the current definition of science seeks to insert "supernatural" explanations into the standards. That proposition is refuted on its face by the proposed alternative which imposes severe empirical limits on scientific explanations:

> ***"Science is a systematic method of continuing investigation, that uses observation, hypothesis testing, measurement, experimentation, logical argument and theory building, to lead to more adequate explanations of natural phenomena.*** Science does so while maintaining **strict empirical standards** and healthy skepticism. Scientific explanations are built on observations, hypotheses, and theories. A hypothesis is a **testable statement** about the natural world that can be used to build more complex inferences and explanations. A theory is **a well-substantiated explanation** of some aspect of the natural world that can incorporate observations, inferences, and tested hypotheses.
>
> "**Scientific explanations must meet certain criteria.** Scientific explanations **are consistent with experimental and/or observational data and testable** by scientists **through** additional **experimentation and/or observation**. Scientific explanations must meet criteria that govern the **repeatability of observations and experiments**. The effect of these criteria is to ensure that scientific explanations about the world are open to criticism and **that they will be modified or abandoned** in favor of new explanations **if empirical evidence so warrants**..... (underlined emphasis added)

The above definition and discussion does not provide room for "supernatural" explanations. Rather it reflects a description of science that uses the scientific method, rather than philosophy to drive explanation. The discussion is actually consistent with the Supreme

Court's definition of scientific knowledge that was enunciated in *Daubert v. Merrill Dow Corporation Pharmaceuticals.*[134] Under *Daubert* for an inference or assertion to qualify as scientific knowledge, it must be derived by the scientific method rather than a preconception. Daubert explains that true science seeks the most "reliable" explanations rather than explanations that seek to reach a pre-ordained conclusion.[135]

The proposed definition and the context within which it resides is consistent not only with *Daubert,* but as shown by the findings is also consistent with the definitions of science and scientific knowledge found in the other 49 states, the National Science Standards and most discussions found in biology textbooks. The claim that the Report seeks to redefine science, is actually more applicable to the Current definition that was inserted into the Kansas Standards in 2001 for the first time in the history of state science standards and then subsequently rejected by Ohio.

During the hearings counsel for the opposition argued that by introducing scientific criticisms of evolution the Report sought to indirectly import the supernatural into scientific explanations. Carried to its logical conclusion this effectively would insulate evolution from any form of criticism that would tend to "weaken" evolution, a purely Naturalistic Explanation of origins. It would convert evolution into a dogma or ideology and effectively remove it from the realm of science. This is true because, as shown by the findings, evolutionary theory is an historical science that can not be confirmed by observation or experiment and that can only be tested or confirmed with an objective consideration of all relevant circumstantial evidence. If evidence inconsistent with the theory may not be considered, evolution results in nothing more than a speculation that has been converted into a dogma or ideology that promotes Secular Humanism and other non-theistic belief systems.

Thus the purpose of the proposed change is not to insert the supernatural, but rather to replace a bias against any scientific explanation or criticism that might favor one class of religious beliefs. The replacement for the bias is not another bias, but nothing more than scientific objectivity that should be religiously neutral. In this regard the Supreme Court has made clear that the establishment clause is not violated simply "because the material to be taught happens to coincide or harmonize with the tenets of some or all religions."[136] If that were the case, then the teaching of evolution would be proscribed as it is a fundamental tenet of Humanist Manifesto III.

As shown by the findings of fact the Proposed Revisions seek to (a) enhance student "understanding" of science and scientific explanations of biological origins, (b) promote a discussion of origins that is secular, neutral and non-ideological, (c) increase academic freedom and remove fear from the biology class room, and (d) promote origins education that is responsive to the legitimate desire of most of the patrons of public education for a more objective and religiously neutral discussion of origins.

Polling results introduced during the hearings from a number of polls that have been conducted around the US in the last four years show that only a small percentage of the population favors the kind of discriminatory "Evolution Only" paradigm proposed by Draft 2 while 70 to 80% favor origins education that teaches both sides of the controversy. This shows that an "Evolution Only" approach is one which actually discriminates in favor of a small minority. It is this kind of discrimination that promotes home schooling, the cry for vouchers and an erosion in the participatory, economic and political support needed to provide and sustain

public education. Ending the discrimination should increase confidence in and support for this critical institution.

All of these are legitimate and valid secular purposes. The evidence adduced during the hearings by the 23 witnesses show that the purposes are genuine and factually based and not mere shams created to advance a hidden religious agenda.

The testimony of Dr. Harris and other witnesses shows that the Proposed Revisions seek to reveal rather than to hide any hidden agenda. This is evident from the instance of the Authors that students be "informed" about any kind of material bias or preconception that may affect explanation.

The findings show that many of the proposals are validated on common sense alone, while the remaining were shown to be not only scientifically valid, but relevant to student comprehension and understanding of the concepts presented.

(2) The Proposed Revisions will have the primary effect of causing the scientific discussion of origins to be neutral as to religion, rather than to favor one particular religious view over another.

The findings of fact show that a true and legitimate scientific controversy exists with respect to chemical evolution and key aspects of biological evolution. The findings also show that the discussion of origins has an unavoidable impact on religion. By seeking to inform students about both sides of the controversy, the Proposed Revisions implement explicitly the meaning of "neutral and non-ideological" as those terms are described in the NAGB definition and in the relevant Supreme Court cases. Rather than seeking to insert a religious or philosophical bias the Proposed Revisions seek to take one out, not to be replaced with another bias, but to be replaced with objectivity. The replacement thereby effects not only the best science education on this sensitive issue, but in the process it causes explanations to be driven by the evidence rather than philosophy or religion. In the process the discussion become religiously neutral.

Accordingly, having a valid secular purpose that achieves religious neutrality, the Proposed Revisions do not offend, rather they tend to promote the principles reflected in the Establishment Clause.

b. The Proposed Revisions accommodate, rather than prohibit the free exercise of religion.

Given the compulsory nature of public education and the fact that the standards apply to parochial and private schools as well as public schools, any discussion or origins, which has unavoidable religious implications, must be designed to accommodate a wide range of religious perspectives. The Proposed Revisions do this by ensuring that the discussion will be driven by scientific objectivity rather than religious or philosophic bias or assumption.

Given the fact that science does investigate and seek to explain the origin of life and its diversity, there appears to be a compelling need to have science education incorporate that discussion in science education. However, the state must also show that the discussion is tailored such that religious views are not offended. The only way to achieve this tailoring is to

open up the discussion rather than to use a bias to exclude relevant evidence that harmonizes with one kind of religious view.

The testimony of Warren Nord, Angus Menuge, James Barham and Stephen Meyer on this point is compelling. The best liberal education is achieved by informing students of both sides of the scientific controversy. In the process the religious problem is solved.

c. The Proposed Revisions eliminate viewpoint discrimination and expands academic freedom.

Perhaps the most riveting testimony during the hearings was from three teachers. Professor Nancy Bryson and Roger De Hart testified about the loss of jobs due to their expression of scientific view points that "weakened" evolutionary theory. The findings also show that teachers know about Ms. Bryson and Mr. DeHart, and also about Mr. Levake, a biology teacher who was reassigned for seeking to teach evolution "honestly." Ms. Jill Gonzalez Bravo, another science teacher from Kansas, testified that knowledge of this kind of viewpoint discrimination was widespread within the community of biology teachers and it had the effect of creating major uncertainty within the class room about how to teach evolution. She herself did not know what "viewpoints" she could express without being disciplined.

Ms. Bravo and the other biology teachers explained that the Proposed Revisions would have the effect of eliminating this viewpoint discrimination and providing for a much more comfortable academic environment friendly not only to teachers, but to students and the parents of students.

Mr. Mark Neas, a Kansas biology teacher that teaches in a parochial school was not allowed to testify due to late notice of his inclusion on the witness list. He would have testified about numerous parents who would like to remove their children from public schools for this very reason. He would have also testified about the importance of the Proposals not only for public schools but for private schools. For a private school teacher to have private school teaching experience count for teaching in a public school, the private school must use curriculum that is consistent with state standards. Thus, if the state standards themselves are not truly secular, neutral and nonideological, private and parochial schools may feel pressured to promote an ideology that conflicts with the beliefs of their patrons simply to attract and retain their teachers.

Viewpoint discrimination is tied closely to the freedom of conscience that is provided by Article 7 of the Kansas Constitution and that is mentioned in many Supreme Court cases involving infractions of the Speech clause. Indoctrination in only one perspective of a controversial subject is the paradigm that robs students and parents of this freedom. The Proposed Revisions will have the effect of promoting that freedom in teachers, but also in those they teach.

d. The Proposed Revisions will align Kansas Science Standards with the implicit requirement of No Child Left Behind that Standards be "secular, neutral and non-ideological."

As defined by the NAGB, secular means to not favor or disfavor a particular religious perspective. The Proposed Revisions seek precisely that middle ground. They do this by responding to the definition of "neutral and non-ideological" by seeking to inform students of

both scientific perspectives regarding origins rather than showing only a "single perspective" on this scientifically controversial issue. Accordingly, the Proposed Revisions will bring Kansas into compliance with No Child Left Behind and at the same time move the state toward realization of the Advice of the Conferees in recommending adoption of the legislation.

e. The Proposed Revisions will align Kansas Science Standards with the requirements of Section 7 of the Kansas Bill of Rights.

By seeking to more comprehensively inform students of the scientific controversy surrounding origins, the Proposed Revisions will accommodate rather than exercise "control of or interference with the rights of conscience." This will respond to the concern of Parents that an evolution only paradigm tends to "infringe" the "right to worship according to the dictates of conscience." By eliminating a preference for Naturalistic Explanations of origins, the Proposed Revisions will eliminate a "preference" for non-theistic religions such as Secular Humanism.

For all the forgoing reasons the Proposed Revisions not only are clearly consistent with the applicable law, they actually serve to bring the state into compliance with that law.

2. Draft 2, which implements methodological naturalism so as to promote only Naturalistic Explanations of origins through the omission of scientifically valid dissenting views is not consistent with the First Amendment, No Child Left Behind and the Kansas Constitution.

It has been demonstrated by the Findings of Fact that Draft 2, without the Proposed Revisions, does two things to promote the philosophy of Naturalism, a tenet fundamental to Secular Humanism and other non-theistic belief systems. First it inserts methodological naturalism into the standards by gerrymandering the definitions of science and scientific knowledge to exclude any scientific disagreement with evolution's core claim that life is the product of "unguided evolutionary change," a claim fundamental to Naturalism. Second, it omits to inform students of scientific knowledge relevant to the adequacy of chemical evolution to explain the origin of life and biological evolution to explain the origin of complex bio-systems.

a. Draft 2 is inconsistent with the Establishment Clause

(1) The use of methodological naturalism to ensure that only Naturalistic Explanations of origins are provided to students about the origin of life and its diversity lacks a secular purpose.

Those supporting Draft 2 admit that methodological naturalism is used to exclude the supernatural. However, this is a purpose that clearly relates to religion. As explained by Richard Lewontin the function of the construct is to keep the "Divine Foot" out of mind and out of sight:

> ***"[W]e have a prior commitment, a commitment to materialism***. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that **we are forced by our *a priori* adherence to material causes** to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counterintuitive, no matter how mystifying to the uninitiated. **Moreover, that**

> **materialism is absolute, for we cannot allow a Divine Foot in the door.**" (emphasis added) [Richard Lewontin, *Billions and Billions of Demons*, (*The New York Review*, January 9, 1997, p. 31)]

This quote shows that the function of methodological naturalism is philosophical and not evidence based, and that it is used to exclude God from any explanation. Thus the entire purpose of the philosophy is one that relates directly to a particular kind of religious belief - theistic belief. Although it may be permissible for a scientist to decide to use this construct as a working hypothesis for a particular scientific endeavor, it is both scientifically and constitutionally problematic when it is used to define what the state is to tell children about where they come from.

It is scientifically problematic because origins science is a historical science where one can not use experimentation and direct observations to test and confirm the "historical narratives" that are developed in this area of science. By allowing only one answer to the question *What is the origin of life and its diversity?* the question need not even be asked. We know the answer in advance. As Jacques Monod and the National Academy of Sciences explain,[137] we are just "occurrences," the products of physics and chemistry that combine with matter, energy and the forces to produce life via "unguided evolutionary change."

The argument is made that science can not operate without methodological naturalism. It is like the security blanket held by Linus in the *Peanuts* comic strip. Science will cease to function if it is not allowed, and this then is its secular purpose. However, that is absurd. As was shown during the hearings and as explained in the explanations in the Report, operational science seldom is confronted with evolutionary biology and often uses methodological design, not methodological naturalism to understand and predict how the biological "software" works. In an email dialogue introduced during the Hearings, Albert De Roos, a scientist working in bioinformatics explains it this way:

> "Dear John, Most scientists indeed do use ''design'' as a practical approach or methodology. The teleological approach works very fine in deciphering systems like the brain, the eye etc. However, as soon as you touch on the subject evolution, it is ''forbidden'' to talk about design. **I have not come across real design thinking in trying to understand genome evolution.** On the contrary, with the advent of neo-Darwinism, evolution has (in my opinion) become a magical thing that ***arose by chance without any goal-direction.*** This basic lack of understanding of evolution has led to the current position evolutionary science has gotten into: no logical explanations about evolution before the Cambrian explosion (comprising 90% of evolution) and speculative theories about the last part. My article is the first, from a methodological approach, to show how design thinking can give new insight into evolution."

Michael Ruse a prominent philosopher of science also acknowledges that design type thinking is actually required:

> "Both history and present Darwinian evolutionary practice have shown us that this kind of design-type thinking is involved in the adaptationist paradigm. We treat organisms – ***the parts at least*** -- as if they were manufactured, as if they were designed, and then we try to work out their functions. End-directed thinking – teleological thinking – is appropriate in biology because, and only because, ***organisms seem as if they were manufactured***, as if they had been created by an intelligence and put to work."[138]

Methodological Naturalism essentially has no scientific utility in seeking to ascertain the origin of life and its diversity. Its effect is to exclude from consideration not only extensive evidence of design that is highly relevant to the question being investigated, but it also has the effect of suppressing criticisms of key tenets of evolutionary theory, including the claim that it is an unguided process driven by chance mutations rather than a guided process. Methodological naturalism effectively suppresses any testing of the chance hypothesis.

Although it is claimed to just be a "method," it actually is a doctrine that requires acceptance. It requires one to think in a particular way. When applied to origins it requires thinking that just happens to be consistent with many non-theistic religions and belief systems.

What is the secular purpose of not allowing one to challenge the Darwinian claim that life results from an unguided purposeless process? We submit, no secular purpose has been advanced, only a purpose that favors one kind of religion over another. That is not a secular purpose.

The purpose of Draft 2 and methodological naturalism is to do precisely what the AAAS seeks to do: cause public schools to prohibit any discussion of the evidence of design that actually can be observed and tested. The exclusion is not based on any objective consideration of that evidence, rather it is based solely on the philosophy expressed by Dr. Lewontin that reflects a religious rather than a secular purpose.

Thus, lacking a secular purpose, Draft 2's proposed prohibition of discussions of the scientific counter-argument to evolution's claim that life is the "result of unguided evolutionary change," lacks secular purpose and offends the First Amendment for that reason alone.

(2) Gerrymandering definitions of science and scientific knowledge and the discussion of evolution to exclude scientific criticisms of the theory is not neutral as between theistic and non-theistic religion and nonreligion.

The teaching of *Epperson, Edwards, Lukumi, and Welsh* is that government can not gerrymander policies, laws and regulations by narrow definitions to exclude particular religious viewpoints. This is precisely what Draft 2 does. It uses an arcane definition of science and scientific knowledge to allow only Naturalistic Explanations of origins that favor Secular Humanism and other non-theistic belief systems. With these definitions in hand, it then shows students a "politically correct" version of evolution without revealing any of the real scientific controversy about the theory.

The Draft 2 definitions are actually scientifically problematic as the witnesses testified. Science studies not only the physical aspects of the natural world, but also those aspects that are

non-physical such as biological information, consciousness, intelligence and behavior. As explained in Note 4 to the Report, modern biology is finding that living systems can not be reduced to physics and chemistry. "Biological systems are extremely complex and have emergent properties that cannot be explained, or even predicted, by studying their individual parts...Biologists have become increasingly critical of the idea that biological systems can be fully explained using physics and chemistry."[139]

The effect prong of the Establishment Clause is focused on the effect of state action in question. The effect of an implementation of Draft 2 without the Proposed Revisions will be to lead not only Kansas public schools but private and parochial schools to teach only one side of a scientific controversy that has a major impact on religion. Instead of students being informed about the relevant scientific knowledge relating to origins, they will only be shown that evidence which supports a "single perspective on a [scientifically] controversial issue" that has a major impact on religious belief. This is not a formula for either scientific objectivity or religious neutrality. It is a formula for religious indoctrination that offends the second prong of the Lemon test.

b. Draft 2 is inconsistent with Free Exercise Rights because the use of methodological naturalism to promote only Naturalistic Explanations of Origins is not a law of general application, is not neutral as to religion, lacks any compelling state purpose and is not narrowly drawn to achieve any legitimate scientific purpose, and thereby offends the free exercise rights of parents who seek to instill theistic beliefs in their children.

Many parents exercise their religion by seeking to instill a belief in their children that they have been created for a purpose. These parents often have no economic choice but to send their children to public schools. However, if those very schools have adopted a policy that teaches their children that they are mere occurrences that lack the attribute of design, then the exercise of their religion has been frustrated and infringed. Because they are required by law and conscience to educate their children they must accept a prohibition that denigrates and infringes upon their religion.

The cases cited above under the discussion of the Free Exercise clause makes it clear that free exercise rights may be trumped by laws of general application that are also neutral as to religion. The use of methodological naturalism in the explication of origins by public schools can in no way be deemed a law of general application. Even in science, it seems to only have utility in the area of origins. Nor, as discussed above, is it neutral as to religion. So what is the compelling state interest for leading children to believe that they are just occurrences and not designs? None has been suggested and none comes to mind. Thus, the final question about whether the rule has been narrowly drawn to achieve that interest without offending religious views, is not even reached. There simply is no compelling state interest in using this device, where its effect may reasonably lead impressionable young children to believe something their parents do not want them to believe.

For the foregoing reasons, Draft 2 without the Proposed Revisions would appear to offend the free exercise rights of parents and students.

c. Draft 2's use of methodological naturalism in origins science effects impermissible viewpoint discrimination that creates an atmosphere of fear in the biology classroom and that deprives parents and students of students receiving relevant scientific information about origins.

As discussed above, the state may limit the content of the subject matter in a non-public forum like a school class room. However, once the subject matter is defined it may not suppress a viewpoint relevant to the subject matter simply because it does not agree with that viewpoint.

The opposition argues that this viewpoint discrimination is necessary to keep religion out of the discussion of origins. A number of Supreme Court speech clause cases are relevant to this point.[140] In the cases shown in the note, public schools sought to exclude certain theistic speech from limited public forums. Although they acknowledged that the exclusion amounted to viewpoint discrimination, they justified it on the grounds that excluding one kind of religious speech would be permissible to ensure compliance with the Establishment Clause. In all of these cases the Supreme Court has rejected this argument on the grounds that excluding only certain kinds of religious speech would offend the very neutrality that the Establishment Clause calls for. In the area of origins, a discussion that unavoidably impacts religion, there would seem to be no justification for opening up the discussion with the argument for no-design, and then not allowing the scientific criticisms and counter arguments to that claim. As discussed above, excluding one of multiple viewpoints will unavoidably violate principles of Establishment Clause neutrality and thereby offer no constitutional excuse for the viewpoint discrimination.

The effect of viewpoint discrimination is to promote a state sponsored ideology or orthodoxy, which is constitutionally impermissible. That is why the NCLB requires educational materials and services provided by supplemental providers to be "non-ideological." The impermissibility of the promotion of an ideology is recognized by the leadership of the writing team and the Peer Reviewers. They acknowledge that it is impermissible for the state to promote Philosophical Naturalism. What they fail to recognize is that methodological naturalism is actually worse, as many of the philosophers of science explained at the hearings.

d. Draft 2 without the Proposed Revisions promotes an ideology that is not secular or neutral and therefore causes the Standards to not comply with No Child Left Behind.

As discussed at length above, the use by the standards of methodological naturalism to prohibit the discussion of the scientific counter argument to suppress any criticism of the Naturalistic Explanation creates an ideology that is not secular or neutral. This has the effect of causing the standards to be out of compliance with the referenced provisions of NCLB.

e. Draft 2 without the Proposed Revisions offends the rights of parents and students under Section 7 of the Kansas Bill of Rights.

As explained, Section 7 of the Kansas Bill of Rights is actually much more explicit than the First Amendment in the protection of religious liberties. Section 7 (a) explicitly prohibits state "control of or interference with the rights of conscience," (b) not only forbids any "prohibition" of the "right to worship according to the dictates of conscience" but states

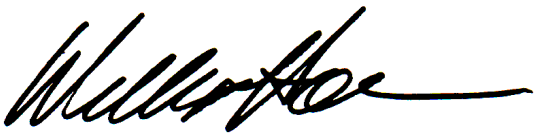
explicitly that the right "shall never be infringed," and (c) forbids the giving of "any preference" to "any" "mode of worship."

For all of the reasons set forth above, state sponsored methodological naturalism that skews the discussion of origins so that only a Naturalistic Explanation is provided, offends the rights granted under Section 7 to parents and students.

For the foregoing reasons, we urge the State Board to provide favorable consideration to all of the Proposed Revisions.

Respectfully submitted on behalf of the Authors this 26th Day of May, 2005:

As to the Suggested Findings of Fact:



William S. Harris, PhD

As to the Findings of Fact and Conclusions of Law:

John H. Calvert, Esq.

Notes

[1] The record consists of the oral testimony, written submissions and power-point presentations made during the hearings, items previously submitted and made a part of the official web site of the Department of Education such as the various drafts of the standards and of the Report, the Peer Review of the Proposed Revisions contained in the Report and the Testimony and presentations made to the Board by members of the Science Writing Committee, and John Calvert on April 13, 2005. The Suggested Findings of Fact do not cite the written transcript as it is not yet available.

[2] C.S. Lewis, *The Abolition of Man: How Education Develops Man's Sense of Morality*, pp 16-17 (MacMillan 1947)

[3] See paragraphs I.B.2.p. *et. Seq.* of the findings of fact and paragraphs II.A.1.a & b(2) of the legal section regarding Secular Humanism and non-theistic religion.

[4] The proposals embraced by the Committee as a whole are set forth in an exhibit presented by Dr. Harris during his testimony that lists these revisions. Item (6) is of particular note because it was embraced by a vote of 22-2 by the Committee only after the Commissioner of Education directed the leadership to vote on the proposals. However, the attorney for those opposing the Authors have argued that Witnesses who spoke for the Report ignored provisions in Draft 2 that would allow teachers and students to engage in critical analysis of all scientific theories expressed in the Standards. Without this change, proposed by the Authors, the Standards would contain a mechanism to suppress that discussion.

[5] The phrase "secular, neutral and non-ideological" is found in the No Child Left Behind Act of 2001. Its meaning and application to the Standards is discussed in the Conclusions of Law under Section B.2.

[6] A memo was introduced during the hearings indicating that the strategy of those who promoted the boycott was to "portray" those endorsing the Report in the "harshest light possible," "as political opportunists, evangelical activists, ignoramuses, breakers of rules, unprincipled bullies, etc." One hates to think that anyone having standing in the Science Community would actually stoop to such unethical and mean spirited tactics. However, much of the opposition voiced during the hearings seemed to harmonize with it.

[7] The conduct of counsel was highly unusual and unexpected from a member of the legal profession. Immediately before he began his presentation on May 12, the Chairman of the Committee explicitly reminded him that his right to speak was conditioned on his agreeing to submit to questions from opposing counsel and the Committee for an amount of time equal to 75% of his presentation time. We have been advised that he had informed persons other than the Committee and opposing counsel immediately before he spoke that he planned to disobey this rule. Whether that is true or not, he did not object to the Committee or to opposing counsel about the rule or otherwise inform them of his intention not to abide by it before he spoke. If the Committee or opposing counsel had known that he did not intend to abide by the rule, he would not have been allowed to speak and his presentation would not have become a part of the record. Given this highly unusual conduct that did not permit any effective examination of his rhetoric that seemed to merely be a further extension of the strategy mentioned in the preceding note, we find his part of the record does not deserve any attention.

[8] *Webster's Third New International Dictionary of the English Language, Unabridged*, (1993); The Random House Webster's Unabridged Dictionary (1999) provides that to educate is **"5.** to inform: *to educate oneself about the best course of action."*

[9] The Random House Webster's Unabridged Dictionary (1999)

[10] The Random House Webster's Unabridged Dictionary (1999)

[11] "Why is science literacy important? First, an understanding of science offers personal fulfillment and excitement--benefits that should be shared by everyone. Second, Americans are confronted increasingly with questions in their lives that require scientific information and scientific ways of thinking for ***informed*** decision making." (National Science Education Standards, 1996, Introduction, page 1)

[12] Dr. Miller did not actually lodge any objection to it. Rather he started his Peer Review with a statement about which he was obviously not "informed:" "In 1999 the Kansas Board of Education took the remarkable step of ***removing evolution*** from its academic standards in science." (emphasis added)

[13] See ***Ohio Academic Content Standards, K-12 Science,*** *Nature of Science*, p 90, (December 10, 2002; http://www.ode.state.oh.us/academic_content_standards/ScienceContentStd/PDF/SCIENCE.pdf).

[14] The OAS definition is discussed in an OAS position paper: "*What is Science*," Position Paper (Ohio Academy of Science 2004). Ohio adopted the part of the OAS definition that is shown below, less the phrase shown in italics. The definition quoted is: **"**Science is a systematic method of continuing investigation, based on observation, hypothesis testing, measurement, experimentation, and theory building, which leads to more adequate explanations of natural phenomena***, explanations that are open to further testing, revision and falsification, and while not believed in through faith may be accepted or rejected on the basis of evidence."*** The definition proposed by the Minority is consistent with the OAS definition in the context of the two paragraphs within which it is quoted. Actually, the entire thrust of the Minority proposals is that scientific explanations be driven by the evidence rather than philosophy, which is the clear goal of the OAS definition.

[15] "KNOWLEDGE AND UNDERSTANDING. Implementing the *National Science Education Standards* implies the acquisition of scientific knowledge and the development of understanding. Scientific knowledge refers to facts, concepts, principles, laws, theories, and models and can be acquired in many ways. Understanding science requires that an individual integrate a complex structure of many types of knowledge, including the ideas of science, relationships between ideas, reasons for these relationships, ways to use the ideas to explain and predict other natural phenomena, and ways to apply them to many events. Understanding encompasses the ability to use knowledge, and it entails the ability to distinguish between what is and what is not a scientific idea. Developing understanding presupposes that students are actively engaged with the ideas of science and have many experiences with the natural world. ....INQUIRY. Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. Inquiry also refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how

scientists study the natural world. Inquiry is a multifaceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known in light of experimental evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results. Inquiry requires identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations. Students will engage in selected aspects of inquiry as they learn the scientific way of knowing the natural world...**,** but they also should develop the capacity to conduct complete inquiries.....Although the *Standards* emphasize inquiry, this should not be interpreted as recommending a single approach to science teaching. Teachers should use different strategies to develop the knowledge, understandings, and abilities described in the content standards. Conducting hands-on science activities does not guarantee inquiry, nor is reading about science incompatible with inquiry. Attaining the understandings and abilities described in Chapter 6 cannot be achieved by any single teaching strategy or learning experience." [*National Science Education Standards,* (1996)]

16 *Jonathan Wells, Ph.D., Supplement B: Definitions of Science in State Standards Summary* (May 5, 2005). The exhibit was submitted as a part of his testimony on May 5, 2005. The exhaustive survey concludes: **"**The definition of science proposed in the Minority Report is fully consistent with definitions used by all other states in the U.S. By contrast, the definition of science currently used in the Kansas standards and defended by the Majority is idiosyncratic and out of step with current educational practice."

17 The Authors submitted into the record a bound volume containing the Curriculum Vitae of these witnesses as well as of all of the other witnesses. The vitae attest to extensive education, knowledge and experience of the many witnesses that testified for the Authors.

18 Draft 2 provides that "as it is practiced in the late 20th and early 21st century, science is restricted to explaining only the natural world, using only natural cause. This is because science currently has no tools to test explanations using non-natural (such as supernatural) causes." However, science does have the tools to test for intelligent causes and uses them on a daily basis. Everyday the SETI program tests radio and light waves for intelligence. So far the tests have all turned up negative. What science can not do is go beyond the data and speculate that any intelligence detected is supernatural.

19 Word searches of that document for "natural explanation," "natural explanations," "natural cause" and "material cause" turns up "not found."

20 Teleology is **"**the study of the evidences of design or purpose in nature," [Random House Webster's Unabridged Dictionary (1999)].

21 The claim of adequacy and lack of design are not empirically based conclusions. This was shown by the origin of life experts and many other witnesses during the hearings.

22 "Humanism is a progressive philosophy of life that, ***without supernaturalism***, affirms our ability and responsibility to lead ethical lives of personal fulfillment that aspire to the greater good of humanity. The life stance of Humanism—***guided by reason****....**Knowledge of the world is derived by observation, experimentation, and rational analysis. Humanists find that science is the best method for determining this knowledge as well as for solving problems and developing beneficial technologies. Humans are an integral part of nature, the result of unguided evolutionary change. Humanists recognize nature as self-existing.*** We accept our life as all and enough, distinguishing things as they are from things as we might wish or imagine them to be. ...Ethical values are derived from human need and interest as tested by experience."

23 "Dr. Kirk defines Secular Humanism as ".....a creed or world view which holds that we have no reason to believe in a creator, that the world is self existing, that there is no transcendent power at work in the world, that we should not turn to traditional religion for wisdom; rather that we should develop a new ethics and a new method of moral order ***founded upon the teachings of modern naturalism and physical science."*** *Smith v. Board of School Commissioners of Mobile County*, 655 F. Supp, 939, (SD Ala 1987, holding that Secular Humanism is a religion) *rev'd* on other grounds 827 F2d 684(11th Cir 1987).

[24] "As a paleontologist, I investigate the past, but not by criteria different from that needed to explore the present. The primary criterion for assessing the strength of hypotheses is the conformity of the hypothesis with the evidence, regardless of whether the evidence is 10 minutes or 10 million years old." [**Response:** This is a generalized objection that does not address with specificity any of the points made by Dr. Meyer or Carol Cleland. In fact the very point they make is that the evidence available for an observable repeatable event that occurs 10 minutes ago before our very eyes is significantly different than the evidence available to ascertain the unobserved cause of an unobserved event that occurred 10 million years ago of which we have little or no evidence, but which is inferred from a spotty record using forensic techniques. Actually scientific investigation and explanation are quite different in both cases.]

[25] "While some aspects of evolutionary biology are certainly historical, many others are very much experimental, and have been tested and validated." [**Response:** The indicator in question does not address that part of operational biology that does not seek to determine the cause of increases in complexity that occurred in the distant past.] "Second, inability to directly test hypotheses by experiment or direct observation is not confined to historical sciences...In all these instances, we rely on the predictive power of a theory, that is on its ability to generate reproducible observable outcomes, even if indirect, about a specific phenomenon. [**Response:** This is true, but that does not alter the fact that those sciences that do not seek to explain the cause of singular remote past events have a different purpose. They seek to understand laws and regularities to aid the prediction of future events, while a truly historical science seeks to determine the cause of singular and particular events that do not "generate reproducible observable outcomes. " Furthermore, theories don't "generate reproducible outcomes" for events that are not reproducible in the lab such as the Cambrian Explosion.] "This is how the fossil record and molecular phylogenies have been used to test and empirically support specific hypotheses about biological evolution." [**Response:** A number of witnesses testified to conflicts between phylogenies based on the fossil record, those based on molecular phylogenies and even molecular phylogenies developed by different laboratories. All of these phylogenies are actually nothing more than "historical narratives" that involve "retrodictions" rather than predictions, which are not being confirmed by the data.] " Finally, there is nothing inherently "weak" about historical theories that necessarily puts them at a specific heuristic disadvantage compared to theories that can be directly tested." [**Response:** Common sense will tell us that explanations about the cause of singular unobservable remote and unreproducible events will be inherently weaker than those about the cause of events that are observable and reproducible in the laboratory. As testified by Dr. Meyer, one reason is because of the kind of reasoning employed. In the historical sciences a form of "abductive" reasoning is used rather than deductive or inductive. Unlike the latter, abductive reasoning does not require repeated observations of the same phenomena but rather an evaluation of the best of a competing pool of explanations in light of the available evidence surrounding a singular historical fact. According to Meyer, abductive reasoning does not produce logically complete explanations as is the case with deductive reasoning. Thus, the historical narratives that seek to explain the cause of singular unobserved remote events such as the origin of life and the Cambrian explosion produced by historical sciences are inherently less reliable than those that may be confirmed by observation and experiment. Dr. Simat testified that the difference was very noticeable as the textbooks he reviewed moved from microevolutionary explanations to macroevolutionary explanations. In the latter chapter the verbs changed from "are," "is" and "did" to "might have," "could have," "it is possible that.." and so forth.]

[26] "This is mistaken. No sharp separation exists between "historical" and "natural" sciences. The practice of modern physics is completely integrated with investigations of physical cosmology and the history of the universe. Separating out "historical sciences" as distinct is arbitrary, and results in an incorrect view of today's science." [**Response:** Dr. Edis is a physicist, not an evolutionary biologist, the indicator does not demarcate science into "historical" and "natural," but seeks to make a distinction between differences in purpose, inquiry, testing and explanation for ascertaining the cause of unobservable singular remote events that can not be wholly explicated via experiment. The carve out is very narrow. His response does not address any of these issues.]

[27] "Moreover, science makes no distinction between the validity of "historical" and "experimental" fields of inquiry. Scientific theories developed through the collection and analysis of historical artifacts are just as valid as theories developed through collection of data from contemporary experiments." [**Response:** These are broad generalizations that do not address the specific issues addressed by the Witnesses and the relevant proposed changes. Given the focus of science on empiricism, that is science that seeks to test and confirm

hypotheses through observation and experiment, distinctions are necessary when direct observation and experiment are not available.]

28 Dr. Miller argues that "The recommendations of the eight tell students that historical sciences require investigators to construct competing hypotheses and test them against each other. **At first glance, their description of how science works is perfectly reasonable**. **Students are told that they must test "*an historical hypothesis by formulating a competing hypotheses and then describing the kinds of data (evidence) that would support one and refute the others (p. 8).***** What's wrong with this passage is not what it says about historical sciences, but its radical suggestion that "experimental sciences" don't work the same way**."** [**Response:** The substance of Miller's argument really does not deny the need to do exactly what the italicized sentence suggests. This is an argument that actually acknowledges the validity of the proposition proposed by the Report, but raises a problem not implicit in any of the proposals at all. The added earth sciences indicator does not in anyway imply that the consideration of alternatives is limited only to hypotheses regarding the cause of remote historical events. The mention of competing hypotheses in this area of science is necessary because experimentation and direct observation are not otherwise available. Opposition to Dr. Mayr's recognition of a real distinction between historical sciences like evolutionary biology and the "hard" sciences like physics and chemistry is two-fold. One reason is that recognition of the distinction will make it more difficult to portray to the uninformed evolutionary theory with a strength that it does not really have by comparing it with gravity and relativity. The other argument is the standard "supernatural" strawman. Although, none of these proposals in any way explicitly or implicitly suggest that science should seek to prove God or the Supernatural, Dr. Miller pulls that strawman out of the hat again. The reason he pulls it out is because he really does not want core claims of evolution critically analyzed. If competing hypotheses must be ruled out to establish the validity of an historical explanation, then evolution's claim that mutations are random must be tested against the alternative that they may somehow be guided or directed. Because this alternative may, but does not require, a so-called "supernatural cause," Miller is opposed to having students be exposed to any difference between historical and experimental sciences. Thus, to protect his Naturalistic philosophy he must suppress good scientific practices because they just might lead to a cause that can not be reduced to the laws of physics and chemistry, the fundamental premise of Naturalism. For the same reason his review argues against any scientific criticism of evolutionary theory. The problem of course is that he is no longer doing science. He is just promoting the philosophy of Naturalism with a capital "N." This is very problematic for any rational analysis of the claims of evolution, because if the chance hypothesis can not be tested and if other criticisms of evolution can not be tolerated for fear of where they may lead, then evolution, and its historical narratives become nothing more than "just-so" stories masquerading as "fact." State sponsored Naturalism is not only a problem for good science education, but also inconsistent with the State's obligation to be religiously neutral.]

29 **Response:** Dr. Theobald's argument against these changes is premised on a curiously faulty understanding of the proposed revisions. He claims that "the Revisers claim that 'historical hypotheses … are not susceptible to confirmation by experiment.'" and then proceeds to disprove this claim, which is not in fact made by the Authors. The words he omitted from this quote as evidenced by the "...." reflects a critical distinction made throughout the proposed revisions that he ignores and that he fails to bring to the attention of his reader: "which are not susceptible to confirmation by experiment." The proposed revisions in this and other benchmarks make it clear that the only historical hypotheses that are subject to this special attention are those hypotheses that seek to explain the cause of singular unobserved and unobservable remote events that are not susceptible to confirmation by experiment. The Teacher's note itself states: "*Students should understand that many aspects of paleontology and earth science are historical in nature where one seeks to explain the cause of singular unobserved remote past events from presently existing evidence."* Thus his criticism sets up another strawman that does not inhere in any of the proposals regarding this issue.

30 Jacques Monod, a Nobel Prize-winning French biologist, *Chance and Necessity: A philosophy for a universe without causality*, p. 112 (Vintage Books, 1971)

31 Supporting Material: NABT's Statement on Teaching Evolution Supporting Material: NABT endorses the following tenets of science, evolution, and biology education. Teachers should take these tenets into account when teaching evolution.....***Essential Concepts of Biological Evolution*** ....The diversity of life

on earth ***is*** the outcome of biological evolution—***an unpredictable and natural process*** of descent with modification that is affected by natural selection, mutation, genetic drift, migration and other natural biological and geological forces..... Natural selection is the primary mechanism for evolutionary changes and can be demonstrated both in the laboratory and in the wild. A differential survival and reproduction of some genetic variants within a population under an existing environmental state, ***natural selection has no discernable direction or goal, including survival of a species.*** [Adopted by the NABT Board of Directors, 1995. Revised 1997, 2000, and May 2004. Endorsed by: The Society for the Study of Evolution, 1998; The American Association of Physical Anthropologists, 1998., http://www.nabt.org/sub/position_statements/evolution.asp

32 The following positions of major science organizations on whether natural phenomena are the product of a designed or guided process show that they take sides rather than being "neutral" on the subject: The National Academy of Science National Science Standards seek to teach children, by the end of the 4th grade that "natural objects" (which are otherwise defined to include living systems) lack the attribute of design: "CONTENT STANDARD E: ....."***ABILITIES TO DISTINGUISH BETWEEN NATURAL OBJECTS AND OBJECTS MADE BY HUMANS*** ...Some **objects occur** in nature; others have been **designed and made** by people **to solve human problems** and enhance the quality of life. ....Objects can be categorized into two groups, **natural** and **designed**." [National Science Education Standards, Chapter 6 – Science Content Standards – Content Standards K-4 – Science and Technology,, http://books.nap.edu/html/nses/html/index.html (1995, National Academy of Sciences)]. The current Kansas Science Standards adopted on February 14, 2001 contain the same learning objective in Fourth Grade Standard 5, Benchmark 3. The teaching effectively promotes at an early age level a very subtle indoctrination in Naturalism, the idea that all natural phenomena just occur and are not designed and made for a purpose, as are human made objects. This essentially reflects the core claim of evolution that living systems are not designed. Due to requests made by the Authors, this benchmark was removed from Draft 2. If this removal had not been effected, then Draft 2 would explicitly promote the postulate that change occurs via an unguided process. The American Association for the Advancement of Science opposes any mention of design in public school science classes because it claims there is no scientific evidence of design in the natural world [*AAAS Board Resolution on Intelligent Design Theory* ,Approved by the AAAS Board of Directors on 10/18/02 http://www.aaas.org/news/releases/2002/1106id.shtml.]

33 **Futuyma:** "Darwin's immeasurably important contribution to science was to show how mechanistic causes could also explain all biological phenomena, **despite their apparent evidence of design and purpose**. By coupling undirected, **purposeless** variation to the **blind, uncaring process** of natural selection, **Darwin made theological or spiritual explanations of the life processes superfluous**. .....Darwin undid the essentialism that Western philosophy had inherited from Plato and Aristotle, and put variation in its place. He helped to replace a static conception of the world with the vision of a world of ***ceaseless change***. Above all, **his theory of random, purposeless variation acted on by blind, purposeless natural selection provided a revolutionary new kind of answer to almost all questions that begin with "Why?"** It cannot be sufficiently emphasized that **before Darwin, both philosophers and people in general answered "Why?" questions by citing purpose. Only an intelligent mind, one with the capacity for forethought, can have purpose.** Thus questions like "Why do plants have flowers?" or "Why are there apple trees?"-or plagues, or storms-were answered by imagining the possible purpose that God could have had in creating them." {Douglas J. Futuyma, *Evolutionary Biology, Third Edition* p. 5,8 (Sinauer Associates, Inc. 1998)

Mayr: "First, Darwinism rejects **all** supernatural phenomena and causations. The theory of evolution by natural selection explains the adaptedness and diversity of the world **solely materialistically**. It no longer requires God as creator or designer (although one is certainly still free to believe in God even if one accepts evolution). **Darwin pointed out that creation, as described in the Bible and other origin of accounts of other cultures, was contradicted by almost any aspect of the natural world.** Every aspect of the "wonderful design" so admired by the natural theologians could be explained by natural selection." (Ernst Mayr, *Darwin's Influence on Modern Thought,* p. 81 (July 2000, Scientific American).

Jacques Monod: "We call these [mutation] events accidental; we say that they are random ***occurrences***. And since they constitute the *only* possible source of modifications in the genetic text, itself the sole repository of the organism's hereditary structures, it necessarily follows that chance *alone* is at the source of every innovation, of all creation in the biosphere. Pure chance, absolutely free and blind, at the very root

of the stupendous edifice of evolution: this central concept of modern biology is no longer one among other possible or even conceivable hypotheses. It is today the sole conceivable hypothesis, the only one that squares with observed and tested fact. And nothing warrants the supposition --or the hope – that on this score our position is likely to be revised." *Chance and Necessity*, p. 112-3 (Vintage Books, 1971)

Jacques Monod: "Man has to understand that he is a mere accident." [Jacques Monod, from Horace Judson's *The Eighth Day of Creation* (New York: Simon & Schuster, 1979), p. 217].

Encyclopedia Britannica: "Darwin did two things: he showed that evolution was a fact contradicting scriptural legends of creation, and that its cause, natural selection, was automatic with no room for divine guidance or design." [The New Encyclopedia Britannica, 15th edition, 1973-74.]

George Gaylord Simpson: "Man is the result of a purposeless and natural process that did not have him in mind." [George Gaylord Simpson, *The Meaning of Evolution*, Yale University Press, 1967, pp. 345]

34 This is hardly a "neutral" posture with respect to the issue of guidance and purpose. As explained in the findings dealing with that issue, science actually studies the "natural world, which has non-physical characteristics such as biological information that has a meaningful or semantic content, consciousness, laws, "codes" and "messages" that drive many aspects of the natural world. A philosophy that reduces science to just matter and energy and the forces is one of Naturalism or Materialism that both ignores much of the reality of the natural world and that provides no room for any purpose or goal necessary for a guided process. A truly neutral posture would be one that has not decided the issue and allows room for objective scientific investigation about the issue.

35 An exhibit was introduced by John Calvert of an email discussion he had with a scientist specializing in bioinformatics that is using software design concepts as a predictive tool for understanding the software architecture of the genome. In the email the scientist effectively testified to the validity of this addition as follows: "Dear John, Most scientists indeed do use ''design'' as a practical approach or methodology. The teleological approach works very fine in deciphering systems like the brain, the eye etc. However, as soon as you touch on the subject evolution, it is ''forbidden'' to talk about design. **I have not come across real design thinking in trying to understand genome evolution.** On the contrary, with the advent of neo-Darwinism, evolution has (in my opinion) become a magical thing that ***arose by chance without any goal-direction.*** This basic lack of understanding evolution has led to the current position evolutionary science has gotten into: no logical explanations about evolution before the Cambrian explosion (comprising 90% of evolution) and speculative theories about the last part. My article is the first, from a methodological approach, to show how design thinking can give new insight into evolution."

36 Page 23 of the National Science Standards defines science inquiry as:
"Scientific inquiry refers to the diverse ways in which scientists study the **natural world** and propose explanations based on the evidence derived from their work."

37 The 14th Amendment in part states: "No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws." In the 1940 case of *Cantwell v. State of Connecticut*, 310 U.S. 296, 203 (1940) the Court held that "the fundamental concept of liberty embodied in [the 14th] Amendment embraces the liberties guaranteed by the First Amendment." See also *McCollum v. Board of Education* , 333 U.S. 203, 209-10 (1948) (Holding that a state board cannot support organized religious instruction during school hours in public schools); *Everson v. Board of Education*, 330 U.S. 1, 15-16 (1947) (holding that a state board may provide bus services for both religious and nonreligious schools); *McGowan v. Maryland*, 366 U.S. 420 (1961); *Torcaso v. Watkins*, 367 U.S. 488 (1961). *West Virginia State Board v. Barnette*, 319 U.S. 624, 637 (1943): "The Fourteenth Amendment, as now applied to the States, protects the citizen against the State itself and all of its creatures-Boards of Education not excepted." As a consequence of *Cantwell* and subsequent holdings of the Court, the First Amendment currently applies to state

governments as well as state agencies such as a state board of education [See *West Virginia State Board of Education v. Barnette*, 319 U.S. 624, 642 (1943), holding that the West Virginia State Board may not adopt a resolution compelling a salute to the US flag and a recitation of a pledge of allegiance.]

[38] Jeffrey L. Oldham, *Constitutional "Religion" a Survey of First Amendment Definitions of Religion*, 6 Tex. F. on C.L. & C.R. 117 (Summer 2001)

[39] *Welsh v. United States*, 398 U.S. 333, *concurring opinion, note 8* (1970): "This Court has taken notice of the fact that recognized 'religions' exist that 'do not teach what would generally be considered a belief in the existence of God,' Torcaso v. Watkins, 367 U.S. 488, 495 n. 11, e. g., "Buddhism, Taoism, Ethical Culture, Secular Humanism and others." Ibid. See also Washington Ethical Society v. District of Columbia, 101 U.S. App. D.C. 371, 249 F.2d 127 (1957); 2 Encyclopedia of the Social Sciences 293; J. Archer, Faiths Men Live By 120-138, 254-313 (2d ed. revised by Puritan 1958); Stokes & Pfeffer, supra, n. 3, at 560. See also *Smith v. Board of School Commissioners of Mobile County*, 655 F. Supp, 939, (SD Ala 1987, holding that Secular Humanism is a religion) rev'd on other grounds 827 F2d 684(11th Cir 1987): "Dr. Kirk defines Secular Humanism as ".....a creed or world view which holds that we have no reason to believe in a creator, that the world is self existing, that there is no transcendent power at work in the world, that ***we should not turn to traditional religion for wisdom; rather that we should develop a new ethics*** and a new method of moral order ***founded upon the teachings of modern naturalism and physical science."*** In Malnak v. Yogi, 592 F.2d 197 (3d Cir. 1979) the court held that the teaching a course in the Science of Creative Intelligence Transcendental Meditation was a violation of the Establishment Clause.

[40] *Alvarado v. City of San Jose*, 94 F3d 1223, 1229 (9th Cir. 1996)

[41] *Smith v. Board of School Commissioners of Mobile County*, 655 F. Supp, 939, (SD Ala 1987), *rev'd* on other grounds 827 F2d 684 (11th Cir 1987). The Smith Case is discussed at length in Jeffrey L. Oldham, *Constitutional "Religion" a Survey of First Amendment Definitions of Religion*, 6 Tex. F. on C.L. & C.R. 117 (Summer 2001). In finding Secular Humanism to be a religion the district court relied on the following description of that religion: "Dr. Kirk defines Secular Humanism as ".....a ***creed or world view*** which holds that ***we have no reason to believe in a creator***, that ***the world is self existing***, that there is no transcendent power at work in the world, that ***we should not turn to traditional religion for wisdom; rather that we should develop a new ethics*** and a new ***method*** of moral order ***founded upon the teachings of modern naturalism and physical science."*** [emphasis added]

[42] See preceding note and Humanist Manifesto III, which establishes the Humanist "belief system," is very consistent with the description in the Smith case, in that it rejects any "supernatural" influence and relies on modern science and the view that humans are the product of "unguided evolutionary change."

[43] *Id.*

[44] *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520, 534 (1993); declaring invalid city ordinances narrowly tailored to proscribe ritual sacrifices of animals; *West Virginia State Board of Education v. Barnette*, 319 U.S. 624, 642 (1943) [compelling students to pledge allegiance to the US Flag was found to be offensive to those who believe that pledges should be made only to God]; and the Speech Clause cases that prohibit various government practices which discriminate against religious speech: *Widmar v. Vincent*, 454 U.S. 263 (1981); *Westside Community Bd. Of Ed. v. Mergens*, 496 U.S. 226 (1990); *Lamb's Chapel v. Center Moriches Union Free School District*, 508 U.S. 384 (1993); *Rosenberger v. University of Virginia*, 515 U.S. 819 (1995); and *Good News Club Et al. v. Milford Central School*, 533 U.S. 98 (2001).

[45] *Epperson v. Arkansas*, 393 U.S. 97, 104-5 (1968), [holding that the state may not censor a nonreligious view of origins to promote a religious view (**"The First Amendment mandates government neutrality** between religion and religion, and **between religion and nonreligion.")**]

[46] *Abington School Dist. v. Schempp*, 374 U.S. 203, 225 (1963) It is insisted that unless these religious exercises are permitted **a "religion of secularism" is established in the schools.** ***We agree of course that the State may not establish a "religion of secularism" in the sense of affirmatively opposing or showing***

hostility to religion, thus "preferring those who believe in no religion over those who do believe." Zorach v. Clauson, supra, at 314." In *Zorach,* the court explained this:

"We are a religious people whose institutions presuppose a Supreme Being. We guarantee the freedom to worship as one chooses. We make room for as wide a variety of beliefs and creeds as the spiritual needs of man deem necessary. We sponsor an attitude on the part of government that shows no partiality to any one group and that lets each flourish according to the zeal of its adherents and the appeal of its dogma. When the state encourages religious instruction or cooperates with religious authorities by adjusting the schedule of public events to sectarian needs, it follows the best of our traditions. For it then respects the religious nature of our people and accommodates the public service to their spiritual needs. **To hold that it may not would be to find in the Constitution a requirement that the government show a callous indifference to religious groups. That would be preferring those who believe in no religion over those who do believe.** Government may not finance religious groups nor undertake religious instruction nor blend secular and sectarian education nor use secular institutions to force one or some religion on any person. **But we find no constitutional requirement which makes it necessary for government to be hostile to religion and to throw its weight against efforts to widen the effective scope of religious influence.** The government must be neutral when it comes to competition between sects. It may not thrust any sect on any person. It may not make a religious observance compulsory. It may not coerce anyone to attend church, to observe a religious holiday, or to take religious instruction. But it can close its doors or suspend its operations as to those who want to repair to their religious sanctuary for worship or instruction. No more than that is undertaken here." [*Zorach v. Clauson*, 343 U.S. 306, 313-14 (1952); holding that schools may release students for religious exercises)]

47 Secularism is "a view of life or of any particular matter, based on the premise that religion and **religious considerations should be ignored or purposely excluded**." (*Web*ster's Third New International Dictionary of the English Language, 1993). In *Abington School Dist. v. Schempp,* 374 U.S. 203, 225 (1963), the Court describes unconstitutional state promotion of "secularism" as state action "affirmatively opposing or showing hostility to religion, thus 'preferring those who believe in no religion over those who do believe." citing Zorach v. Clauson, supra, 343 U.S. 306, 313-14 (1952); holding that schools may release students for religious exercises)]

48 In the recent Pledge case, the atheistic beliefs of the Plaintiff were characterized by both the Ninth Circuit and the Supreme Court as "religious." In a concurring opinion, Justice O'Connor noted that "[E]ven if the Religion Clauses were originally meant only to forestall intolerance between Christian sects, they now encompass ***all forms of religious Conscience***."["*Elk Grove Unified School District et Al. V. Newdow et al.*. (June 14, 2004)]

49 Scientism is "2. a thesis that the methods of natural sciences should be used in all areas of investigation including philosophy, the humanities and the social sciences: a belief that only such methods can fruitfully be used in the pursuit of knowledge." (*Webster's* Third New International Dictionary of the English Language, 1993). Michael Shermer, a columnist for *Scientific American*, and signatory to Humanist Manifesto III, describes Scientism in terms that harmonize very closely with Secular Humanism, that describes various well known scientists as "shamans" or high priests of this "ism." and that relies on naturalism as its core tenet: "***First, cosmology and evolutionary theory ask the ultimate origin questions*** that have traditionally been the province of religion and theology. **Scientism is courageously proffering naturalistic answers that supplant supernaturalistic ones and in the process is providing spiritual sustenance for those whose needs are not being met by these ancient cultural traditions**." (emphasis added) [Michael Shermer, *The Shamans of Scientism,* Scientific American, p.35 (June 2002)] Also note his acknowledgment of the proposition that evolutionary theory addresses issues that have traditionally been the province of theistic religion.

50 C.S. Lewis, *Mere Christianity: What One Must Believe to be a Christian*, p. 43 (Macmillan, 1952)

51 Disclosing methodological naturalism is not an easy task. A one-act drama that illustrates the problem: Daniel Schwabauer and John Calvert, *The Rule,* (IDnet 2002).

52 *United States v. Seeger*, 380 U.S. 163 (1965) conscientious objections to all war for non-theistic religious grounds sustained*; Welsh v. United States*, 398 U.S. 333 (1970); conscientious objection to all war on

moral grounds sustained; *Gillette v. United States*, 401 U.S. 437 (1971), government may distinguish between conscientious objections to a particular war and those which object to all wars.

[53] *Welsh v. United States*, 398 U.S. 333, 336 (1970).

[54] *United States v. Seeger*, 380 U.S. 163, 166 (1965).

[55] "The "radius" of this legislation is the conscientiousness with which an individual opposes war in general, yet the statute, as I think it must be construed, excludes from its "scope" individuals motivated by teachings of non-theistic religions, [8] and individuals guided by an inner ethical voice that bespeaks secular and not "religious" reflection. It not only accords a preference to the "religious" but also disadvantages adherents of religions that do not worship a Supreme Being. **The constitutional infirmity cannot be cured, moreover, even by an impermissible construction that eliminates the theistic requirement and simply draws the line between religious and nonreligious.** This in my view offends the Establishment Clause and is that kind of classification that this Court has condemned."[*Welsh v. United States*, 398 U.S. 333, 357-8 (1970), J. Harlan, concurring.]

[56] *Epperson v. Arkansas*, 393 U.S. 97, 104-5 (1968); holding that the state may not censor a nonreligious view of origins to promote a religious view (**"The First Amendment mandates government neutrality** between religion and religion, and **between religion and nonreligion.")** According to Justice Harlan, the classic case of a religious gerrymander is that found in Epperson v. Arkansas. In that case the class involved was "all discussions of the origins of man." The State law, excised evolution from the discussion instead of excising the entire discussion. "The Establishment Clause case that comes most readily to mind as involving 'underinclusion' is *Epperson v. Arkansas*, 393 U.S. 97 (1968). There the State prohibited the teaching of evolutionist theory but "did not seek to excise from the curricula of its schools and universities all discussion of the origin of man."[*Welsh v. United States*, 398 U.S. 333, 356-7 (1970), J. Harlan concurring.] Draft 2, narrow definition of "science" and "scientific knowledge" effectively gerrymanders origins discussions to ensure that only the Naturalistic Explanation is provided. This is a classic case of "underinclusion."

[57] *Texas Monthly, Inc. v. Bullock*, 489 U.S. 1 (1989)

[58] *Epperson v. Arkansas*, 393 U.S. 97, 116 (1968)

[59] *Zelman v. Simon-Harris*, (No. 00-1751, Argued February 20, 2002, Decided June 27, 2002); holding that the state could issue payment vouchers to both religious and nonreligious schools chosen by parents.

[60] *Lamb's Chapel v. Center Moriches Union Free School District*, 508 U.S. 384 (1993); holding that a school cannot censor after school discussions regarding religious family values and affirming the assertion of the Church that "denying its application demonstrated a hostility to religion and advancement of nonreligion not justified under the Establishment of Religion Clause of the First Amendment."

[61] *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520, 534 (1993); declaring invalid city ordinances narrowly tailored to proscribe ritual sacrifices of animals for religious purposes but not proscribing other nonreligious forms of animal sacrifice, such as fishing. "The net result of the gerrymander is that few, if any, killings of animals are prohibited other than Santeria sacrifice, which is proscribed because it occurs during a ritual or ceremony and its primary purpose is to make an offering to the orishas, not food consumption. Indeed, careful drafting ensured that, although Santeria sacrifice is prohibited, killings that are no more necessary or humane in almost all other circumstances are unpunished." at 536

[62] William A. Dembski, *"The Design Inference,"* p.47 (Cambridge University Press, 1998) and *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence* (Rowman & Littlefield, p. 5 (2002).

[63] Jacques Monod, *Chance and Necessity*, pp 112-3 (Vintage Books 1971)

[64] *Daubert v. Merrill Dow Corporation Pharmaceuticals, Inc.*, 509 U.S. 579, 590 (1993) and its progeny. According to *Daubert* for an inference or assertion to qualify as scientific knowledge, it must be derived by the scientific method. As shown above, that is not the case with either Methodological Naturalism or, because of Methodological Naturalism, evolution. An expert that cannot rule out a competing hypotheses has not been allowed to advance an opinion as to the cause of an historical event. (*Kumho Tire Co., Ltd., Et al. v. Carmichael Et al.* 119 S.Ct. 1167 (1999) (where an expert that could not rule out other hypotheses was not allowed to opine that a tire failed due to design defect. See Arvid V. Zuber, J.D., Ph.D., *Daubert & Scientific Methodology – Science Made Easy, Supplement For The Defense,* p 19 (Defense Research Institute, November 1999).

[65] *McLean v. Arkansas Board of Education***,** 529 F.Supp 1255 (E.D. Ark 1982)

[66] *Edwards v. Aguillard***,** 482 U.S. 578, 107 S.Ct. 2573, 2588 (1987); *Alvarado v. City of San Jose*, at 1232 and *Fleischfresser v. Directors of School District 200*, 15 F3rd 680, 689 (7th Cir 1994).

[67] See Note 37.

[68] "The metaphor of a "wall" or impassable barrier between Church and State, taken too literally, may mislead constitutional analysis, see Walz v. Tax Commission, supra, at 668-669; Zorach v. Clauson, 343 U.S. 306, 312 -313 (1952), but the Establishment Clause stands at least for the proposition that **when government activities touch on the religious sphere, they must be secular in purpose, evenhanded in operation, and neutral in primary impact."** *Gillette v. United States*, 401 U.S. 437, 450 (1971); holding that government may distinguish between conscientious objections to a particular war and those which object to all wars.

[69] Allegheny County v. Greater Pittsburgh ACLU, 492 U.S. 573, 592 (1989); ruling against a nativity scene at the entrance of a government office.

[70] *Gillette v. United States*, 401 U.S. 437, 449-50 (1971)

[71] See the Peer Review where five of the 12 reviewers acknowledge that the standards use methodological naturalism. The same admission has been made by the leadership of the writing committee in 2001 and 2004-5. For an article acknowledging use of the construct by John Staver, a member of the current committee and Chair of the 1999- 2001 committee, see: John Staver, *Evolution and Intelligent Design,* p. 32-35 (The Science Teacher, November 2003)

[72] A central claim of Christianity and other theistic religions is that an observation of design in natural phenomena provides a rational basis for belief, "..[19]since what may be known about God is plain to them, because God has made it plain to them. [20]For since the creation of the world God's invisible qualities – his eternal power and divine nature – have been clearly seen, **being understood from what has been made, so that men are without excuse.**"[Romans 1:19-20] [The commentary for this verse states: "Atheists have no excuse. **Open minded attention to the nature of creation** makes the existence of God evident."; New International Version, Disciples Study Bible, p. 1,417 (Holoman Bible Publishers, 1988). A recent article in *Discover* shows how anthropologists use the same evidence used by the Apostle Paul to infer the existence and nature of a Divine mind, to infer the prior existence and nature of human minds: "Scientists don't yet know how that modern mind came into existence. The question is particular hard to answer because they can't get into the brain of *H. ergaster* or any of our ancestors. Instead they have to infer what those ancient minds were like ***by looking at the things they made***…..Klein …has offered a ***controversial theory***: The modern mind is the result of a rapid genetic change." Carl Zimmer, *Great Mysteries of Human Evolution,* p. 40 (*Discover*, September 2003).

[73] See the Humanist Manifesto, which predicates the Religion of Secular Humanism on belief that humanity is the result of "unguided evolutionary change." Along similar lines, advocates of Naturalistic explanations of natural phenomena claim that they provide a rational basis for non-theistic belief: "But what Hume did was criticize the logic of using apparent design in nature as positive evidence for the existence of God. He did not offer any alternative explanation for apparent design, but left the question open. An atheist before Darwin could have said, following Hume: 'I have no explanation for complex biological design. All I know is that God isn't a good explanation, so we must wait and hope somebody comes up with a better

one.' ***I can't help feeling that such a position, though logically sound, would have left one feeling pretty unsatisfied, and that although atheism might have been logically tenable before Darwin, Darwin made it possible to be an intellectually fulfilled atheist."*** [Richard Dawkins, *The Blind Watchmaker: Why The Evidence of Evolution Reveals A Universe Without Design"* p. 6, (W.W. Norton & Company, 1996).]

[74] See also:

Mano Singham:

"Are scientists dedicated materialists who automatically reject any explanation for phenomena that involves an intelligent being who can transcend the laws of science? ***Are scientists thus committed to an atheistic philosophy?***

****

"The scientific community has a better chance of keeping religious beliefs out of its structure ***if it concedes that science is fundamentally materialistic and atheistic in its outlook.*** Materialism is at the core of science just as much as a belief in God is at the core of most religions." (Mano Singham, *Are Scientists Materialists?* p. 2, (Unpublished essay, 12/4/01)

Noam Lahav

"***Implied in the term "teleology" is the existence of a designer or God, that directs processes and changes.*** With the advent of modern scientific thinking, teleology ***had to be discarded***, to remain only in the realm of religion. ***Indeed, it is a very significant merit of Darwin's theory that the teleological aspect of pre-Darwinian biology could be replaced so nicely by a purposeful-like explanation."*** Noam Lahav, "Biogenesis: Theories of Life's Origin" at page 114 (Oxford University Press 1999)

Ernst Mayr

"Eliminating God from science made room for strictly scientific [naturalistic?] explanations of all natural phenomena: it gave rise to positivism; ***it produced a powerful*** intellectual and ***spiritual revolution***, the effects of which have lasted to this day." (bracketed phrase added) (Ernst Mayr, *Darwin's Influence on Modern Thought*, p. 81, (July 2000, Scientific American). All of the reasons mentioned for eliminating God are philosophical or religiously based.

[75] Kenneth R. Miller, *Finding Darwin's God: A Scientists Search for Common Ground Between God and Evolution*, 187 (Harper Collins, 1999); Miller refers to Naturalism as "scientific materialism" at 27. Miller tries to explain why the materialism that undergirds evolutionary biology need not conflict with theism as discussed in the quote. He fails, because he never explains how any materialistic process driven only by law and chance can produce purpose and why a materialistic explanation does not destroy the evidentiary basis for theistic belief. If the observed appearance of design is merely an illusion because it can be explained fully without resort to a mind or any form of intelligence, then the inference that supports theistic belief crumbles. Although Miller recognizes both of these problems as the central issues, he never reconciles them.

[76] Michael Shermer, *The Shamans of Scientism*, Scientific American, p.35 (June 2002)

[77] Ernst Mayr, *Darwin's Influence on Modern Thought*, p. 81 (July 2000, Scientific American).

[78] Douglas J. Futuyma, *Evolutionary Biology, Third Edition* p. 5,8 (Sinauer Associates, Inc. 1998)

[79] (Alvin Plantinga, "Methodological Naturalism ?,"http://www.id.ucsb.edu/fscf/library/plantinga/mn/home.html)

[80] [*Eagle Scout Faces Official Challenge Over His Lack of Faith; The New York Times*, November 3, 2002, Sunday, Late Edition – Final, §: § 1; Page 20; Column 1; National Desk].

[81] See *Memorandum: Response to the Resolution of the American Association for the Advancement of Science that seeks to censor intelligent design, dated December 19, 2002* http://www.intelligentdesignnetwork.org/ResponseToAAAS.htm and the attached AAAS resolution; and the Board's action on February 20, 2003, which rejected the suggestion in Letter of Intelligent Design network, inc. dated January 6, 2003, page 3-9 and Implementing suggestion 2, at http://www.IntelligentDesignNetwork.org/wvletter.pdf.

[82] National Science Education Standards, Chapter 6 – Science Content Standards – Content Standards K-4 – Science and Technology,, http://books.nap.edu/html/nses/html/index.html (1995, National Academy of Sciences).

[83] *Lemon v. Kurtzman*, 403 U.S. 602, 613-14 (1971)

[84] "Nor does today's decision signal a major departure from this Court's prior Establishment Clause jurisprudence. A central tool in our analysis of cases in this area has been the Lemon test. As originally formulated, a statute passed this test only if it had a secular legislative purpose, if its principal or primary effect was one that neither advance[d] nor inhibit[ed] religion, and if it did not foster an excessive government entanglement with religion..... **In *Agostini v. Felton*,... we folded the entanglement inquiry into the primary effect inquiry.** This made sense because both inquiries rely on the same evidence, see ibid., and the degree of entanglement has implications for whether a statute advances or inhibits religion, see Lynch v. Donnelly, 465 U.S. 668, 688 (1984) (O'CONNOR, J., concurring). ***The test today is basically the same as that set forth in School Dist. of Abington Township v. Schempp*** .... over 40 years ago. (emphasis added and citations omitted) *Zelman v. Simon-Harris*, (No. 00-1751, Argued February 20, 2002, Decided June 27, 2002); holding that the state could issue payment vouchers to both religious and nonreligious schools chosen by parents.

The "test" enunciated in *Abington Township v. Schempp* which Justice O'Connor referred to is:

> "The test may be stated as follows: what are the purpose and the primary effect of the enactment? If either is the advancement or inhibition of religion then the enactment exceeds the scope of legislative power as circumscribed by the Constitution. ***That is to say that to withstand the strictures of the Establishment Clause there must be a secular legislative purpose* AND *a primary effect that neither advances nor inhibits religion."*** *Abington School Dist. v. Schempp*, 374 U.S. 203, 222 (1963); prohibiting readings from the bible at beginning of each school day.

[85] *Lynch v. Donnelly*, 465 U.S. 668, 690 (1984); holding that the erection of a nativity scene as a part of a traditional holiday display in a privately owned park to celebrate the Holiday recognized by Congress and national tradition and to depict the origins of that Holiday, are legitimate secular purposes.

[86] *Wallace v. Jaffree*, 472 U.S. 38, 56 (1985); *Freiler v. Tangiahoa Parish Board of Education*, 185 F.3rd 337 (5th Cir 1999) holding that the purpose prong of the Lemon Test was satisfied where two of three purposes for a disclaimer were valid. The two valid secular objectives were those that sought to disclaim orthodoxy of belief even though they related to religion. *Lynch v. Donnelly*, 465 U.S. 668, 673 (1984) (holding that the erection of a nativity scene as a part of a traditional holiday display in a privately owned park to celebrate the Holiday recognized by Congress and national tradition and to depict the origins of that Holiday are legitimate secular purposes). The opinion of Justice O'Connor in *Lynch* suggests that the issue is whether government actually intends to convey a message of endorsement or disapproval of religion. If that is the case, an incidental secular purpose will not suffice to satisfy the purpose test.

[87] *Gillette v. United States*, 401 U.S. 437, 449-50 (1971).

[88] *Abington School Dist. v. Schempp*, 374 U.S. 203, 214-5 (1963); holding that the bible cannot be read at the beginning of school.

[89] *Webster's* Third New International Dictionary of the English language, 1993

[90] *Abington School Dist. v. Schempp*, 374 U.S. 203, 214-5 (1963).

[91] *Everson v. Board of Education of Ewing tp*., 330 U.S. 1, 18 (1947); "That Amendment requires the state to be neutral in its relations with groups of religious believers and non-believers; it does not require the state to be their adversary. State power is no more to be used so as to handicap religions, than it is to favor them. The fullest realization of true religious liberty requires that government neither engage in nor compel religious practices, ***that it effect no favoritism*** among sects or between religion and nonreligion, ***and that it work deterrence of no religious belief.";*** *Epperson v. Arkansas*, 393 U.S. 97, 116 (1968)**:** "The very cases cited by the Court as supporting its conclusion hold that the State must be neutral, ***not favoring one religious or anti-religious view over another.***" (J. Black, Concurring); *Rosenberger v. Rector and Visitors of the University of Virginia*, 515 U.S. 819, 831 (1995): "By the very terms of the SAF prohibition, the University does not exclude religion as a subject matter, but selects for disfavored treatment those student journalistic efforts with religious editorial viewpoints."

[92] *Lemon v. Kurtzman*, 403 U.S. 602, 613-14 (1971): "First, the statute must have a secular legislative purpose; second, its principal or primary effect must be one that neither advances nor ***inhibits religion***, Board of Education v. Allen, 392 U.S. 236, 243 (1968); finally, the statute must not foster "an excessive government entanglement with religion."

[93] *Allegheny County v. Greater Pittsburgh ACLU*, 492 U.S. 573, 593-4 (1989): "Of course, the word "endorsement" is not self-defining. Rather, it derives its meaning from other words that this Court has found useful over the years in interpreting the Establishment Clause. Thus, it has been noted that the prohibition against governmental endorsement of religion "preclude[s] government from conveying or attempting to convey a message that religion or a particular religious belief is favored or preferred." Wallace v. Jaffree, 472 U.S., at 70 (O'CONNOR, J., concurring in judgment) (emphasis added). Accord, Texas Monthly, Inc. v. Bullock, 489 U.S., at 27 , 28 (separate opinion concurring in judgment) **(reaffirming that "government may not favor religious belief over disbelief" or adopt a "preference for the dissemination of religious ideas")**; Edwards v. Aguillard, 482 U.S., at 593 (**"preference" for particular religious beliefs constitutes an endorsement of religion**); Abington School District v. Schempp, 374 U.S. 203, 305 (1963) (Goldberg, J., concurring) (**"The fullest realization of true religious liberty requires that government . . . effect no favoritism among sects or between religion and nonreligion")**. Moreover, the term **"endorsement" is closely linked to the term "promotion,"** Lynch v. Donnelly, 465 U.S., at 691 (O'CONNOR, J., concurring), and this Court long since has held that government **"may not . . . promote one religion or religious theory against another or even against the militant opposite,"** Epperson v. Arkansas, 393 U.S. 97, 104 (1968). See also Wallace v. Jaffree, 472 U.S., at 59 -60 (using the concepts of endorsement, promotion, and favoritism interchangeably). Whether the key word is "endorsement," "favoritism," or "promotion," the essential principle remains the same. The [492 U.S. 573, 594] **Establishment Clause, at the very least, prohibits government from appearing to take a position on questions of religious belief or from "making adherence to a religion relevant in any way to a person's standing in the political community." Lynch v. Donnelly, 465 U.S., at 687 (O'CONNOR, J., concurring).***"*

[94] *West Virginia State Board of Education v. Barnette*, 319 U.S. 624, 634 (1943); "The purpose prong of the Lemon test asks whether government's actual purpose is to endorse or ***disapprove*** of religion." Lynch v. Donnelly, 465 U.S. 668, 690 (1984) (O'CONNOR, J., concurring); **Instead, I suggest that certain forms of state discrimination between ideas are improper. In particular, our precedents command the conclusion that the State may not act to deny access to an idea simply because state officials disapprove of that idea for partisan or political reasons.** Board of Education. v. Pico, 457 U.S. 853, 879 (1982); (J. Blackmum, Concurring); *Rosenberger v. Rector and Visitors of the University of Virginia*, 515 U.S. 819, 831-2, 115 S.Ct. 2510,2518 (1995): '"We have time and again held that the government generally may not treat people differently based on the God or gods they worship, or do not worship.' [Citations omitted]. This insistence on government neutrality toward religion explains why we have held that schools may not discriminate against religious groups by denying them equal access to facilities that the schools make available to all. [citations omitted]. Withholding access would leave an impermissible perception that religious activities are disfavored. 'The message is one of neutrality rather than endorsement; if a State refused to let religious groups use facilities open to others, then it would demonstrate not neutrality but **hostility toward religion.**' [citations omitted]. 'The Religion Clauses prohibit the government from

favoring religion, but they provide no warrant for discriminating against religion.'[citations omitted]. **Neutrality, in both form and effect, is one hallmark of the Establishment Clause."** (emphasis added)

95 *Rosenberger v. Rector and Visitors of the University of Virginia*, 515 U.S. 819, 846, 115 S.Ct. 2510,2525 (1995) 'The Religion Clauses prohibit the government from favoring religion, but ***they provide no warrant for discriminating against religion***.'[citations omitted]. **Neutrality, in both form and effect, is one hallmark of the Establishment Clause."** (emphasis added).

96 *Epperson v. Arkansas*, 393 U.S. 97, 104-5 (1968); holding that the state may not censor a nonreligious view of origins to promote a religious view (**"The First Amendment mandates government neutrality** between religion and religion, and **between religion and nonreligion."); *Rosenberger v. Rector and Visitors of the University of Virginia*, 515 U.S. 819, 846, 115 S.Ct. 2510,2525 (1995): 'The Religion Clauses prohibit the government from favoring religion, but they provide no warrant for discriminating against religion.'[citations omitted]. **Neutrality, in both form and effect, is one hallmark of the Establishment Clause."** (emphasis added). *Welsh v. United States*, 398 U.S. 333, 357-8 (1970), (J. Harlan, concurring). Here Justice Harlan makes clear that nonreligion means secular beliefs that do not amount to formal organized religion, whether theistic or non-theistic. His conclusion is that the Establishment Clause prohibits discrimination or religious gerrymandering as to these kinds of secular beliefs and other kinds of formal religious beliefs. This discussion of nonreligion describes Naturalism, as presently practiced in many scientific circles.

97 *Welsh v. United States*, 398 U.S. 333, *concurring opinion, note 8* (1970): "This Court has taken notice of the fact that recognized 'religions' exist that 'do not teach what would generally be considered a belief in the existence of God,' Torcaso v. Watkins, 367 U.S. 488, 495 n. 11, e. g., "Buddhism, Taoism, Ethical Culture, Secular Humanism and others." Ibid. See also Washington Ethical Society v. District of Columbia, 101 U.S. App. D.C. 371, 249 F.2d 127 (1957); 2 Encyclopedia of the Social Sciences 293; J. Archer, Faiths Men Live By 120-138, 254-313 (2d ed. revised by Puritan 1958); Stokes & Pfeffer, supra, n. 3, at 560. See also *Smith v. Board of School Commissioners of Mobile County*, 655 F. Supp, 939, (SD Ala 1987, holding that Secular Humanism is a religion) rev'd on other grounds 827 F2d 684(11th Cir 1987): "Dr. Kirk defines Secular Humanism as ".....a creed or world view which holds that we have no reason to believe in a creator, that the world is self existing, that there is no transcendent power at work in the world, that ***we should not turn to traditional religion for wisdom; rather that we should develop a new ethics*** and a new method of moral order ***founded upon the teachings of modern naturalism and physical science."***

98 *Welsh v. United States*, 398 U.S. 333, 357-8 (1970) (J. Harlan, concurring): "However, having chosen to exempt, it cannot draw the line between theistic or non-theistic religious beliefs on the one hand and secular beliefs on the other. Any such distinctions are not, in my view, compatible with the Establishment Clause of the First Amendment. See my separate opinion in *Walz v. Tax Comm'n*, 397 U.S. 664, 694 (1970); *Epperson v. Arkansas*, 393 U.S. 97 (1968); *School District of Abington Township v. Schempp*, 374 U.S. 203, 305 (1963) (Goldberg, J., concurring); *Engel v. Vitale*, 370 U.S. 421 (1962); *Torcaso v. Watkins*, 367 U.S. 488, 495 (1961); *Fowler v. Rhode Island*, 345 U.S. 67 (1953). The implementation of the neutrality principle of these cases requires, in my view, as I stated in *Walz v. Tax Comm'n, supra*, "an equal protection mode of analysis. The Court must survey meticulously the circumstances of governmental categories to eliminate, as it were, ***religious gerrymanders***. In any particular case the critical question is whether the scope of legislation encircles a class so broad that it can be fairly concluded that [all groups that] could be thought to fall within the natural perimeter [are included]." 397 U.S., at 696. (emphasis added). See also: *Texas Monthly, Inc. v. Bullock*, 489 U.S. 1 (1989), where the court held that a tax exemption for religious publications that did not also extend to secular publications was inconsistent with the required neutrality: "'As long as the breadth of exemption includes groups that pursue cultural, moral, or spiritual improvement in multifarious secular ways, including, I would suppose, groups whose avowed tenets may be antitheological, atheistic, or agnostic, I can see no lack of neutrality in extending the benefit of the exemption to organized religious groups.' 3 Id., at 697 (separate opinion) (footnote omitted). [489 U.S. 1, 14]'"

99 *Abington School Dist. v. Schempp*, 374 U.S. 203, 225 (1963).

100 "At one time it was thought that this right merely proscribed the preference of one Christian sect over another, but would not require equal respect for the conscience of the infidel, the atheist, or the adherent of

a non-Christian faith such as Islam or Judaism.[36] But when the underlying principle has been examined in the crucible of litigation, the Court has unambiguously concluded that the individual freedom of conscience protected by the First Amendment embraces the right to select any religious faith or none at all." *Wallace v. Jaffree*, 472 U.S. 38, 54 (1985)

101 "If there is any fixed star in our constitutional constellation, it is that **no official**, high or petty, **can prescribe what shall be orthodox** in politics, nationalism, religion, or other matters of opinion or force citizens to confess by word or act their faith therein.**"** *West Virginia Board of Education v. Barnette*, 319 U.S. 624, 642 (1943)

"Our Constitution does not permit the official suppression of ideas." Board of Education. v. Pico, 457 U.S. 853, 871 (1982) (J. Brennan, Concurring)

"In starker terms, we must reconcile the schools' "inculcative" function with the First Amendment's bar on **"*prescriptions of orthodoxy*."** Board of Education. v. Pico, 457 U.S. 853, 879 (1982); (J. Blackmum, Concurring) "Instead, I suggest that certain forms of state **discrimination between ideas** are improper. In particular, **our precedents command the conclusion that the State may not act to deny access to an idea simply because state officials disapprove of that idea for partisan or political reasons."**

"Our Nation is deeply committed to safeguarding academic freedom, which is of transcendent value to all of us, and not merely to the teachers concerned. That **freedom** is therefore a special concern of the First Amendment, which **does not tolerate laws that cast a pall of orthodoxy over the classroom.** "The vigilant protection of constitutional freedoms is nowhere more vital than in the community of American schools." Shelton v. Tucker, supra at 487. The classroom is peculiarly the 'marketplace of ideas.' The Nation's future depends upon leaders trained through wide exposure to that robust exchange of ideas which discovers truth 'out of a multitude of tongues, **[rather] than through any kind of authoritative selection**.'" Keyishian v. Board of Regents, 385 U.S. 589, 603 (1967)

102 *Texas Monthly, Inc. v. Bullock*, 489 U.S.1, 16-17 (1989)."As Justice Harlan remarked: **'The Court must survey meticulously the circumstances of governmental categories to eliminate, as it were, religious gerrymanders.'"**

103 The conscientious objector cases show that government may not gerrymander classes based on particular tenets of religious beliefs so that certain religious beliefs are favored while those holding other beliefs are not. Thus, government may not gerrymander exemptions from the draft based on whether a belief system is one which adheres to a God, no God or simply a moral conviction. These aspects of religion were noted by the Court in its discussion of whom should qualify for a "conscientious objector" exemption from the draft in *United States v. Seeger*, 380 U.S. 163 (1965), *Welsh v. United States*, 398 U.S. 333 (1970), (conscientious objection on non-theistic religious grounds sustained); and *Gillette v. United States*, 401 U.S. 437 (1971), (conscientious objection on moral rather than any theistic or non-theistic religious ground sustained).

104 *Texas Monthly, Inc. v. Bullock*, 489 U.S. 17 (1989). "Because Texas' sales tax exemption for periodicals promulgating the teaching of any religious sect lacks a secular objective that would justify this preference along with similar benefits for **nonreligious** publications or groups, and because it effectively endorses religious belief, the exemption manifestly fails this test."

105 *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520 (1993); declaring invalid city ordinances narrowly tailored to proscribe ritual sacrifices of animals for religious purposes but not proscribing other nonreligious forms of animal sacrifice, such as fishing.

106 *Texas Monthly, Inc. v. Bullock*, 489 U.S. 1 (1989)

107 *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520 (1993); declaring invalid city ordinances narrowly tailored to proscribe ritual sacrifices of animals for religious purposes but not proscribing other nonreligious forms of animal sacrifice, such as fishing.

108 *Welsh v. United States*, 398 U.S. 333, 356-7 (1970), J. Harlan concurring.

[109] *Epperson v. Arkansas, 393 U.S. 97 (1968)*

[110] *Epperson v. Arkansas, 393 U.S. 97, 109 (1968).* "Arkansas' law cannot be defended as an act of religious neutrality. Arkansas did not seek to excise from the curricula of its schools and universities all discussion of the origin of man. The law's effort was confined to an attempt to blot out a particular theory because of its supposed conflict with the Biblical account, literally read."

[111] *Welsh v. United States*, 398 U.S. 333, 356-7 (1970), J. Harlan concurring.. See note 15 of Justice Harlan's concurring opinion.

[112] see Letter of Intelligent Design network, inc. to Kansas State Board of Education dated February 8, 2001, at http://www.IntelligentDesignNetwork.org/Feb8letterKSBE.htm, which documents the comment: "The primary mechanism to achieve this end is the Sixth Draft's proposed use of a definition of science that permits only "natural explanations of the world around us." Natural explanations comprehend only "natural causes." This rules out design as a cause even though the inference of design is logically based on data that is observed in nature, consistent with scientific methods used in other scientific disciplines that focus on design detection. ***If there was ever any doubt about the intent of this natural limit to censor design inferences and explanations, it was removed in the dialogue between Dr. Abrams and the Co-Chairmen of the Committee on January 9, 2001. In that discussion the Committee leaders advised the Board that the new definition of science is intended to narrow the "domain of science" such that teachers are not permitted under the Sixth Draft to bring up design as a possible cause of natural objects. If a child raises the question, then the Sixth Draft requires that the child be told that this matter is outside the "domain of science" and to take the question elsewhere.***.

[113] *McLean v. Arkansas Board of Education***,** 529 F.Supp 1255 (E.D. Ark 1982)

[114] *Edwards v. Aguillard*, 482 U.S. 578, 588-9 (1987)

[115] For a number of good discussions about this issue see: Francis J. Beckwith, *Public Education, Religious Establishment and the Challenge of Intelligent Design*, l 17 Notre Dame Journal of Law, Ethics and Public Policy 2, 461 (2003); David K. DeWolf, Stephen C. Meyer and Mark E. DeForrest, "*Teaching the Origins Controversy: Science or Religion or Speech*, 2000 Utah Law Review 39 (February 9, 2001); Francis J. Beckwith, *Law, Darwinism and Public Education: The Establishment Clause and the Challenge of Intelligent Design*, p.94, and 92-106 (Rowman & Littlefield 2003).

[116] *Wisconsin v. Yoder*, 406 U.S. 205, 215 (1972)

[117] *West Virginia State Board of Education v. Barnette*, 319 U.S. 624, 634 (1943)

[118] *Wright v. Raines*, 571 P2nd 26 (Kan.App. 1977)

[119] *Employment Div., Ore. Dept. Of Human Res. v. Smith*, 494 U.S. 872, 879 (1990); holding that although it is constitutionally permissible to exempt sacramental peyote use from the operation of drug laws, it is not constitutionally required.

[120] *Id.* The burden on the state to show a compelling state interest once either neutrality or general applicability has not been demonstrated is sever. Only in rare cases will the analysis survive this scrutiny. This is made clear in both *Smith* and *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520, 546 (1993) as follows:

"To satisfy the commands of the First Amendment, a law restrictive of religious practice must advance ``interests of the highest order,' and must be narrowly tailored in pursuit of those interests. McDaniel v. Paty, 435 U.S., at 628 , quoting Wisconsin v. Yoder, 406 U.S. 205, 215 (1972). The compelling interest standard that we apply once a law fails to meet the Smith requirements is not "water[ed] . . . down" but "really means what it says." Employment Div., Dept. of Human Resources of Ore. v. Smith, 494 U.S., at 888 . A law that targets religious conduct for distinctive treatment or advances legitimate governmental interests only against conduct with a religious motivation **will survive strict scrutiny only in rare cases**. It follows from what we have already said that these ordinances cannot withstand this scrutiny."

[121] *Id.*

[122] *Wright v. Raines***,** 571 P2nd 26, 32 (Kan.App. 1977)

[123] *Planned Parenthood v. Casey*, 505 U.S. 833, 851 (1992)

[124] *Rosenberger v. Rector*, 515 U.S. 819, 828 (1995)

[125] *Cornelius v. NAACP Legal Defense and Educational Fund, Inc.*, 473 US 788, 800 (1985)

[126] *Citizens for a Responsible Curriculum, et.al. v. Montgomery County Public Schools*, p. 19, (Civil Action No. AW - 05-1194 (D. MD. May 5, 2005)

[127] *Rosenberger v. Rector*, 515 U.S. 819, 832 (1995)

[128] "Our Constitution does not permit the official suppression of ideas." Board of Education. v. Pico, 457 U.S. 853, 871 (1982) (J. Brennan, Concurring). At 867-8: "And we have recognized that **"the State may not, consistently with the spirit of the First Amendment, contract the spectrum of available knowledge.**" ..... In keeping with this principle**,** we have held that, in a variety of contexts, **"the Constitution protects the right to receive information and ideas."**.... **This right is an inherent corollary of the rights of free speech and press that are explicitly guaranteed by the Constitution, in two senses. First, the right to receive ideas follows ineluctably from the sender's First Amendment right to send them: "The right of freedom of speech and press . . . embraces the right to distribute literature, and necessarily protects the right to receive it." ..** The dissemination of ideas can accomplish nothing if otherwise willing addressees are not free to receive and consider them. It would be a barren marketplace of ideas that had only sellers, and no buyers..... **More importantly, the right to receive ideas is a necessary predicate to the recipient's meaningful exercise of his own rights of speech, press, and political freedom.** Madison admonished us: "A popular Government, without popular information, or the means of acquiring it, is but a Prologue to a Farce or a Tragedy, or perhaps both. Knowledge will forever govern ignorance, and a people who mean to be their own Governors must arm themselves with the power which knowledge gives." ..... As we recognized in Tinker, students too are beneficiaries of this principle: **In our system, students may not be regarded as closed-circuit recipients of only that which the State chooses to communicate. . . . [S]chool officials cannot suppress "expressions of feeling with which they do not wish to contend..."** (emphasis added)

[129] *Epperson v. Arkansas*, 393 U.S. 97, 103-6 (1968)

[130] *Mitchell v. Helms*, 530 US 793 (2000); "Finally, Chapter 2 satisfies the first Agostini criterion because it does not provide to religious schools aid that has an impermissible content. The statute explicitly bars anything of the sort, providing that all Chapter 2 aid for the benefit of children in private schools shall be "secular, neutral, and nonideological," §7372(a)(1), and the record indicates that the Louisiana SEA and the Jefferson Parish LEA have faithfully enforced this requirement insofar as relevant to this case.

[131] *State v. Smith*, 127 P2nd 518, 522 (Kansas 1942)

[132] The first amendment only applied to Congress in 1861, before the adoption of the 14th amendment which was subsequently held to make the First Amendment applicable to the states.

[133] *Id at* 523, "Section 7 of our Bill of Rights and Article 6, sec. 2, each being a part of our constitution, must be construed together. While under Article 6, sec. 2, the legislature is required to establish a system of schools, in doing so it cannot violate section 7 of the Bill of Rights."

[134] *Daubert v. Merrill Dow Corporation Pharmaceuticals, Inc.*, 509 U.S. 579, 590 (1993) and its progeny. According to *Daubert* for an inference or assertion to qualify as scientific knowledge, it must be derived by the scientific method. As shown above, that is not the case with either Methodological Naturalism or, because of Methodological Naturalism, evolution. An expert that cannot rule out a competing hypotheses has not been allowed to advance an opinion as to the cause of an historical event. (*Kumho Tire Co., Ltd., Et al. v. Carmichael Et al.* 119 S.Ct. 1167 (1999) (where an expert that could not rule out other hypotheses

was not allowed to opine that a tire failed due to design defect. See Arvid V. Zuber, J.D., Ph.D., *Daubert & Scientific Methodology – Science Made Easy, Supplement For The Defense,* p 19 (Defense Research Institute, November 1999).

[135] The Court points out that the focus should be "on principles and methodology, not on the conclusions that they generate." Contrary to this focus, Methodological Naturalism dictates the conclusion before the process starts. It interferes with hypothesis generation and hypothesis testing that is required by the method. *Daubert v. Merrill Dow Corporation Pharmaceuticals, Inc.*, 509 U.S. 579, 590 (1993).

[136] *Edwards v. Aguillard***,** 482 U.S. 578, 107 S.Ct. 2573, 2588 (1987); *Alvarado v. City of San Jose*, at 1232 and *Fleischfresser v. Directors of School District 200*, 15 F3rd 680, 689 (7th Cir 1994).

[137] According to Monod the software that defines life is just made up of "random occurrences." This is consistent with biology textbooks that describe mutations as random occurrences or "hapenings." The NAS and Current Kansas Standards seek to imbue 4th graders with this idea in science standards that teach that natural phenomena just "occur," while human made objects are designed and made for a purpose. See Fourth Grade Standard 5, Benchmark 3 in the current Kansas Standards which was taken from the National Standards.

[138] Michael Ruse, *Darwin and Design: Does evolution have a purpose?*, p. 268 (Harvard, 2003)

[139] Marc H.V. Van Regenmortel, *Reductionism and complexity in molecular biology*, p 1016, (European Molecular Biology Organization, EMBO reports, Vol 5, No. 11, 2004): "The reductionist method of dissecting biological systems into their constituent parts has been effective in explaining the chemical basis of numerous living processes. However, many biologists now realize that this approach has reached its limit. Biological systems are extremely complex and have emergent properties that cannot be explained, or even predicted, by studying their individual parts. The reductionist approach – although successful in the early days of molecular biology – underestimates this complexity and therefor has an increasingly detrimental influence on many areas of biomedical research, including drug discovery and vaccine development. …..As the value of methodological reductionism has been particularly evident in molecular biology, it might seem odd that, in recent years, biologists have become increasingly critical of the idea that biological systems can be fully explained using physics and chemistry."

[140] *Widmar v. Vincent*, 454 U.S. 263 (1981); school may not exclude student religious group; *Westside Community Bd. Of Ed. v. Mergens*, 496 U.S. 226 (1990); Exclusion of after hours student religious club was a violation of the Equal Access Act and that Act was not a violation of the Establishment Clause; *Lamb's Chapel v. Center Moriches Union Free School District*, 508 U.S. 384 (1993); holding that a school cannot censor after school discussions regarding religious family values; and *Rosenberger v. University of Virginia*, 515 U.S. 819 (1995); holding that a university may not refuse to fund a Christian publication if it funds other secular and nonreligious publications; *Good News Club Et al. v. Milford Central School*, 533 U.S. 98 (2001): "allowing the Club to speak on school grounds would ensure neutrality, not threaten it."

APPENDIX A
Definitions of Secular, Neutral, and Non-ideological Item Review Criteria

From Governing Board Policy on NAEP Item Development and Review—5/18/02

Items shall be secular, neutral, and non-ideological. Neither NAEP nor its questions shall advocate a particular religious belief or political stance. Where appropriate, NAEP questions may deal with religious and political issues in a fair and objective way. The following definitions shall apply to the review of all NAEP test questions, reading passages, and supplementary materials used in the assessment:

> **Secular** — NAEP questions will not contain language that advocates or opposes any particular religious views or beliefs, nor will items compare one religion unfavorably to another. However, items may contain references to religions, religious symbolism, or members of religious groups where appropriate.
>
> Examples: The following phrases would be acceptable: "shaped like a Christmas tree," "religious tolerance is one of the key aspects of a free society," "Dr. Martin Luther King, Jr. was a Baptist minister," or "Hinduism is the predominant religion in India."
>
> **Neutral and Non-ideological — Items will not advocate for** a particular political party or partisan issue, for any specific legislative or electoral result, or for **a single perspective on a controversial issue. An item may ask students to explain both sides of a debate, or it may ask them to analyze an issue, or to explain the arguments of proponents or opponents, without requiring students to endorse personally the position they are describing.** Item writers should have the flexibility to develop questions that measure important knowledge and skills without requiring both pro and con responses to every item. (Emphasis not contained in Appendix issued by NAGB)
>
> **Examples:** Students may be asked to compare and contrast positions on states rights, based on excerpts from speeches by X and Y; to analyze the themes of Franklin D. Roosevelt's first and second inaugural addresses; to identify the purpose of the Monroe Doctrine; or to select a position on the issue of suburban growth and cite evidence to support this position. Or, students may be asked to provide arguments either for or against Woodrow Wilson's decision to enter World War I. A NAEP question could ask students to summarize the dissenting opinion in a landmark Supreme Court case.

The criteria of neutral and non-ideological also pertain to decisions about the pool of test questions in a subject area, taken as a whole. **The Board shall review the entire item pool for a subject area to ensure that it is balanced in terms of the perspectives and issues presented.**
(emphasis added) [National Assessment Governing Board, *Collection and Reporting of Background Data by the National Assessment of Educational Progress Policy Statement, Appendix A, Definitions of Secular, Neutral, and Non-ideological: Item Review Criteria* (NAGB, May 18, 2003).]