

ORIGINAL: 2187

FRANKLIN & MARSHALL

21st May, 2001

Dr. Peter H. Garland, Executive Director
State Board of Education
333 Market Street
Harrisburg
Pennsylvania 17126-0333

Dear Dr. Garland,

re: Proposed Academic Standards for Science and Technology

A year ago, I testified before a subcommittee of the State Board of Education, in Harrisburg on the merits of the draft Academic Standards for Science and Technology. I congratulated the Board then on its good work. I urged that no changes should be made to the draft in response to the demands of those who wish to make it possible to incorporate "scientific creationism" or otherwise undermine the treatment of evolution in the curriculum. Subsequently, a number of changes have been made in the draft standards. Most of these changes are appropriate, but two are very problematic. Consequently, I urge the Board to consider making the following changes to the Academic Standards, as now drafted, before they are approved.

Current Draft Standard:

3.3.10.D.1 Analyze evidence of fossil records, similarities in body structures, embryological studies and DNA studies that support or do not support the theory of evolution.

Change to:

3.3.10.D.1 Analyze the fossil record, similarities in body structures, embryological studies and DNA and other molecular data as evidence of the evolutionary relationships among living and extinct organisms.

Current Draft Standard:

3.3.12.D.1 Analyze the impact of new scientific facts on the theory of evolution.

Change to:

3.3.12.D.1 Analyze the impact of new scientific facts on the operation of evolutionary processes and their consequences.

Current Draft Standard:

3.3.10.B.1 Describe the relationship between the structure of organic molecules and the function they serve in living organisms.

Change to:

3.3.10.B.1 Describe the relationships between the structures of organic molecules and the functions they serve in living organisms.

DEPARTMENT OF GEOSCIENCES FRANKLIN & MARSHALL COLLEGE P.O. BOX 3003 LANCASTER, PENNSYLVANIA USA 17604-3003
TELEPHONE: 717.291.4133 FAX: 717.291.4186

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Dr. Peter H. Garland, Executive Director -2-
State Board of Education

My principal concern in recommending these changes to the Board is that the Academic Standards should acknowledge the fact of evolutionary change in complex natural systems, over time. It is now established beyond any reasonable doubt that living organisms, the physical body of the Earth, the Solar System, galaxies, and the Universe as a whole are the products of various kinds of evolutionary processes. Evolutionary theories deal with the mechanisms of change in these systems, not the reality of evolutionary change. The fact of evolution is as well established as the fact that the Earth is round, not flat.

Scientists should applaud a standard that calls for study of the "impact of new scientific facts" on a body of theory relating to evolutionary mechanisms or any other natural phenomena. Scientific knowledge is open-ended. It increases as existing models are challenged by new data and their interpretation. This is the nature of our enterprise. However, it seems likely that some intend to interpret standard 3.3.12.D.1 to mean that arguments of so-called "creation science" or evidence that is said to be consistent only with "intelligent design" may be incorporated into the teaching of science. Consequently, it is important that the State Board of Education should acknowledge, as a matter of record, that "creation science" and "intelligent design" are theological constructs, based on religious belief, and not science as the term is generally understood and as it is used in these Academic Standards.

The third change I have recommended above is merely technical, not substantive. It simply recognizes the extraordinary variety of organic molecules and the large number of functions in which they are employed.

Some members of our community deny the reality of evolution and resist its inclusion in the curriculum because they see it as a challenge to their faith in God. They set this issue up as a struggle between true believers and faithless atheists. This is a false dichotomy, both in practice and in principle. In practice, people of many faiths, including most Christians, have long accepted evolution as a natural phenomenon that is fully consistent with their religious beliefs. In principle, the real dichotomy is between belief that the world is amenable to rational explanation and belief that the acts of the Creator are simply mysterious. For many of us, the concept of a God who works constructively, according to the rules of his creation, is more consistent with "faith, hope and love" than one whose acts are as vengeful and capricious as a literal reading of the Old Testament would suggest.

Once again, I would like to congratulate the Board of Education on its drafting of a set of academic standards that will challenge our students and teachers to excel in their work. We owe it to our children to set high standards, embodying humane and intellectual values that are independent of creed and ideology. The economic health of the Commonwealth, as well as the future of the larger world our children will help to shape, depends on their education. Not least, they should have a state-of-the-art understanding of mathematics, the natural sciences, and technology. We will also serve ourselves and our children well if we can avoid the ridicule heaped on others who have failed to resist demands that they should include stories and interpretations, based on

Dr. Peter H. Garland, Executive Director
State Board of Education

-3-

religious traditions and beliefs, not science, in the science curriculum. Only now are my colleagues in Kansas getting over being on the receiving end of criticism and derision that was leveled at the state, from around the world, two years ago.

Please convey my thanks to the Board for their patience in attending to the arguments of so many people who hope to influence the Academic Standards for Science and Technology by the expression of their opinions. I hope my suggestions may prove helpful.

Kind regards.

Yours sincerely,

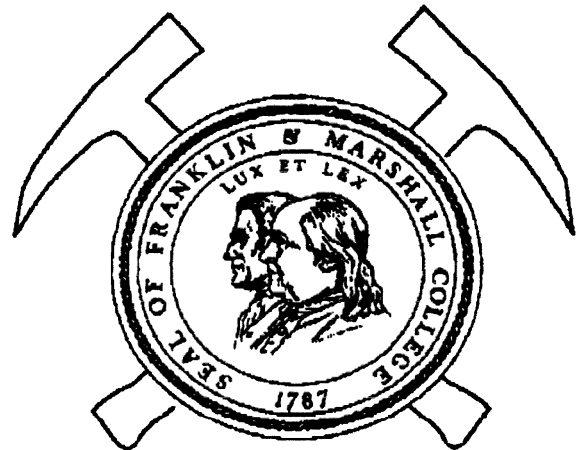
Roger Thomas

R. D. K. Thomas

John Williamson Nevin Professor of Geosciences

telephone: 717-291-4135 fax: 717-291-4186

e-mail: r_thomas@acad.fandm.edu

Franklin and Marshall College**Department of Geosciences****P.O. Box 3003****Lancaster****Pennsylvania 17604-3003****Tel: (717) 291-4135****Fax: (717) 291-4186**

Date: 21st May, 2001
Number of pages: 4
To FAX number: (717) 787-7306
Institution/Company: State Board of Education
Attention: Dr. Peter H. Garland
From: Roger Thomas
Re: State Education Standards

Dr. Garland:

I am attaching a letter in which I make three recommendations for change in the current draft of the revised academic standards for K-12 education in Science and Technology.

I am sending this letter by fax and e-mail, to meet today's deadline.

I will put my signed, original letter on the mail this evening.

Kind regards,

Roger Thomas

RECEIVED
MAY 23 AM 9:24
EDUCATION COMMISSION

RECEIVED
2001 MAY 22 AM 9:49
REVIEW COMMISSION

Dear Peter H. Garland

Teach the Truth (Creation)

Do not confuse the student

James M. Smith

RECEIVED
MAY 21 2001
PA. STATE BOARD
OF EDUCATION

EDUCATION

Comment on standards

The State Board of Education is soliciting public comment on the proposed academic standards for science and technology.

The revised standards include a controversial provision allowing science teachers to introduce theories that "support and do not support the theory of evolution."

Comments should be made no later than Monday and addressed to Peter H. Garland, executive director of the State Board of Education 333 Market St., Harrisburg, PA 17126-0333.

Garland can also be reached by e-mail at pgarland@state.pa.us.

Garland, Peter

ORIGINAL: 2187

To: knowhal@netreach.net
Subject: RE: Feedback On Changes To The Standards

Dear Mr. Wright:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

Be assured that your comments will be considered carefully in the development of the final-form of these regulations.

The Regulatory Review Act provides that information on the final-form of regulations be mailed to public commentators at their request. If you would like to receive the final-form of these academic standards when they are submitted to the Education Committees and IRRC, please make your request in writing to the State Board of Education, First Floor, 333 Market Street, Harrisburg, PA 17126-0333.

Sincerely yours,

Peter

H. Garland

Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

-----Original Message-----

From: Hal Wright [mailto:knowhal@netreach.net]
Sent: Sunday, May 20, 2001 1:40 PM
To: 00statbd@psupen.psu.edu
Subject: Feedback On Changes To The Standards

Dr. Garland,

I am writing to voice my concern over the changes in standards shown below.

Collectively, they represent a subtle retreat from the position supported by virtually all scientists that evolution is the only scientifically valid explanation for the variety of life on earth today.

The body of scientific evidence supporting the theory of evolution is tantamount to that supporting Newton's laws of motion or the present model of the atom. Developed via direct or indirect observation and rational thought, these ideas provide a framework to allow us to understand and

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2001 MAY 22 AM 10:05

make
predictions about the natural world.

Great scientific ideas are provisional only in the ways that all
scientific
ideas are provisional. Scientific ideas that have stood the test of time
may
be enhanced -- as Einstein's theory of relativity enhances Newtonian
mechanics -- and may even be overturned, but not without valid evidence
to
refute earlier supportive findings. In the case of evolution, this
evidence
does not exist.

If we are seriously want our students to be the best in the world in
science
and mathematics, then we need to teach them what science is and what
scientists do. We need to avoid polluting the scientific curriculum with
religious dogma.

Sincerely,

Hal Wright

The changes:

Section 3.2: Inquiry and Design

Old Standard

3.2.7.A.4 - Integrate new information into existing theories and
practice.

New Standard

3.2.7.A.4 - Explain how new information may change existing theories and
practice.

Old Standard

3.2.10.A.4 - Explain how new information may change existing theories
and
practice.

New Standard

3.2.10.A.4 - Integrate new information into existing theories and
practice.

Old Standard

3.2.10.A.2 - Know that science is limited to the study of concrete
aspects
of the world and the universe.

New Standard

3.2.10.A.2 - Know that science is limited to the study of observable
aspects of the world and the universe.

Section 3.3: Biological Sciences

Old Standard

3.3.10.D.1 - Analyze evidence of fossil records, similarities in body
structures, embryological studies and DNA studies that support the
theory
of evolution.

New Standards

3.3.10.D.1 - Analyze evidence of fossil records, similarities in body
structures, embryological studies and DNA studies that support or do not
support the theory of evolution.

Old Standard

3.3.10.A - Explain the causes of similarities and differences found
among

living things.

New Standard

3.3.10.A - Explain the structural and functional similarities and differences found among living things.

Old Standard

n/a No comparable standard

New Standard

3.3.10.B.1 - Describe the relationship between the structure of organic molecules and the function they serve in living organisms.

Old Standard

n/a No comparable standard

New Standard

3.3.10.B.3 - Explain how cells store and use information to guide their functions.

Old Standard

n/a No comparable standard

New Standards

3.3.12.D.1 - [A]nalyze the impact of new scientific facts on the theory of evolution.

Section 3.4: Earth Sciences

Old Standard

3.4.12.A.3 - [I]nterpret the geological evidence for evolution to explain biological and astronomical changes.

New Standard

3.5.12.A.3 - [I]nterpret the geological evidence supporting evolution.

Garland, Peter

ORIGINAL: 2187

To: Kathleen Blee
Subject: RE:

DearMs. Blee

Thank you for your e-mail of May 21, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

Be assured that your comments will be considered carefully in the development of the final-form of these regulations.

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Sincerely yours,

Peter H. Garland
Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

-----Original Message-----

From: Kathleen Blee [mailto:kblee+pitt.edu]
Sent: Monday, May 21, 2001 6:53 AM
To: pgarland@state.pa.us
Subject:

RECEIVED
MAY 22 2001

20110722 06:53

Dear Peter Garland:

I am writing as the parent of two children in the Pittsburgh Public Schools to protest vigorously the new state standards for science and technology that allow science teachers to introduce theories that do not support the theory of evolution. It is the responsibility of the Pennsylvania State Board of Education to provide our children with accurate science information and not to be swayed by the pressure of anti-evolution interest groups.

Sincerely,

Kathleen M. Blee
4334 Saline St

ORIGINAL: 2187

Garland, Peter

To: Nancy M. Fitzgerald

Subject: RE: Proposed PA Education Standards

2001 MAY 22 11:10:05

REVIEW COMMISSION

Dear Ms. Fitzgerald:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H.
Executive Director

Garland

cc: Members of the State Board

Senator Rhoades

Senator Schwartz

Representative Stairs

Representative Colafella

IRRC

-----Original Message-----

From: Nancy M. Fitzgerald [mailto:nmfitzge@nb.net]

Sent: Sunday, May 20, 2001 6:32 PM

To: pgarland@state.pa.us

Subject: Proposed PA Education Standards

Secretary Garland:

5/21/2001

I am writing to comment on the proposed education standards in science and technology. **I am strongly against the provision allowing science teachers to introduce theories that "support and do not support the theory of evolution."**

I do NOT approve of teacher choice to include opinion based ideas about scientific evolution. The place for those ideas is in public discourse and in our churches. As a permanently certified teacher in Pennsylvania who has taught chemistry and general science and as a research chemical engineer and active member of my church, I strongly urge you to stick with scientific theories in science classes. There is no data base for countering evolution beyond individual faith. That is not what I want in public schools.

Thank you for acting on this input.

Sincerely,
Nancy M. Fitzgerald, M.A.T., M.S. ChE.
201 Chestnut St., Pgh, 15218-1511
412-731-2994 voice & fax

5/21/2001

Garland, Peter

ORIGINAL: 2187

To: rockwell@pop.penncom.mindspring.com
Subject: Science Standards

Dear Mr. and Mrs. Rockwell:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland
Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

2001 MAY 22 PM 9:57
IRRC
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ORIGINAL: 2187

May 20, 2001

Dr. Peter Garland, Executive Director
PA State Board of Education
333 Market Street
Harrisburg PA 17126-0333

RE: Draft Standards for Science and Technology Education

Dear Dr. Garland:

There are several important errors in the proposed Standards for Science and Technology. The most serious is the weakening of the role of evolution as a foundation for the life sciences. Curriculum that follows the current proposed standards will give students a deficient and faulty life-sciences education that will leave them ill-prepared for higher education and for careers in life-sciences-related professions.

As written, there are three main problems with the proposed standards regarding evolution as currently written.

1. In the scientific arena, evolution explains the pattern of similarity and difference among living things throughout the Earth's history and in its many environments and habitats. More important, though, evolution provides the basis for scientific research in medicine, agriculture, biotechnology, pharmacology, and dozens of related fields. It is this record of supporting productive research that gives evolution its place among the sciences. Evolution has earned its place at the foundation of the biological sciences.
2. In the educational arena, if we are seriously want our students to be the best in the world in science and mathematics, then we need to teach them what 21st-century science really is and does. There are many rejected ideas in the history of science that we no longer take seriously — that the Earth is flat or that the Sun, Moon, and stars revolve around us — yet which some people continue to proclaim. These are simply not a part of the "scientific" debate and therefore have no place in the science curriculum
3. In the constitutional arena, a series of state and federal court rulings have repeatedly found that science is what scientists do and that attempts to legislate interpretations of data that follow particular religious or philosophical traditions is unconstitutional, tantamount to violating the Establishment Clause of the First Amendment.

It is simply in the best interests of our children's education that what they learn in the classroom reflects the current consensus of scholars and practitioners in the appropriate fields — whether it is science or some other discipline. Singling out evolution for a special challenge among all other theories — electromagnetic theory, quantum theory, the theory of gravitational attraction, germ theory, and so on — is not warranted on any scientific grounds. Moreover, it gives students the false impression that evolution itself, is under attack or in crisis within the biological sciences. If it is debate and critical thinking that we desire, then let our students debate real issues in the sciences — such as how various evolutionary models and mechanisms have produced the history and diversity of life that we observe around us.

Eliminate the standard that calls for "evidence that does not support" evolution and other standards that show bias against evolutionary theory by singling it out among all other scientific theories for special criticism within the standards. Ensure that Pennsylvania's students will have a complete, up-to-date, and competitive science education.

Sincerely Yours,

M-F Gregory
M-F Gregory
333 South Allen Street, Apt. 703
State College, PA 16801
mfgtrb@earthlink.net

Garland, Peter

ORIGINAL: 2187

To: rac7@erols.com
Subject: Science Standards

Dear Mr. Cooper:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland
Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

RECEIVED
2001 MAY 22 AM 9:57
INDEPENDENT
REGULATORY REVIEW
COMMISSION

**From The Desk Of
Robert A. Cooper**

Pennsbury High School
705 Hood Boulevard
Fairless Hills, PA 19030
215-949-6700

279 Willow Drive
Levittown, PA 19054
215-943-0787

May 21, 2001

Dr. James P. Gallagher, President
333 Market Street
Harrisburg, PA 17126-0333

Dear Dr. Gallagher:

As a Pennsylvania citizen and a biology teacher, I am concerned about the revisions made to the most recent version of the Academic Standards for Science and Technology. I have compared an earlier version (from 8/27/98) that I had on file with the Revised draft that is dated July 12, 2000 and is posted on the Pennsylvania Department of Education web site. I believe that several of the changes that have been made in the revised draft of July 12 will compromise the quality of the standards depending on how they are interpreted. Thus, one can only conclude that they will also seriously compromise the quality of education in Pennsylvania. The proposed standards may result in students who are poorly educated with regard to one of the most important groups of theories (i.e., evolutionary theories) that scientists have developed, thus making it difficult for students to compete for admission to the most selective colleges and universities in the United States. In addition there may also be economic consequences to the State of Pennsylvania as there were in Kansas when high-tech companies refused to locate in the state after the Kansas School Board voted to remove evolution from their state standards in 1999.

The August 1998 version of the standards contained clear and accurate language describing what students should learn about evolution. This earlier version was consistent with modern evolutionary theory as it is currently formulated by the scientific community. In contrast, the July 12, 2000 revision includes several statements which misrepresent the current state of scientific knowledge about evolution. For example the more recent revision includes the statement, Students will "Analyze evidence of fossil records, similarities in body structures, embryological studies and DNA studies that support or do not support the theory of evolution." and also the statement, Students will "Analyze the impact of new scientific facts on the theory of evolution." These statements suggest that there is substantial evidence that would cause scientists to doubt that evolution occurred. These sentences include catch phrases of several creationist groups and I am concerned that creationists may use these statements as justification for introducing their personal religious views into the forum of public science classrooms in the guise of a creation science theory. In fact, so-called "creation science" or "Intelligent Design Theory" is not a science at all. As described in the federal court ruling in *McLean v. Arkansas Board of Education* (1982, 529 F. Supp. 1255, 50 U.S. Law Week 2412), it is a thinly disguised attempt to promote the teachings of a particular religion as science.

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EDUCATION
REVIEW COMMISSION

As a biology teacher, I have carefully investigated this matter, and I can assure you that there is ample evidence that evolution has occurred and continues to occur. In addition, there is no substantial evidence to the contrary. Those who claim that there is such evidence typically present distortions of fact and/or fallacious arguments to support their claims. A case in point is the following quote from the chairman of the Pittsburgh-based Creation Science Fellowship, Dennis Wert, claiming that evolution "is not a science theory." He argued that evolution "... is considered to be the most tentative of science-based theories because it is based on the kind of evidence that cannot be reproduced" (Bethlehem Morning Call, 02/18/01). Unfortunately, this argument put forth by Mr. Wert is based on misconceptions about science and evolution. To suggest that theories that describe and explain life's history are somehow less scientific because the events of the past cannot be repeated is simply absurd and demonstrates a lack of understanding of science and the scientific process. There are methods scientists use to construct reliable theories of the past. These theories are verified using observations of remnants from the past like fossils or trace elements found in certain rocks. The observations of fossils and trace elements are reliable and reproducible. The fact that these scientific theories deal with events in the past that cannot themselves be repeated does not make them any less certain than theories verified by experiment. The methods scientists use to investigate the past are similar to those used by detectives investigating a crime scene, or by lawyers trying to establish the guilt or innocence of an accused individual. A fine example of this approach is the recent conviction in the Lockerbie bombing case. If the courts can reach conclusions with a high degree of reliability using these methods, then it follows that scientists can do the same when investigating life's past.

In other attempts to discredit evolutionary theory, some individuals attempt to associate evolution with various -isms, such as atheism, communism, Marxism, and nazism as Congressman Samuel Rohrer (R) of Berks County has. In fact, there is no necessary connection between these various -isms and evolutionary theory. Historically, it is true that proponents of these -isms attempted to associate themselves with evolution in order to lend credence to their ideas; however, that is the extent of their association. None of the aforementioned -isms has any necessary connection to evolution, nor can any of these -isms be logically derived from evolutionary theory. I urge you to examine the executive summary of *Evolution, Science and Society*, a document prepared by delegates from the American Society of Naturalists, the Animal Behavior Society, the Ecological Society of America, the Genetics Society of America, the Paleontological Society, the Society for Molecular Biology and Evolution, the Society for the Study of Evolution, the Society of Systematic Biologists and endorsed by the American Institute of Biological Sciences (Available at <http://www.amnat.org>). It represents the consensus view of a broad base of professional biologists that evolution plays an important role in biological science and is also important to the future of society. Nowhere in the document do the biologists profess allegiance to atheism, communism, Marxism, or nazism.

I urge the members of the Pennsylvania Board of Education to reject the standards in their current form. The section of the Standards that deals with Biological Sciences, specifically evolution, should be restored to its original form (8/27/98). This is the only way to ensure quality science education for the children of Pennsylvania and the continued competitiveness of our students at the nation's most selective colleges and universities as well as the competitiveness of Pennsylvania as a home for high-tech businesses in the future.

Sincerely,

Robert A. Cooper

Garland, Peter

ORIGINAL: 2187

To: tagme@usachoice.net

Subject: RE: PA Proposed Science Standards

Dear Ms.Mauk :

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland

Executive Director

cc: Members of the State Board

Senator Rhoades

Senator Schwartz

Representative Stairs

Representative Colafella

IRRC

---Original Message---

From: Mauk Family [mailto:tagme@usachoice.net]

Sent: Monday, May 21, 2001 10:00 AM

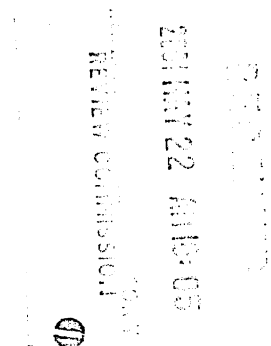
To: 00statbd@psupen.psu.edu

Subject: PA Proposed Science Standards

Dear Dr. Garland,

Thank you for the opportunity to respond to the proposed PA science standards. I appreciate

5/21/2001



being able to contribute in a small way by voicing my opinion.

I am writing to urge you to keep all of the elements of the PA Proposed Science Standards that encourage a critical, objective approach of the teaching of origins. Evolution is a THEORY, not proven fact. It is imperative to present it this way in the public school classrooms across the Commonwealth.

Also, I am urging you to modify the hominid portion of the standards (Section 3.3.12.D). It reads, *"Examine human history by describing the progression from early hominids to modern humans."*

I would ask you to consider changing it to the following, *"Critically evaluate the validity of the hominids that evolutionists claim to be ancestral to modern man."*

Thank you for your time and consideration to this matter.

Sincerely,

Mary Mauk

5/21/2001

Garland, Peter

ORIGINAL: 2187

To: Mark_Jorgenson@mgind.com
Subject: RE: Response to Proposed changes to Science and Technology Curriculum

Dear Mr. Jorgenson:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

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Sincerely yours,

H. Garland

Peter

Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

-----Original Message-----

From: Mark_Jorgensen@mgind.com [mailto:Mark_Jorgensen@mgind.com]
Sent: Sunday, May 20, 2001 4:44 PM
To: 00statbd@psupen.psu.edu
Subject: Response to Proposed changes to Science and Technology Curriculum

State Board Members,

An article in the Morning Call (

"Critics,..." by Mario Cttabiani 20May01)
brought the proposed science and technology changes to my attention. Of particular interest was the paragraph which captured the theme of the article.

Science is the art of hypothesis, observation, and deduction. Therefore, I see no reason to study all aspects of science, even those observations which tend to clash with current evolutionary thought. If evolution is to be taught scientifically, and not dogmatically, it must be taught, warts and all.

All other subjects in school can be made centers for debate. Debate challenges students to defend their positions and understand their arguments. This is true for Literature, Politics, History, and even Mathematics. The same should hold true for all Science.

It is a sad day when we ignore certain facts that may disrupt or negate present theories. Instead, we should admit that with evolutionary science, we are in essence, writing a movie summary with one or two frames of film. To shut out other theories and suppositions that conform to observational data, is both intolerant and dogmatic.

Every comment by supposed educators and scientists in the Morning Call article contained overtones of vitriol for anyone questioning the theory of evolution. It disturbs me to think that my child would be silenced from posing questions in class regarding the shortcomings of evolution.

I will end my note by stating that I do believe in creationism, not only because of my faith, but also after an exhaustive examination of the facts. My theories on the origin of species, as well as the galaxy, has not hindered my ability to function in this world. I have served in the military and hold a BS and MBA. I grew up in the East Penn School District. Even though I voiced my opinion at times, I studied the material intently and always received high grades. My junior year, I had even written a paper on radioactive dating methods, including their shortcomings, and received high marks.

No student or teacher should be subjected to silence if he or she points out the shortcomings of any theory. That paragraph ensures sound science will prevail over the current dogma. Additionally(please excuse the upcoming bias), it is such a small portion of an overwhelmingly large evolution-riddled curriculum, that I should be attacking the other 99.9% of the proposal instead of defending a few words.

I hope you, the board members will not shut out this important area of debate from our schools. A student or teacher does not have to teach creationism, but they should not be silenced from poking legitimate holes in current evolutionary theory. Only by asking questions can we hope our students will learn to find their answers.

Sincerely

Mark Jorgensen
Hellertown, PA

Garland, Peter

ORIGINAL: 2187

To: Donald E. Saunders
Subject: RE: Academic standards science and technology

Dear Mr. Saunders:

Thank you for your e-mail of May 21, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

Be assured that your comments will be considered carefully in the development of the final-form of these regulations.

The Regulatory Review Act provides that information on the final-form of regulations be mailed to public commentators at their request. If you would like to receive the final-form of these academic standards when they are submitted to the Education Committees and IRRC, please make your request in writing to the State Board of Education, First Floor, 333 Market Street, Harrisburg, PA 17126-0333.

Sincerely yours,

H. Garland

Peter

Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

-----Original Message-----

From: Donald E. Saunders [mailto:geo55@stargate.net]
Sent: Monday, August 27, 1956 8:50 AM
To: Mr. Peter Garland
Cc: pgarland@state.pa.us
Subject: Academic standards science and technology

Mr. Garland

5/20/01

I have taught Earth Science classes in the Carlynton School District for the past 28 years. I hope the new standards will oppose the teaching of creationism as science in the classroom.

Donald E. Saunders
Carlynton Highschool
435 Kings Highway
Carnegie Pa. 15106

2001 MAY 22 AM 10:05
RECEIVED COMMISSION
10

Garland, Peter

ORIGINAL: 2187

To: jdbieber@enter.net

Subject: RE: evolution/creationism

Dear Mr. Bieber:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland

Executive Director

cc: Members of the State Board

Senator Rhoades

Senator Schwartz

Representative Stairs

Representative Colafella

IRRC

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2001 MAY 22 AM 10:04
INDEPENDENT REGULATORY REVIEW COMMISSION

-----Original Message-----

From: Jeffrey Bieber [mailto:jdbieber@enter.net]

Sent: Sunday, May 20, 2001 6:37 PM

To: 00statbd@email.cas.psu.edu

Subject: evolution/creationism

I hear the 30-day public comment period for the science and technology standards ends tomorrow. Just

5/21/2001

wanted to give my input.

Supposing evolution is false and creationism is true, as I believe it is? Most folks take evolution as truth, when in reality it has not been conclusively proven to be true. If people would research creationism as much as they do evolution, they might have a better understanding of the issue. As it is, balance can only be achieved by comparing one thing with another. This is true of any issue. The student should be left with an open mind to explore facts--in any field. If science prides itself on being factually based, let them look for the facts that are out there, and, as the initiative says, "Analyze evidence of fossil records, similarities in body structures, embryological studies and DNA studies that support or do not support the theory of evolution."

5/21/2001

Garland, Peter

ORIGINAL: 2187

To: KATILIUS,GERARD (HP-USA,ex1)
Subject: RE: strongly against the provision for science teachers

Dear Mr. Katilius:

Thank you for your e-mail of May 19, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter

H. Garland

Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

-----Original Message-----

From: KATILIUS,GERARD (HP-USA,ex1) [mailto:gerard_katilius@hp.com]
Sent: Saturday, May 19, 2001 1:38 PM
To: 'pgarland@state.pa.us'
Subject: strongly against the provision for science teachers
Importance: High

Dear Mr. Garland,

I am writing to comment on the proposed academic standards for science and technology.

I am strongly against the provision allowing science teachers to introduce theories that "support and do not support the theory of evolution."

I earned my degree in Electrical Engineering from the United States Naval Academy at Annapolis, and I do not think it is appropriate for science

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teachers to be able to arbitrarily introduce theories that may not be scientifically supportable. That is the reason we taxpayers pay all the money for textbooks -- our elected officials review and approve them, and the teachers should be teaching the material in the books, not pushing their own individual agendas.

I strongly urge you to leave out this provision from the new academic standards for science and technology.

Gerard Katilius
HP Computing & Imaging
gerard_katilius@hp.com

Direct dial: 724-742-3130
800 Cranberry Woods Drive, Suite 200
Cranberry Township, PA 16066

Garland, Peter

ORIGINAL: 2187

To: bioprocess@earthlink.net

Subject: RE: science & technology standards

Dear Mr. Marks:

Thank you for your e-mail of May 20, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland

Executive Director

cc: Members of the State Board

Senator Rhoades

Senator Schwartz

Representative Stairs

Representative Colafella

IRRC

-----Original Message-----

From: David Marks [mailto:bioprocess@earthlink.net]

Sent: Sunday, May 20, 2001 1:49 PM

To: 00statbd@email.cas.psu.edu

Subject: science & technology standards

I'm writing in support of the PA science & technology standards as currently proposed. I support the teaching of the theory of evolution in our public schools, but it should be taught as a theory - objectively

5/21/2001

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looking at the evidence for and against it. The greatest danger inherent in the creationist/evolution debate is that for many people the theory of evolution becomes scientific dogma. When any theory is erroneously taught as fact, it closes our minds to other possibilities and inhibits the progress of scientific discovery.

David M. Marks
Center Valley, PA

5/21/2001

Garland, Peter

ORIGINAL: 2187

To: ira@CHUHEP2.PHYS.CMU.EDU
Subject: RE: Science Standrds

Dear Dr. Rothstein:

Thank you for your e-mail of May 19, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter

H. Garland

Executive Director

cc: Members of the State Board
Senator Rhoades
Senator Schwartz
Representative Stairs
Representative Colafella
IRRC

---Original Message-----

From: Ira Rothstein [mailto:ira@CMUHEP2.PHYS.CMU.EDU]
Sent: Saturday, May 19, 2001 4:37 PM
To: 00statbd@email.cas.psu.edu
Subject:

Dear Dr. Garland,

I am greatly concerned about the recent changes made to the proposed academic standards for science and technology. It seems clear that the unscientific ideas of creationists are slowly creeping into the the standards. It seems now that the new standards are asking students to "challenge" the theory of evolution. There is no doubt that the science makes progress via challenging and amending known theories. Evolution, is a bedrock of the life sciences, and while it may not be completely understood in all its nuances, that does mean that students should be given the impression that its wrong.

Its true that there are pathways which are so complicated that we

2001 MAY 22 AM 9:51
REVIEW COMMISSION

presently don't understand them, but to give high school students the idea that it might be "wrong", is a crime. It would be like telling them that they should challenge Newtons laws of mechanics, because presently we don't understand how quantum mechanics and gravity work in a unified theory. Well, perhaps I'm exaggerating slightly, but not much. I urge you to follow the recommendations in "Reports of the National Center for Science Education 20(4):13-15, 2000".

Sincerely,

Ira Rothstein
Associate Professor of Physics (CMU)

Ira Rothstein

tel: (412-268-2739)

fax: (412-681-0648)

Dept. of Physics Carnegie Mellon University

Garland, Peter

ORIGINAL: 2187

To: KarenLGerard@aol.com

Subject: RE: proposed academic standards for science and technology

Dear Ms. Gerard:

Thank you for your e-mail of May 19, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland

Executive Director

cc: Members of the State Board

Senator Rhoades

Senator Schwartz

Representative Stairs

Representative Colafella

IRRC

-----Original Message-----

From: KarenLGerard@aol.com [mailto:KarenLGerard@aol.com]

Sent: Saturday, May 19, 2001 1:41 PM

To: pgarland@state.pa.us

Subject: proposed academic standards for science and technology

Dear Mr. Garland,

5/21/2001

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MAY 22 AM 9:56
INDEPENDENT
REGULATORY
REVIEW COMMISSION

I am writing to comment on the proposed academic standards for science and technology. I am **strongly against** the provision allowing science teachers to introduce theories that "support and do not support the theory of evolution."

I am a certified teacher in Pennsylvania, and I do not think it is appropriate for science teachers to be able to **arbitrarily introduce theories that may not be scientifically supportable**. That is not their job, and that is not what we should be teaching our children - let the teachers teach from the textbooks - I don't want any religious materials taught in schools.

I strongly urge you to leave out this provision from the new academic standards for science and technology.

Karen Katilius
3464 Treeline Drive
Murrysville, PA 15668

5/21/2001

Garland, Peter

ORIGINAL: 2187

To: ctwartog@hotmail.com

Subject: RE: Science Education Standards

Dear Mr. Twarog :

Thank you for your e-mail of May 19, 2001 on proposed 22 Pa. Code, Chapter 4, Appendix B (academic standards for Science and Technology).

Your e-mail is considered as official public comment and is being shared with all members of the Board. Pursuant to the provisions of the Regulatory Review Act, copies of your comments are also being provided to the Independent Regulatory Review Commission (IRRC) and the Chairmen of the House and Senate Education Committees.

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Sincerely yours,

Peter H. Garland

Executive Director

cc: Members of the State Board

Senator Rhoades

Senator Schwartz

Representative Stairs

Representative Colafella

IRRC

-----Original Message-----

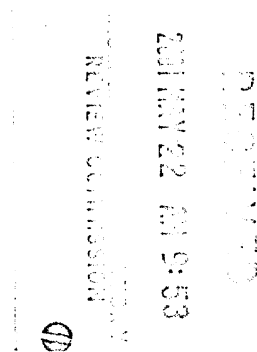
From: CHESTER TWAROG [mailto:ctwartog@hotmail.com]

Sent: Saturday, May 19, 2001 2:29 PM

To: 00statbd@psupen.psu.edu

Subject: Science Education Standards

5/21/2001



To Whom It May Concern,

The Pennsylvania Science standards do not need to be changed.

If you read, for example, the June issue of National Geographic on Pterosaurs, you will notice that science takes care of itself, is self-corrective, is not absolute, and is always open to verification, testing, falsibility, new discoveries, and readily admits its own limitations, areas of weaknesses but continually asks questions and seeks empirical evidence verifiable by everyone or anyone anywhere.

"Paleontologists can paint this vivid picture of Araripe pterosaurs because their bones were exquisitely fossilized, intact and uncrushed, within the quiet sediments at the bottom of the lagoon."

"Even with the new (fossil) discoveries, the rarity of fossils leaves major gaps in (our) knowledge about pterosaurs. No one knows how they evolved flight, why they vanished, or exactly what they looked like. Debate swirls around these reptiles." pg 91

"All paleontologists admit, however, that the question of origins (of flight) remains open, awaiting new fossil evidence/discoveries of early forms of pterosaurs." pg 99.

Will the Creationists and Intelligent Design Theologists be held to the same standards? Will they admit they could be in error? Their source is the (literal) interpretation of the King James Version of the Holy Bible and their science must conform to this source. How can the Young Earth Creationists verify and provide evidence that the Cosmos and Earth were created in a six day period during the week of Oct 26th, 4004 B.C.E? What evidence can they demonstrate conclusively that God formed Adam out of the dust of the earth and with His breath of Life, brought Adam to life? Or, that Eve was created from Adam's rib or side? If they, too, were required to provide substantial evidence against their Biblical hypothesis as your new standards propose for science education, they could only falsify their Biblical Science.

Thank you,

Chester Twarog

Meteorologist/ B.S. degree in Earth Sciences

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Carnegie Mellon

ORIGINAL: 2187

2001 MAY 23 AM 9:30

REVIEW COMMISSION

Department of Physics
Carnegie Mellon University
Pittsburgh, Pennsylvania 15213-3890
(412) 268-2740

Prof. Richard E. Griffiths
Dept. of Physics
412-268-1886
griffith@astro.phys.cmu.edu

19 May 2001

Peter H. Garland
Executive Director
Pennsylvania State Board of Education
333 Market Street
Harrisburg, PA 17126-0333

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MAY 22 2001

PA. STATE BOARD
OF EDUCATION

Dear Dr. Garland,

My colleagues and I have reviewed the proposed changes to the Pennsylvania academic standards for science and technology and would like to express concern about the standards pertaining to the teaching of evolution. The Universe of galaxies Has evolved from the Big Bang, and following the formation of our sun and the earth, life has evolved over the past four billion years.

The proposed standards introduce some very subtle but potentially significant changes in wording that would not only undermine the teaching of evolution but that could also open the door to the teaching of creationism or its modern- day descendant - "intelligent design." These changes in wording are found in the Grade 10 and Grade 12 standards.

My concerns are as follows:

Proposed standard: Explain the mechanism of the theory of evolution.
(Standard 3.3.10.D)

Proposed standard: Analyze the theory of evolution. (Standard 3.3.12.D)

It is important that students learn that the scientific usage of the word "theory" is very different from the common usage. In science, the word theory refers to an underlying principle of observed phenomena that has been tested and verified. However, in common usage, it has come to mean hunch' or speculation' (what the word hypothesis means in science). Unfortunately, those who oppose the teaching of evolution ignore this very significant difference and seize on the use of the word theory to insinuate that evolution is just scientific conjecture. Failing to teach students the meaning of the word theory as it is used in science will undermine not just the teaching of evolution, but also all science education.

The Grade 12 standard is too vague. Asking students to analyze a theory, without any

constraints as to the nature of the analysis, is asking students to propound on alternate, non-scientific explanations for the natural world. It is more likely than not those students - or teachers - who have come to accept creationism or intelligent design, will view this open-ended discussion as an opportunity to introduce their views into the science classroom. In addition to undermining the teaching of sound science, the State of Pennsylvania is inviting conflict in the classroom, legal challenges, and, very likely, embarrassing adverse publicity of the nature that rained upon the State of Kansas when that state proposed changes to its science standards that undermined the teaching of evolution.

Proposed standard: Analyze evidence of fossil records, similarities [sic] in body structures, embryological studies, and DNA studies that support or do not support the theory of evolution. (Standard 3.3.10.D) This is the most problematic standard. It is entirely appropriate to assess scientific evidence. However, this assessment must be placed in context. Students must first learn about the scientific process. The very process of science requires the repeated challenging of ideas through hypothesis testing. Inevitably, some - even many - of these tests will fail to support the hypothesis. Over time, scientists re-examine earlier studies and experiments. Many times, the same experiments are repeated. We often find that earlier experiments were in some way flawed. Students must also learn that no one piece of evidence is conclusive.

Without this context, students are engaging in an exercise that fails to differentiate between the failure of test and the failure of a theory. In fact, the introductory material to the standards discusses this point at some length, but the standards fail to adequately incorporate this fundamental concept. Therefore, students reach Grade 10 without a solid grounding in the scientific process, and are then asked to start challenging accepted scientific theory. This situation would be untenable no matter what the subject matter of the analysis. It undermines the teaching of all science. When this kind of exercise is introduced in the context of the teaching of evolution, it is all the more inappropriate, because, unlike most other scientific theories, the challenge does not end with the assessment of individual pieces of evidence. Instead, the challengers rush to propose alternate, non-scientific explanations.

I suggest, given the persistent challenges to the teaching of evolution, that this particular intellectual exercise take place in the context of some other subject matter. I applaud the state's interest in encouraging the assessment of scientific evidence and the development of critical thought processes. However, one cannot ignore the fact that the opponents of the teaching of evolution continually seek ways to introduce discussion of creationism and intelligent design into science classrooms. By inviting students to challenge this particular subject - and no other in the curriculum - the State is inadvertently suggesting to students that this particular theory is somehow less robust than others.

Further, this standard opens the door to the discussion of non-scientific ideas such as creationism and intelligent design. It is an unfortunate fact that the proponents of these

concepts have distorted the scientific process by insisting that if some studies or experiments do not support a scientific theory, then the theory must fail. In establishing this dogma, they have attempted to inextricably intertwine the valid assessment and re-assessment of scientific evidence with the notion that the only acceptable explanation is the supernatural creation of life and of species. The State of Pennsylvania should be sensitive to this fact and guard against the inadvertent introduction of religious or quasi-religious ideas into the science classroom. It is possible, if not probable, that some students and teachers have come to accept this anti-evolution dogma and will carry it with them into the discussions mandated by this standard. The science classroom is not the proper place for these discussions. That principle is well established by the Supreme Court of the United States.

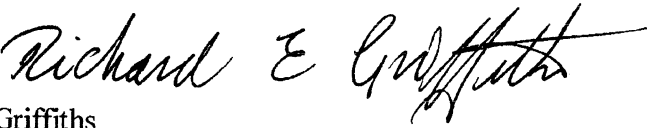
Proposed standard: Analyze the impact of new scientific facts on the theory of evolution (Standard 3.3.12.D). The theory of evolution does not change. This follows from the scientific definition of the word "theory." The National Academy of Sciences, in its 1999 publication *Science and Creationism: A View From the National Academy of Sciences*, stated, "Today, evolution is an extremely active field of research, with an abundance of new discoveries that are continually increasing our understanding of how evolution occurs." A better standard, then, might read, "Analyze how new scientific studies are increasing our understanding of how evolution occurs."

Proposed standard: Compare modern day descendants of extinct species and propose possible accounts for their present appearance. (Standard 3.3.10.D) There are perfectly valid scientific explanations for changes in body plan and structure. However, there are also those who would say that there are no scientific explanations and that these changes – especially those resulting in more complex structures or significant changes – are evidence of "intelligent design." The standard, as written, would allow students to propose intelligent design as a possible account for the changes in body plan and structure. Although the intelligent design proponents do not specify the nature of the "intelligent designer," it is clear that the concept implies the existence of a supernatural, deity or deity-like force. This subject matter is inappropriate in a science classroom – as has been stated clearly by the Supreme Court. The standard should be amended to read, "Compare modern day descendants of extinct species and propose possible scientific accounts for the present appearance."

The State of Pennsylvania should understand that by undermining the teaching of evolution, it is undermining the teaching of biology as well as the other pure sciences. We stand firmly behind the principle that "nothing in biology makes sense except in the light of evolution." We recognize, as did Theodosius Dobzhansky in making this statement in a 1973 issue of the *American Biology Teacher* (a publication of the National Association of Biology Teachers) that "biologic research shows no sign of approaching completion...disagreements and clashes of opinion are rife among biologists, as they should be in a living and growing science." Therefore, we encourage the continual re-evaluation of our knowledge. However, encouraging high school students – budding scientists – to re-evaluate before they have a firm grasp on that knowledge is not the best way to develop a solid understanding of science.

We strongly encourage the State Board of Educators to withdraw these proposed standards and revise them so as to preclude the inadvertent undermining of the teaching of evolution or the introduction of the teaching of creationism and intelligent design beliefs.

We hope these comments prove helpful to you and to the State Board of Educators. We thank you for considering our views.

Sincerely, 

Richard E. Griffiths

Professor of Physics
Carnegie Mellon University