

Citizens for Objective Public Education



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Achieve, Inc.
1400 16th Street NW, Suite 510
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RE: Response of Citizens for Objective Public Education, Inc. (COPE) to the January 2013 Draft of National Science Education Standards (the *Standards*) and the Framework for K-12 Science Education (the *Framework*) upon which the Standards are based.

Ladies and Gentlemen,

We have reviewed the second draft of the Next Generation Science Standards and find that it is not responsive to any of the comments we provided regarding the first draft. A copy of that response (dated June 1, 2012) is posted on our website at www.COPEinc.org/docs/COPE-Letter-Achieve-Inc-June-1-2012.pdf. Achieve's lack of response to the serious Constitutional, scientific, and educational issues raised by our letter is both surprising and puzzling.

To reiterate our main complaints:

1. The *Framework* and *Standards* (F&S) address fundamental religious questions. If implemented the F&S will likely indoctrinate children, beginning in Kindergarten, to accept materialistic/atheistic explanations to these religious questions.
2. The F&S do not explain to impressionable children the use, purpose, and effect of using methodological naturalism, which arbitrarily limits explanations in historical (origins) science to materialistic/atheistic causes.
3. The F&S omit evidence that conflicts with the materialistic assumption of methodological naturalism, including evidence that leads to a logical inference of purposeful design in nature.
4. The F&S omit distinctions between historical (origins) science and experimental (operational) science, which are important in assessing the plausibility of competing materialistic and teleological narratives about the origins of the universe and of life.
5. The F&S make no provision to provide students with clear and precise definitions of key terms and phrases necessary to an adequate understanding of the nature of science, the concepts presented, and the methods used for testing hypotheses.
6. The F&S are not age appropriate. For example, throughout grades K-8 the F&S seek to teach answers to religious questions to immature minds that lack the capacity or knowledge to understand or to question the teachings.

7. The *Standards*, which effectively promote an atheistic religious viewpoint, are designed to cohere in mathematics, English language arts, and social studies. Coherence and progression, while good in some cases, become tools of indoctrination and evangelism that will promote that religious viewpoint.

8. The F&S reflect the consensus of a small group of science and education elites. Input from parents and other stakeholders appears to have been minimal or non-existent. Although the F&S purport to promote diversity among a wide variety of groups and classes of individuals, no provision addresses the religious rights of theistic stakeholders.

9. The F&S support specific political views on certain controversial issues. Legitimate competing viewpoints are minimized or omitted.

These concerns have already been explained in detail in our letter of June 1, 2012. In this letter we will provide a few specific examples of our concerns with respect to selected provisions in the January 2013 draft.

A. Materialism.

The philosophy of *materialism* (or naturalism) and the assumption of *methodological naturalism* by NGSS were covered in some detail in our letter of June 1, 2012. Only a couple examples of their use by NGSS will be given here. Crosscutting concept #2 is described as follows:

“Cause and Effect: Mechanism and Prediction. Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.” (Appendix G, p. 13)

In the context of the *Standards’* prescription of methodological naturalism as the sole legitimate scientific methodology, this concept assumes that all events are the product of unguided material/mechanistic causes. However, there are many events for which the cause is unknown, such as the origin of the universe, the origin of the genetic code, and even the origin of life itself. Much of the evidence relative to causation actually points to nonmaterial/teleological causes as a more plausible explanation.

The assumption that only material causes have “mediated” all events in the natural world is evidenced by a dichotomy used throughout the *Standards*. Several references are made to the “natural and designed world” and to “natural and designed systems.” These are some examples:

“Ask questions based on observations of the natural and/or designed world.” (Appendix F, p. 5, grades K-2)

“Cause and effect relationships may be used to predict phenomena in natural and designed systems.” (Appendix G, p. 4, 6-8 grade band)

“Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system.” (Appendix G, p. 4, 9-12 grade band)

These examples *assume* that human-made systems are designed and that “natural” ones are not. This is an opinion, not a scientific fact. An enormous amount of observable evidence contradicts this dichotomy. Evolutionary biologists, in a paper published in the *Proceedings of the National Academy of Sciences*, acknowledge that “[T]he challenge for evolutionary biologists is to explain how seemingly well designed features of [an] organism, where the fit of function to biological structure and organization often seems superb, is achieved without a sentient Designer.” [Adam S. Wilkins, “Between ‘design’ and ‘bricolage’:

genetic networks, levels of selection, and adaptive evolution,” in *PNAS* (2007), 1004 (Suppl. 1), *supra* note 53]

B. The nature of science.

The term *science* is only defined in a general sense in the *Standards*:

“[S]cience is a way of explaining the natural world.” (Appendix H, p. 1)

“Science is the pursuit of explanations of the natural world.” (Appendix H, p. 2)

This definition is extremely misleading and inadequate. It gives the impression that *all logical* explanations for natural phenomena can be considered, but taken in context with the *Standards*’ prescription of methodological naturalism, in reality only *materialistic/mechanistic* explanations are allowed.

The *Standards* list these criteria regarding scientific inquiry:

“Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings.” (Appendix H, p. 6)

“Scientific explanations are subject to revision and improvement in light of new evidence.” (Appendix H, p. 6)

These statements are good guidelines, but by limiting science to materialistic explanations, the *Standards* violate these criteria. NGSS leads the student to believe that science is open-minded, when in fact the *Standards* promote the closing of minds with respect to the possibility that the apparent design of living systems is not an illusion.

Also, NGSS never defines the key term “scientific knowledge.” The Supreme Court has concluded that “to qualify as ‘scientific knowledge,’ an inference or assertion must be derived by the scientific method.” The *Daubert* decision explains that true science seeks the most “reliable” explanations rather than explanations that seek to reach a pre-ordained conclusion. The Court pointed out that the focus should be “on principles and methodology, not on the conclusions that they generate.” [*Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 590 (1993)] The scientific method is defined by a dictionary frequently used by that Court “as the principles and procedures used in the systematic pursuit of intersubjectively accessible knowledge and involving as necessary conditions the recognition and formulation of a problem, the collection of data through observation and if possible experiment, the formulation of hypotheses, and the testing and confirmation of the hypotheses formulated.” [*Webster’s Third New International Dictionary*, 2003] This definition omits any suggestion that scientific knowledge is to be developed through the use of a preconception like methodological naturalism.

C. Evolution.

This core idea from the *Standards* relates to the *origin of the diversity of life*:

“Genetic information, like the fossil record, also provides evidence for evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence.” (HS-LS4.A)

This description is *biological evolution*, a materialistic origins narrative. Only evidence that appears to support biological evolution is given, and no evidence is given that critiques the adequacy of the theory. The core idea listed above is particularly misleading, since the evidence cited (fossil record, similarities, embryological development) can also be interpreted as evidence that the apparent design of the system is not an illusion. However (because of the use of methodological naturalism), the evidence that leads to a teleological inference, as explained above in the *PNAS* article, is omitted.

D. Environmentalism.

This important topic was not addressed in the letter of June 1, 2012. The *Framework* and *Standards* seek to imbue students with a particular view regarding the manner in which humans should respond to climate change, sustainability, and other environmental matters. This issue impacts not only religion, but also political and Constitutional views regarding human liberty, the right to property, and the proper role of government. Like origins science, environmental science often reduces to matters of opinion about many controversial issues. The fact that the F&S take a position on these issues seems to be inconsistent with the view of the U.S. Supreme Court that the state should not prescribe what is “orthodox in politics, religion, nationalism or other matters of opinion.” [West Virginia Board of Education v. Barnette, 319 U.S. 624, 642 (1943)] The following are specific examples taken from the *Standards*.

Several core ideas, including those listed below, relate to *human interaction* with the environment:

“Moreover, anthropogenic changes (induced by human activity) in the environment – including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change – can disrupt an ecosystem and threaten the survival of some species.” (HS-LS2-j)

“But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change.” (HS-LS2-l)

The emphasis in the *Standards* seems to be on ameliorating the negative effects of human activities – without giving consideration to the negative effects of governmental regulation on human liberty, property rights, and the economy. Also, there needs to be a greater emphasis on positive human effects that result from responsible interactions with the environment. The issue is extraordinarily complex and based in many respects on opinions which frequently change as new data come to light. What seems to be lacking is an objective discussion of competing viewpoints.

Several core ideas, including the ones listed below, deal with the controversial issue of *climate change*.

“The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun’s energy output or Earth’s orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities.” (HS-ESS2-e,f)

“Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth’s mean surface temperature (‘global warming’).” (MS-ESS3-e)

While there is evidence that global temperatures may be slowly rising, the causes and future effects of “global warming” are still being debated. In particular, students should be aware that there is widespread debate among climate scientists over (a) the extent to which greenhouse gases (GHG) contribute to changes in global temperature, (b) the degree of climate sensitivity to atmospheric carbon dioxide, (c) whether the consequences of GHG warming will be net beneficial or net harmful, and (d) whether the

benefits of any attempts to reduce GHG emissions would be worth the costs. The curriculum needs to be balanced and objective on this topic.

Another core idea deals with *sustainability*:

“The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources.” (HS-ESS3-e)

The general idea of protecting the environment and conserving natural resources is not controversial. However, “sustainability” has become a political movement that emphasizes simpler lifestyles, reduced economic development, global redistribution of wealth, limited use of natural resources in developed countries, “green” (renewable) energy, “smart growth” policies, human population control, and global governance. In short, sustainability is more a term of ideology than of science; it is a word that needs to be defined and used carefully. But more importantly, the issue deals with “politics, religion and other matters of opinion.” We question the wisdom of even raising these issues with impressionable young minds. If they are raised, then the state assumes an enormous burden of presenting the issues objectively so that they will have a neutral effect. It is clear to us that NGSS coverage of environmental issues lacks the necessary objectivity.

E. Glossary and definitions.

The January 2013 draft contains a “Glossary of Common Acronyms used by NGSS.” A dictionary definition of *glossary* is a “list of terms in a special subject, field, or area of usage, with accompanying *definitions*.” No definitions are given in the NGSS “Glossary,” so the word is used incorrectly. A real glossary is needed so that the meaning of key words is clear. Among the many words and phrases that should be defined are these: science, scientific knowledge, materialism, mechanism, naturalism, methodological naturalism, teleology, design, information, evolution, homology, adaptation, mutation, natural selection, climate change, global warming, ecosystem, and sustainability.

In summary, Achieve has failed to respond to the key concerns we have raised about the proposed NGSS document. We believe the issues we raise must be satisfactorily resolved to ensure that the *Framework* and *Standards* are consistent with the mandates of the First Amendment that “government activities [which] *touch on the religious sphere* ... be secular in purpose, evenhanded in operation, and neutral in primary impact.” [*Gillette v. United States*, 401 U.S. 437, 450 (1971)]

Sincerely yours,



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