Report of the Earth and Space Science TEKS Working Group
Concerning the Five Amendments Passed by the State Board of Education
on January 22, 2009

by
The Texas Earth and Space Science Working Group
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Five amendments were passed by majority vote by the State Board of Education on January 22. Most are not scientifically acceptable. None of the five amendments—indeed, none of the thirteen proposed amendments—were needed, and apparently all were proposed to scientifically weaken and damage the Earth and Space Science (ESS) TEKS. In our earlier report, we asked that the ESS standards be adopted without change. We continue to ask that for all the remaining ESS standards.

The reasons given for the proposed amendments were to "qualify" the ESS standards and add "humility and tentativeness" to them. These are not good scientific reasons to revise science standards; rather, they accomplish just the opposite, making the amended standards unscientific. The ESS standards were written by Earth science professionals and experts, who worked hard to include the most up-to-date scientific knowledge in the course. We are concerned that State Board member Ms. Barbara Cargill was acting on the advice of two non-Earth scientists when she drafted her changes. Contrary to the repeated statements of Ms. Cargill during debate, neither Dr. Stephen Meyer of the Discovery Institute or Dr. Charles Garner of the Baylor University Department of Chemistry is an "expert" in Earth and Space Science, and Dr. Meyer is not even a scientist. To the contrary, both have well-known pseudoscientific agendas and wish to promote Intelligent Design Creationism, a non-scientific doctrine. Their suggestions—Student Expectation 8A in particular—have that effect on the ESS curriculum.

Following is a discussion of the revisions. The original standard is listed first, the January 22 amendment is second with proper markup that was often not indicated in the list provided to the SBOE during debate by Ms. Cargill, and the third is our suggestion for proper revision to be accomplished by amendment at the March 26-27 SBOE meeting (these will also be provided on a separate page):

> **(4) Earth in space and time.** The student knows how Earth-based and space-based astronomical observations reveal the structure, scale, composition, origin, and history of the universe.
>
> **(4) Earth in Space and Time.** The student knows how Earth-based and space-based astronomical observations reveal <u>differing theories about</u> the structure, scale, composition, origin, and history of the universe.
>
> **(4) Earth in space and time.** The student knows how Earth-based and space-based astronomical observations reveal ~~differing theories about~~ <u>information about</u> the structure, scale, composition, origin, and history of the universe.

This revision is scientifically awkward and unacceptable. The consensus of the scientific community is that there is only one scientific theory of the structure, scale, composition, origin, and history of the universe: the Big Bang Theory. There are no other "differing theories" that satisfy the modern scientific measurements and observations and it is unscientific to claim there are. We have added "information about," which is a moderating compromise.

(5) Earth in space and time. The student knows that Earth's place in the solar system is explained by the solar nebular accretionary disk model.

(5) Earth in Space and Time. The student understands ~~that Earth's place in the solar system is explained by~~ the solar nebular accretionary disk model.

(5) Earth in Space and Time. The student ~~understands~~ knows the solar nebular accretionary disk model.

Substituting “understands” for “knows” is a minor change, but every other Knowledge Statement uses "knows," so we would prefer to keep it for consistency as amended above. However, we would be willing to accept this KS as amended by Ms. Cargill, although we do not understand why the innocuous phrase about Earth's place in the solar system was removed.

(5)(B) investigate sources of heat, including kinetic heat of impact accretion, gravitational compression, and radioactive decay, which allows protoplanet differentiation into layers;

(5)(B) investigate sources of heat, including kinetic heat of impact accretion, gravitational compression, and radioactive decay, which are thought to allow protoplanet differentiation into layers;

(5)(B) investigate thermal energy sources ~~of heat~~, including kinetic heat of impact accretion, gravitational compression, and radioactive decay, ~~which are thought to allow~~ and their role in protoplanet differentiation into layers and atmosphere and hydrosphere formation.

This was a minor change which weakened the standard in an unscientific way. The scientific consensus is that Earth’s internal heat allowed protoplanet Earth to differentiate. Indeed, there is no other known method, and none have been hypothesized, so it is silly and awkward to say that thermal sources are “thought to allow” differentiation. Instead, we substituted "and their role in" as a moderating compromise. We have also taken the opportunity to change "sources of heat" to the more scientific and consistent "thermal energy sources," and added "and atmosphere and hydrosphere formation," which thermal energy helped to produce.

(6)(D) evaluate how Earth’s cooling led to tectonic activity, resulting in continents and ocean basins.

(6)(D) evaluate ~~how~~ the evidence that the Earth's cooling led to tectonic activity, resulting in continents and ocean basins.

(6)(D) evaluate the evidence that ~~the~~ Earth's cooling led to tectonic activity, resulting in continents and ocean basins.

This change is unnecessary but acceptable. It can remain, but the article "the" needs to be removed for stylistic consistency, since we do not use "the Earth" anywhere in the document.

(8)(A) evaluate a variety of fossil types, transitional fossils, fossil lineages, and significant fossil deposits with regard to their appearance, completeness, and rate and diversity of evolution;

(8)(A) evaluate a variety of fossil types, proposed transitional fossils, fossil lineages, and significant fossil deposits ~~with regard to their appearance, completeness, and rate and diversity of evolution~~ and assess the arguments for and against universal common descent in light of this fossil evidence;

(8)(A) evaluate a variety of fossil types, ~~proposed~~ transitional fossils, fossil lineages, and significant fossil deposits with regard to their appearance, completeness, and rate and diversity of evolution ~~and assess the arguments for and against universal common descent in light of this fossil evidence~~;

The amended revision is very unscientific and unacceptable. The totality of the revision was hidden from Ms Cargill's colleagues on the State Board who voted for the amendment, since several important words were struck from the original that were not indicated on the list supplied by her (but are indicated in the list here). Here are the reasons this amendment is scientifically unacceptable:

First, the phrase “with regard to their appearance, completeness, and rate of diversity of evolution” should not have been removed since it is essential to the purpose of the standard, which is to evaluate fossils and their evolution. The fossil record must be examined with regard to occurrences of organisms, whether the record is complete or not, and the recorded rate of changes that have been observed. These skills are recommended by the Texas College Readiness Standards and it is essential that they are not removed.

Second, the phrase about "arguments for and against universal common descent" substituted for the struck phase is unscientific. There are no good arguments in modern science “against universal common descent,” which has been accepted by biologists for over 130 years, so the phrase is asking for something that authors and publishers cannot honestly supply. Common descent is a concept older than Darwin, since it dates back to the first evolutionary hypotheses. Genetic studies have confirmed the common ancestry of organisms. The added phrase supports an anti-evolution intent which is not scientific. The original student expectation should be retained, and we strongly urge you to do this.

Finally, transitional fossils are not “proposed.” They exist in the fossil record and are well-known by paleontologists, so insertion of the word “proposed” makes this phrase unscientific, since it suggests a false uncertainty.

In conclusion, Student Expectation 8A should be returned to its original language.

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