



Dear Members of the Texas State Board of Education:

The National Academy of Sciences (NAS) and the National Science Teachers Association (NSTA) have a long history of promoting high quality, evidence-based science literacy for all students. Today, scientific and technological knowledge in virtually all spheres of life and civilization are increasing rapidly while scientific and technological application and innovation require that people have access to the most up-to-date scientific knowledge and understanding of the natural world.

The guide that you prepared in 2001 to help parents better understand the Texas Essential Knowledge and Skills (TEKS) state standards includes a similar statement: "Every day our world becomes more complex and demanding. To succeed beyond high school, students must be better prepared than at any time in the history of our state." The document elaborates on this statement: "Each student must develop a stronger understanding of science concepts, especially in biology, chemistry, and physics."

At the request of Raymond Matthews, Jr., President of the Texas Academy of Science, and in support of your statement for Texas children, NAS and NSTA together urge the members of the Texas State Board of Education to adopt Revision #3 of the TEKS science standards, and especially the statement

"The student is expected to analyze and evaluate scientific explanations using empirical evidence, logical reasoning, and experimental and observational testing."

Our support for this statement stems from our concern about how the language in the current standard, which mandates that students learn the strengths and weaknesses of scientific theories, affects science education in the area of biological evolution. Based on overwhelming and continually increasing evidence from a broad array of the natural sciences, evolution has earned its place as a major unifying concept in modern science. According to committees of experts of publications from the National Academy of Sciences and the Institute of Medicine:

...there is no controversy in the scientific community about whether evolution has occurred. On the contrary, the evidence support descent with modification, as Charles Darwin termed it, is both overwhelming and compelling. In the century and a half since Darwin, scientists have uncovered exquisite details about many of the mechanisms that underlie biological variation, inheritance, and natural selection, and they have shown how these mechanisms lead to biological change over time. Because of this immense body of evidence, scientists treat the occurrence of

evolution as one of the most securely established of scientific facts. Biologists also are confident in their understanding of how evolution occurs.¹

Few other ideas in science have had such a far-reaching impact on our thinking about ourselves and how we relate to the world.²

Yet, data collected over an extended period of time³ indicate that Texas science teachers do not emphasize evolution in a manner commensurate with its importance in understanding the history and nature of the natural world. This tendency to lessen the emphasis on evolution may have been encouraged in part by teachers' perceptions that school administrators, state policy makers, and parents will not support instruction about evolution. They also have been concerned that they could be subject to censorship or the threat of sanctions if they teach this subject in any comprehensive way.⁴

Historically, one method that those who have sought to undermine the teaching of evolution is to insist that teachers present both the "strengths and weaknesses" of evolution, thereby suggesting that evolution is a "theory in crisis." Therefore we are encouraged that Revision #3 to the science standards deletes this language and substitutes a statement that is much more consistent with the nature and processes of modern science.

This revised statement would alleviate the pressures teachers too often associate and experience with the teaching of evolution and provide a clear message to teachers that there is an expectation for students to learn the skills of scientific inquiry rather than expecting teachers to single out, or target, particular natural processes or explanations for scrutiny.

We also urge the members of the Texas State Board of Education to accept the language in Revision #3 which states:

Science, as defined by the National Academy of Sciences, is the 'use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process.' ... Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

¹ National Academy of Sciences and Institute of Medicine (2008). *Science, Evolution, and Creationism*. Washington, DC: National Academies Press. Page xiii.

² National Academy of Sciences (1998). *Teaching About Evolution and the Nature of Science*, Washington, DC: National Academies Press. Page 21.

³ Shankar, G., & Skoog, G. (1993). Emphasis given evolution and creationism by Texas high school biology teachers. *Science Education*, 77(2), 221-233.

Bilica, K. (2001). Factors which influence Texas biology teachers' decisions to emphasize fundamental concepts of evolution. Unpublished Dissertation. Texas Tech University.

⁴ National Science Teachers Association. (2005). Survey Indicates Science Teachers Feel Pressure to Teach Nonscientific Alternatives to Evolution. Press release. <http://www.nsta.org/about/pressroom.aspx?id=50377>

Together, these two statements will send a clear message to teachers, students, and others about the nature and processes of science.

Sincerely,

A handwritten signature in cursive script that reads "Ralph J. Cicerone".

Ralph J. Cicerone
President
National Academy of Sciences

A handwritten signature in cursive script that reads "Page Keeley".

Page Keeley
President
National Science Teachers Association