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Texas Science Textbook Adoption: 2013

What Proposed Science Instructional Materials Say about Evolution

*A report from the Texas Freedom Network Education Fund
July 2013*



The State Board of Education this year takes up the adoption of science textbooks and other instructional materials for Texas public schools. In doing so, the board will be renew the long-running “culture war” over what Texas students should learn about evolution.

When the state board revised the Texas Essential Knowledge and Skills (TEKS) curriculum standards for science in 2009, a board majority voted down an effort to require that students learn the “strengths and weaknesses” of scientific theories like evolution. For more than a decade, creationists had used such a requirement to demand that students learn about the “flaws” of evolutionary theory – even though scientists have debunked those anti-evolution arguments as nonsense.

After failing to include the “strengths and weaknesses” requirement in the TEKS standards, creationists then turned to another strategy. The board’s chairman at the time, Don McLeroy, succeeded in passing a number of standards creationists hoped would force publishers to portray the evidence supporting evolution as weaker than scientists say it is. The Texas Freedom Network Education Fund, working with science academics at Southern Methodist University in Dallas and Southwestern University in Georgetown, identified the four most problematic of these standards. A review of those standards, why they are problematic, and recommendations for how publishers could address them responsibly can be found at www.tfn.org/scienceTEKSprimer.

The first test of creationists’ new strategy came in 2011. The Legislature had not appropriated enough funding for the state’s public schools to purchase entirely new science textbooks. So the state board invited publishers instead to submit online instructional materials that addressed only new or revised curriculum standards adopted by the state board in 2009. In nearly every case, however, publishers refused to include junk science arguments questioning evolution. The only publisher that tried to do so ultimately withdrew from the adoption process before the board was able to consider its product. Following their failure in 2011, creationists were forced to look to this year’s full science textbook adoption. The state board will consider full science textbooks and other instructional materials, with a final vote scheduled for November.

TFN Education Fund’s Review of the New Science Instructional Materials

Publishers submitted their textbooks and online instructional materials in April. The TFN Education Fund then contracted with doctoral candidates in the sciences from the University of Texas at

Publishers Submitting Instructional Materials for High School Biology

Last year 18 publishers declared an intention to submit instructional materials for the high school biology adoption in Texas. Fourteen ultimately submitted review materials to Education Service Centers in April of this year. It is unclear whether the remaining four publishers – as well as other publishers that did not originally declare an intention to submit biology materials – plan to bypass the State Board of Education adoption process. In 2011, Texas lawmakers passed legislation, Senate Bill 6, that gives school districts the ability to use state funds to purchase instructional materials the state board has not adopted. Most publishers, however, continue to see board adoption as important in demonstrating to school districts that their products cover the state’s curriculum standards.

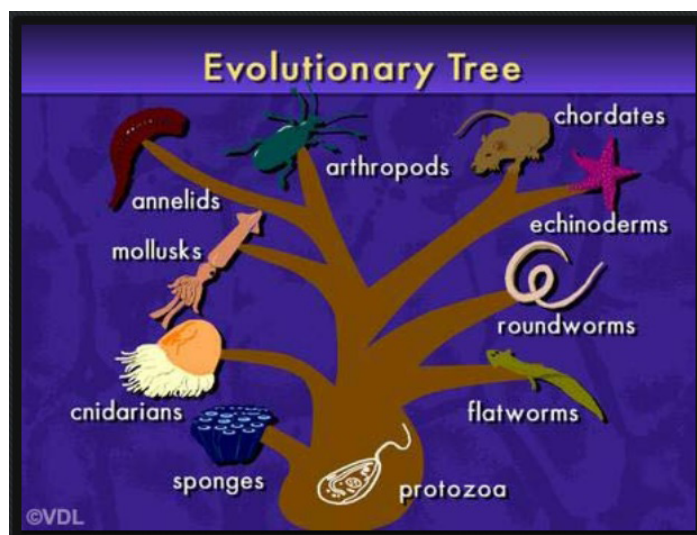
Publishers submitting materials to the State Board of Education for adoption this year:

Adaptive Curriculum
Agile Mind
Discovery Education
Edumatics Corporation (Edusmart)
Houghton Mifflin Harcourt (Holt McDougal)
LAB-AIDS
LAZEL (dba Explore Learning)
McGraw-Hill Education (Glencoe/McGraw-Hill)
Pearson Education (publishing as Prentice Hall)
Rice University STEMscopes
Sapling Learning
Scientific Minds
SciTEX
VSCHOOLZ



Austin and Southern Methodist University in Dallas to review what those materials teach about evolution. Their reviews covered instructional materials for high school biology courses submitted by 14 publishers. (See the box on the previous page for the list of publishers submitting high school biology materials for adoption.)

Our reviews reveal that creationists on the State Board of Education have failed to pressure publishers into including “junk science” that questions evolutionary theory in the new high school biology materials. Indeed, all of the publishers have submitted biology instructional materials that honestly address and support the science of evolution and that do not include pseudoscience intended to water down or “disprove” evolution.



From Discovery Education

Key Findings

★ ***The proposed instructional materials affirm evolution as factual, well-established, mainstream science.***

Science instructional materials submitted for the Texas adoption invariably present evolution as a scientific fact while also explaining to students that scientists continue to study how evolutionary processes work. Our review uncovered no areas in which publishers promoted the arguments of evolution deniers, including supporters of “intelligent design”/creationism. In fact, publishers made a point in numerous places to make clear that evolution is central to understanding the biological sciences.

For example, Discovery Education, in the Introduction to the History of Life segment of the Diversity of Life unit, makes the fact of evolution clear:

Life on Earth is continually evolving. The history of Earth can be traced back about 4.5 billion years to an Earth that was very different to the one we know today. All life now found on Earth is related to these early forms of life.

These passages from the Pearson/Prentice Hall textbook are similarly clear:

Page 465:

(E)very scientific test has supported Darwin’s basic ideas about evolution.

Page 467

All historical records are incomplete, and the history of life is no exception. The evidence we do have, however, tells an unmistakable story of evolutionary change.

Page 473

Advances in many fields of biology, along with other sciences, have confirmed and expanded most of Darwin’s hypotheses. Today, evolutionary theory – which includes natural selection – offers insights that are vital to all branches of biology, from research on infectious diseases to ecology. That’s why evolution is often called the grand unifying theory of the life sciences.



Like any scientific theory, evolutionary theory is constantly reviewed as new data are gathered. Researchers still debate important questions such as precisely how new species arise and why species become extinct. There is also significant uncertainty about exactly how life began. However, any questions that remain are about how evolution works – not whether evolution occurs. To scientists, evolution is the key to understanding the natural world.

A section review question on the same page:

In your own words, write a paragraph that explains how evidence since Darwin's time has strengthened his theories.

From the Houghton Mifflin Harcourt/Holt McDougal textbook, page 309:

As the great geneticist Theodosius Dobzhansky (1900-1975) once noted, "Nothing in biology makes sense except in the light of evolution."

★ ***The proposed instructional materials reject creationist arguments that the fossil record fails to provide sufficient evidence for evolutionary change over time.***

Creationists hoped that their arguments about "gaps," missing links/transitional fossils and the sudden appearance of new life forms in the fossil record would raise doubts about evolutionary explanations. But in their new instructional materials, publishers presented clear scientific explanations debunking such arguments. They note that the fossil record provides overwhelming evidence for evolution and common ancestry of life today.

★ ***The proposed instructional materials reject creationist arguments that evolution could not account for the complexity of cells and other organisms.***

Publishers refused to lend credence to evolution deniers who argue that organisms are too complex to have evolved without the guidance of an "intelligent designer." Instructional materials include clear, detailed and substantive discussions about the evolution of cells and cellular structures beginning billions of years ago.

★ ***The proposed instructional materials explain that scientific evidence supports the development of early life from organic compounds billions of years ago.***

The proposed new instructional materials clearly point out that most scientists maintain, based on substantial evidence from experiments and other research, that life on Earth developed through a series of chemical processes billions of years ago. The materials duly note that scientists cannot at this time know for certain how the first life began, but in nearly every instance they offer only a substantive scientific explanation of major hypotheses regarding its early development. We found no instances, however, in which publishers disparage the religious beliefs of those who reject the science of evolution and what science tells us about the early development of life. They simply focus on science and scientific research.



How Publishers Addressed Problematic TEKS Curriculum Standards

The TFN Education Fund identified four Texas Essential Knowledge and Skills (TEKS) curriculum standards for high school biology that creationists hoped would force publishers to include unscientific arguments about evolution in their materials. Following are samples of how publishers responsibly addressed those curriculum standards.

Biology TEKS 3A: “In all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.”

The wording of this standard was at the center of the controversy surrounding the 2008-09 revision to science curriculum standards at the Texas State Board of Education. After failing to include the old “strengths and weaknesses” of evolution requirement in the standards, creationists on the state board added a new curriculum requirement that students examine “all sides of scientific evidence” of scientific explanations like evolution. On its face, such a requirement would seem harmless. Yet creationists have distorted the common understanding of “scientific evidence,” opening the door to junk science promoted by creationist/“intelligent design” organizations like the Discovery Institute in Seattle. Moreover, Don McLeroy (the state board’s chairman at the time the science curriculum standards were adopted) has argued that science should include the study of supernatural explanations for the development of life. The proposed instructional materials, however, reject such suggestions.

One of the best passages describing science comes from the Houghton Mifflin Harcourt/Holt McDougal textbook, page 19:

Scientific inquiry is important to understanding nature, but there are limitations to the kinds of questions that scientific inquiry can answer. For example, observations must be testable and verifiable. Observations that cannot be verified or replicated cannot count as evidence in scientific inquiry. Some phenomena that are not scientifically testable now may become testable with new or better technology. Other phenomena, such as supernatural phenomena, may never be testable or scientific.

Creationists during the state board’s curriculum debate also focused on the word “theory,” suggesting that “the theory of evolution” is not much more than a guess or a hunch. Publishers, however, provided important explanations in their materials about what scientists mean by “theory.” Their explanations make clear that the scientific evidence behind evolution is strong.

Again from the Houghton Mifflin Harcourt/Holt McDougal textbook, page 19:

In everyday conversation, the word theory means a guess or a hunch. In science, the meaning of the word theory is very different. A theory is a proposed explanation for a wide range of observations and experimental results that is supported by a wide range of evidence.

From Lazel’s biology materials, Evaluating Scientific Explanations module:

Unlike hypotheses, theories are very well-established and have been tested by multiple independent researchers. In addition, theories are widely accepted by the majority of scientists within a field. Because of this, theories are highly-reliable explanations of phenomena, so they can accurately predict events in the natural world. However, this does not mean that theories cannot be revised or replaced by more accurate theories.

The VSCHOOLZ biology materials provide clear explanations about the distinctions between “theory,” “hypothesis” and “law.”



Scientific Thinking and Processes Unit, Slide 10:

A theory is a proposed **explanation** for a wide range of observations and experimental results that is supported by a wide range of evidence.

A scientific law is a **description** of a scientific event.

An accompanying table:

Scientific hypothesis: "Educated guess as to the cause."

Scientific theory: "Educated explanation of WHY?"

Scientific law: "Educated description of HOW?"

Slide 13:

Usually, the word theory in everyday conversation means a speculation, or something that is imagined to be true. In science, the meaning of theory is very different.

Recall that a hypothesis is a proposed answer for a scientific question. A theory is a proposed explanation for a wide range of observations and experimental results that is supported by a wide range of evidence. Eventually, a theory may be broadly accepted by the scientific community.

In contrast, a scientific law describes a truth that is valid everywhere in the universe. For example, the law of conservation of energy states that energy may change form but it cannot be created or destroyed. Although this law describes the nature of energy, it does not provide any explanations. Scientific theories provide explanations. For example, natural selection is a scientific theory. It is supported by a large amount of data, and it explains how populations can evolve. Theories are not easily accepted in science, and by definition they are never proved. Scientific hypotheses and theories may be supported or refuted, and they are always subject to change. New theories that better explain observations and experimental results can replace older theories.

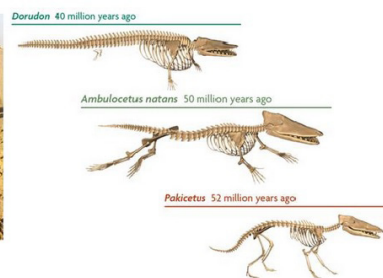
Biology TEKS 7B: "Analyze and evaluate scientific explanations concerning any data of sudden appearance, stasis, and sequential nature of groups in the fossil record."

This standard was a new addition to the Texas science TEKS in 2009. Language referencing "sudden appearance" appears commonly in – and is closely associated with – the "intelligent design" movement. The inclusion of the expectation that students "analyze and evaluate scientific explanations concerning any data of sudden appearance ... in the fossil record" parallels the major thesis of a book – *Explore Evolution* – promoting "intelligent design"/creationism that was written by five members affiliated with the Discovery Institute's Center for Science and Culture. Similarly, the "stasis, and sequential nature" part of TEKS 7B harkens back to discredited, scientifically falsified accounts from "intelligent design"/creationist publications that species appear in the fossil record without any transitional fossil evidence. Among the examples of these types of discredited arguments in "intelligent design" publications is the textbook supplement *Of Pandas and People*, which was the book at the center of the Kitzmiller v. Dover decision in 2005 in which a federal judge in Pennsylvania ruled that teaching "intelligent design" in public schools represents an unconstitutional promotion

Evolutionary Biology Today

Paleontology is the study of fossils or extinct organisms.

- Provides new information and support for current hypotheses about how evolution occurs.



From VSCHOOLZ



of religion. Another example is *Icons of Evolution*, which pursues the discredited idea that major phylogenetic groups in biology arose without any connection through descent from a common ancestor. In the age of modern biology, the hypotheses that fossil transitions are not evident in the fossil record as presented in *Pandas* and *Icons* have been fully refuted by many legitimate fossil transition discoveries. These real discoveries fully support modern evolutionary theory.

Scientists see unfounded doubts about the cornerstone of evolutionary theory, namely descent from common ancestors, introduced into students' learning expectations via the use of "intelligent design"/creationism language like "sudden appearance," "stasis, and "sequential nature," as having no place in biology classrooms and textbooks in Texas or anywhere else.

The proposed instructional materials take a straightforward approach to what the fossil record shows about evolution and the common ancestry of life today.

From the McGraw-Hill/Glencoe McGraw-Hill textbook, page 391:

Fossils provide key evidence for understanding the origin and history of life on Earth.

From the LAB-AIDS textbook, page 453:

Although not all fossils are likely to be found, there is abundant fossil evidence to show that evolution occurs. And, as shown by the origin of tetrapods, the work of scientists has reconstructed the steps by which major transitions occurred. This has led to a better understanding of the process of evolution.

From an Edumatics/Edusmart worksheet on fossils and evolution:

A missing link does not provide evidence of a lack of common ancestry between species. There are many reasons why the intermediate body form may be missing. For example, the intermediate body form is yet to be found, or the environmental conditions during the time the organism existed may not have been favorable to the formation of fossils.

From the Houghton Mifflin Harcourt/Holt McDougal textbook, page 306:

The fossil record is not complete, because most living things do not form fossils after they die, and because fossils have not been looked for in many areas of the world. However, no fossil evidence that contradicts evolution has ever been found.

From Sapling's textbook, pages 290-91:

Some fossil records are almost complete and support the theory of common ancestry. These records allow scientists to trace adaptations through different environments. A good example is the *Equus* genus, which includes the horse. Figure 10.2-5 shows how, over time, the limbs have elongated, the number of digits has been reduced to facilitate speed, and the teeth have become longer and wider for grazing grass. This almost complete record provides evidence that all organisms in the *Equus* genus, such as horses, zebras, and donkeys share a common ancestor.

When species exhibit limited morphological change over long periods of time, stasis is occurring. Remember that populations change through the process of natural selection. If no trait is actively selected, there will be no natural selection. This lack of natural selection creates stasis. In stasis, the fossil record for one or a



group of species does not change for large stretches of time. These species are sometimes called “living fossils” because of the lack of changes. One example of this stasis is the crocodile, which has seen little morphological change over time (Figure 10.2.6). Because crocodiles are highly adapted to their environment, there are little selection pressures for change, creating stasis.

Conditions needed for fossilization are very specific, creating a limitation of the fossil record. Some organisms, such as ones with soft bodies or small bones, do not fossilize well. If the species eventually evolves into a form that is more favorable for fossilization, organisms may appear suddenly in the fossil record. As Figure 10.2-7 shows, irregular fossil preservation may also be responsible for a lack of transitional forms in the fossil record. This would make it look like an organism rapidly changed from one form to another. Gaps in the fossil record continue to be filled in as new fossils are discovered. However, because of the specific conditions needed for fossilization, it is likely that fossils of some species will never be discovered.

From the Adaptive biology materials, Fossils as Evidence of Evolution, Enrichment Sheet 2, page 7:

Finally, it must be made clear that the theory of evolution does not suggest that all species on earth evolve and change at the same rate. In fact, there is every reason to suspect that the rate of change is widely different between species. It is not logical to suggest the theory of evolution is erroneous because a few creatures living today more closely resemble some specimens found in fossils than others do. It is known that things fall slower on the moon than they do on Earth, but do we doubt the theory of gravity because of this? We do not, because if we study the theory of gravity carefully, we understand that this is exactly what it predicts.

From the Pearson/Prentice Hall biology textbook, page 538:

The preserved remains or traces of ancient life in the fossil record provide abundant evidence of common ancestry among groups of organisms. How? Fossils document descent with modification within and between groups of organisms over time.

The Pearson/Prentice Hall textbook, page 752, also debunks creationists’ suggestions that the “Cambrian Explosion” was a sudden event that somehow disproves evolution:

We use the word ‘suddenly’ in the geological sense, because the Cambrian Explosion itself occurred over 15 million years! ... But recent discoveries provide fossil evidence that this explosive evolution of multicellular organisms began millions of years earlier, and lasted millions of years longer than originally thought. So the Cambrian Explosion was not a single event, but rather a series of events that took place over millions of years.

The McGraw-Hill/Glencoe McGraw-Hill textbook, page 424, plainly discards creationists’ arguments about missing transitional fossils in the fossil record:

Today, scientists studying evolutionary relationships have found hundreds of thousands of transitional fossils that contain features shared by different species.

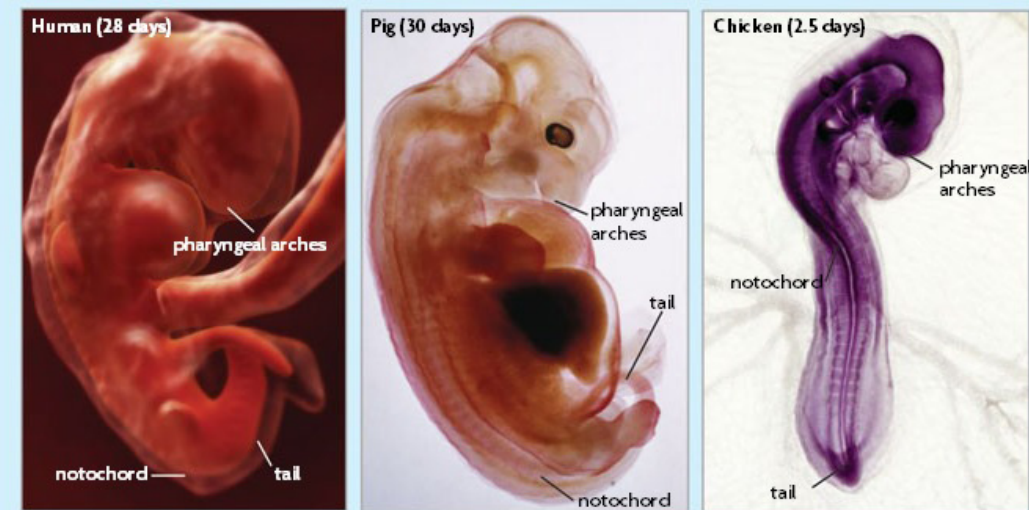
Discovery Education also discounts arguments that the fossil record doesn’t sufficiently support evolution:

By studying the fossil record, scientists are able to trace the changes in physical structures as they evolved little by little over the years. Although the fossil record does not provide a complete record of all life on earth, it does provide extensive and ever increasing evidence to support the theory of evolution.



FIGURE 4.5 Developmental Homologies

Although humans, pigs, and chickens appear different from each other as adults, several of the same structures can be seen at various stages in their developing embryos.



Analyze How would these similar structures provide evidence of a common vertebrate ancestor? **TEKS** 7a

From Houghton Mifflin Harcourt/Holt McDougal

Biology TEKS 7G “Analyze and evaluate scientific explanations concerning the complexity of the cell.”

This standard was also a new addition to the Texas science TEKS in 2009. The language of this standard comes directly out of the “intelligent design”/creationism movement and represents discredited and scientifically falsified hypotheses. Creationists hoped that requiring students to “analyze and evaluate scientific explanations concerning the complexity of the cell” would open the classroom and textbooks to discussions of thoroughly refuted creationist claims of the “irreducible complexity” of the cell’s components, an idea most recently popularized by Discovery Institute Fellow Michael Behe. Proponents of the concept of “irreducible complexity” argue that organisms are so complex that they could not have evolved through unguided natural processes. Instead, they argue, only an “intelligent designer” could account for such complexity. Publishers’ new instructional materials do include detailed explanations about the complexity of cells and cellular evolution over time. None, however, include in their materials suggestions that cell complexity is explained through the actions of an “intelligent designer.”

Pearson/Prentice Hall’s biology textbook offers a particularly clear discussion of how seemingly complex characteristics of cells evolved as a recombination of more simple, preexisting cell structures and proteins. The textbook also rightly acknowledges that biologists have more to learn:

From the Pearson/Prentice Hall textbook, page 558:

Many uncertainties remain in our current understanding of cellular complexity. Biologists are still learning how cells function in response to their environments, and how they interact with each other. Such uncertainties are part of biology, as they are for any experimental science. In many ways, this is good news, because it means that there are plenty of mysteries to be solved by the next generation of biologists. Meanwhile, what we do understand suggests that complex cell structures and pathways were produced by known mechanisms of evolutionary change.



The McGraw-Hill/Glencoe McGraw-Hill textbook also includes a detailed explanation for the evolution of cells and leaves no real doubt that cells began evolving far longer ago than just 6,000 or 10,000 years. From page 405:

Scientists recently announced the discovery of what appeared to be fossilized microbes in rock that is 3.5 billion years old. This suggests that cellular activity had become established very early in Earth's history.

Biology TEKS 9D: "Analyze and evaluate the evidence regarding formation of simple organic molecules and their organization into long complex molecules having information such as the DNA molecule for self-replicating life."

This standard was also added to the Texas science TEKS in 2009. Like TEKS standard 7G, it incorporates the beliefs of evolution deniers regarding the complexity of organisms. Discovery Institute Fellow William Dembski asserts that an "intelligent designer" must be involved in the creation of meaningful information whenever "specific complexity" is found because his own "Law of Conservation of Complex Specified Information" prevents natural selection from increasing the amount of information in a genome. Moreover, creationists hope to show that science has no explanation for how the first cells developed at the dawn of life.

Publishers refused to promote these scientifically unsupported views. The proposed instructional materials include substantial discussions of evidence and experiments scientists have used to show that early life on Earth began through chemical processes and evolved over time.

From the McGraw-Hill/Glencoe McGraw-Hill textbook, pages 401, 402 and 403:

Page 401:

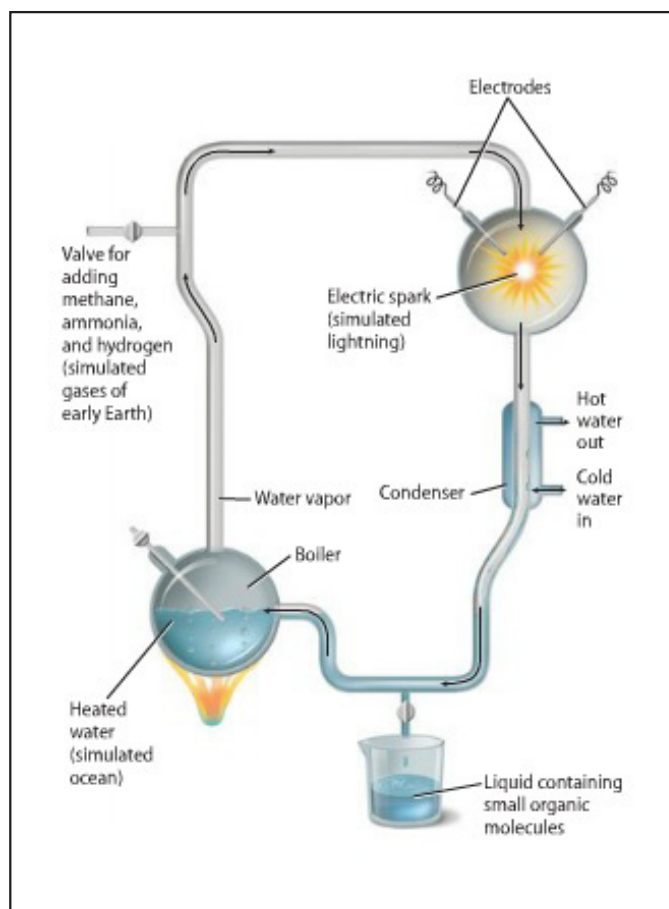
Evidence indicates that a sequence of chemical events preceded the origin of life on Earth and that life has evolved continuously since that time.

Page 402:

Most scientists agree that life originated through a series of chemical events early in Earth's history. During these events, complex organic molecules were generated from simpler ones. Eventually, simple metabolic pathways developed. Such pathways allowed molecules to be synthesized or broken down more efficiently. These pathways might have led to the emergency of life as we know it. How this happened is a topic of ongoing research among scientists today.

Page 403:

In 1953, American scientists Stanley Miller and Harold Urey were the first to show that simple organic molecules could be made from inorganic compounds, as proposed by Oparin and Haldane.



From McGraw-Hill/Glencoe McGraw-Hill



Discovery Education's The History of Life on Earth segment in the Diversity of Life unit notes that scientists can't be certain about how life started, but it explains that what science tells us reinforces the concept of common ancestry:

Ideas about how life originated are varied. Recent research suggests that life started near a deep sea hydrothermal vent. Chemicals found in these vents and the energy they provide could have fueled many of the chemical reactions necessary for the evolution of life. Furthermore, DNA sequences of modern organisms suggest that the most recent common ancestor for all life was a microorganism that lived in extremely high temperatures, like those found in hydrothermal vent habitats. However it is far from certain how or where life started.

Whatever the location it is very likely that life originated in a series of steps. These steps probably started with simple organic molecules like nucleotides that, when they reacted together, formed self replicating molecules similar to DNA and RNA. It is believed that these molecules could have been formed in the atmosphere and rained down to Earth. Once self replicating molecules were formed they would begin to evolve through the process of natural selection. Later some of these self-replicating molecules became associated with membranes and metabolic processes that were the forerunners of cells.



Appendix A

Reviewers

Jenna Marie Battillo, M.A., is a doctoral candidate who began working toward her doctoral degree at Washington State University, where she worked as a lab assistant and taught Introduction to Biological Anthropology. Jenna is finishing her PhD at Southern Methodist University in anthropology/archaeology. She earned a master's degree in human skeletal biology from New York University.

Amelia Weber Hall is a doctoral candidate in microbiology at the University of Texas at Austin. She earned a bachelor's degree in molecular genetics from the University of Rochester in New York. Her research interests lie in transcriptional regulation of the genome and how to better understand this regulation by using high throughput approaches and next generation sequencing. She is currently studying glioblastoma multiforme (brain cancer) and atrial fibrillation. Over the last year she has been awarded the Joseph F. Short Memorial Endowed Fellowship and the Ethel and Robert L. Terry Memorial Scholarship.

Maeve Skidmore, M.A., is a doctoral candidate in anthropology at Southern Methodist University. Maeve has done extensive field research in South America and has taught various courses at SMU. She earned a master's degree in anthropology from SMU and a bachelor's degree in archaeology from Boston University.

Ammon Thompson is a doctoral candidate in ecology, evolution and behavior at the University of Texas at Austin. He earned a bachelor's degree in neuroscience from Brigham Young University. Ammon researches the evolution of genes that result from ancient gene duplication errors. He uses the pattern of mutations in these genes to make inferences about the process of natural selection in the distant past. He also measures the expression of these genes in numerous species to decipher how their function has changed from being an exact copy of another gene to being a unique and essential part of the genome.



Appendix B

The Textbook Adoption Process in Texas

The Texas State Board of Education typically adopts new textbooks and other instructional materials for public schools about every eight years. Because of budget cuts by the Legislature, the last full science textbook adoption was in 2003. (The state board adopted online “supplemental” materials for science in 2011. Those instructional materials were intended to teach only new and revised curriculum standards until the next full textbook adoption.)

The adoption process actually begins with the revision of the Texas Essential Knowledge and Skills, or TEKS. The TEKS curriculum standards lay out what the state board expects students to learn in their science and other classrooms. Once the state board has adopted those standards, publishers write their textbooks and other instructional materials to cover those standards.

The state board adopted new TEKS curriculum standards for science in 2009. The board in 2013 plans to adopt instructional materials for science for Grades K-12, mathematics for Grades K-8, and Technology Applications for Grades K-12. Following is the adoption schedule for 2013:

- ★ **April 19, 2013:** Deadline for publishers to submit textbooks and other instructional materials to the State Board of Education for Review. Under rules adopted by the state board, publishers submitted their materials in digital format only – online or on DVD/CD-ROM – to the 20 Education Service Centers around Texas. The public may visit those ESCs to review the instructional materials.
- ★ **June-July 2013:** Review teams appointed by the state board and the Texas Education Agency review the submitted materials. The review teams, which include educators, parents and other community members from around the state, determine whether the instructional materials cover all or just some of the TEKS curriculum standards. They also identify any factual errors in the materials.
- ★ **July 2013:** The Texas education commissioner issues a preliminary recommendation, based on the work of the review teams, on which instructional materials the state board should adopt and which it should reject.
- ★ **July 17-19, 2013:** First State Board of Education meeting at which board members have an opportunity to comment on the proposed instructional materials. As of the printing of this report, the state board had not indicated whether it planned to hold a public hearing on the materials.
- ★ **September 18-20, 2013:** State Board of Education holds a public hearing on the proposed instructional materials. The Texas Education Agency provides a live webcast of the hearing. Before the meeting, state board members get reports from the official review teams.
- ★ **October 4, 2013:** The education commissioner issues a report listing all corrections of factual errors required in the proposed instructional materials and another report advising the state board on the adoption of those materials.
- ★ **October 18, 2013:** Deadline for publishers to file written confirmation of their intent to correct all errors identified by the education commissioner.
- ★ **November 20-22, 2013:** The state board holds its final scheduled meeting on the adoption. The board may or may not hold a public hearing prior to the final vote on which materials to adopt.

Under the provisions of Senate Bill 6 as passed by the Texas Legislature in 2011, the state must identify the percentage of the TEKS curriculum standards each product under consideration covers. Moreover, districts are



no longer restricted from using their state funds to purchase only those instructional materials approved by the state board of adoption. In practice, however, publishers will likely see placement of their textbooks and other instructional materials on the state board's adoption list as important to sales to local school districts.



Appendix C

Science Censorship in Texas

Science has typically been the subject of some of the most intense censorship battles at the State Board of Education, especially over the past 12 years.

- ★ In the late 1980s and in 1997, creationists succeeded in including in new statewide curriculum standards a requirement that students learn “strengths and weaknesses” of evolution. Among the so-called “weaknesses” they noted were alleged gaps in the fossil record and what creationists see as a lack of transitional fossils showing the evolution of species. Scientists urged the board not to water down the standards, noting that mainstream science has debunked those and other arguments about “weaknesses” of evolution. Creationists failed in their efforts to include “intelligent design” as an alternative to evolution.
- ★ In 2001, the state board rejected an environmental science textbook that some members called anti-free enterprise and even anti-Christian. They specifically objected to textbook discussions about global warming and the dangers of over-development and pollution. The advanced-placement textbook had been used at the college level for several years. Changes to other textbooks significantly curtailed the talk of endangered species and discussions of Native American cultures.
- ★ In 2003, creationists on the State Board of Education worked to reject proposed high school biology textbooks, arguing that the books didn’t include so-called “weaknesses” of evolution. After months of public hearings and heated debate, the board approved all of the textbooks without forcing publishers to weaken discussions of evolution.
- ★ In 2008-09, state board members approved new Texas Essential Knowledge and Skills curriculum standards that included requirements creationists hoped would force publishers to challenge key evolutionary concepts in their new textbooks. In particular, board creationists wanted textbooks to show – incorrectly – that the fossil record and the complexity of the cell don’t support the concepts of common ancestry and the evolution of life through unguided natural processes.



Appendix D

Who's Who in the Science Textbook Battle in Texas: Evolution Deniers

Barbara Cargill, R-The Woodlands

Appointed by Gov. Perry as State Board of Education chair in 2011, Cargill has insisted that students learn about “weaknesses” of evolution, including creationist arguments about the fossil record. At a hearing of the Texas Senate Education Committee in January of this year, Cargill complained about science instructional materials that teach “only one side” of evolution.

David Bradley, R-Beaumont

One of the most abrasive members of the State Board of Education, Bradley is also one of its most strident creationists. In responding to questions about the state’s science curriculum standards in 2007, Bradley said: “If some of my associates want to believe their ancestors were monkeys, that is their right. I believe God is responsible for our creation. . . . Given that none of today’s scientists were around when the first frog crawled out of the pond, there is no one who can say exactly what happened.” (Dallas Morning News, August 23, 2007)

Ken Mercer, R-San Antonio

This State Board of Education member once compared those who support teaching students about evolution to slave traders and Nazis. He also has insisted that evolution makes no sense because he has never seen a hybrid “cat-dog” or “cat-rat.”

Discovery Institute

The Seattle-based Discovery Institute is one of the nation’s major organizers of efforts to undermine the teaching of evolution in public schools. The organization promotes an alternative to evolution called “intelligent design,” which mainstream scientists have long rejected as creationism dressed up in a lab coat. **Stephen Meyer**, director of the Discovery Institute’s Center for Science and Culture, served as a so-called “expert” adviser to the Texas State Board of Education when the board revised the science curriculum standards in 2008-09.

Some of the nation’s most prominent advocates of “intelligent design”/creationism have populated the Discovery Institute’s list of associates. Among them are William A. Dembski, a research professor in philosophy at Southwestern Baptist Theological Seminary in Fort Worth, Texas, and Raymond Bohlin, president of Texas-based Probe Ministries.

The Discovery Institute has suffered several setbacks in recent years. In 2005, for example, a Republican-appointed federal judge ruled in **Kitzmiller v Dover Area School District** that the teaching of “intelligent design”/creationism in public schools was unconstitutional. The judge said that evidence presented at trial made it overwhelmingly clear that “(intelligent design) is a religious view, a mere re-labeling of creationism, and not a scientific theory.” The next year, in 2006, proponents of teaching “intelligent design” also suffered major electoral defeats in races for the Kansas and Ohio state boards of education.

Texans for Better Science Education (TBSE)

Evolution opponents created Texans for Better Science Education in the summer of 2003, during that year’s heated debate over proposed new biology textbooks for the state’s public schools. The group’s founder, Mark Ramsey of Spring near Houston, and other spokespersons demanded that publishers cast doubt on the science behind evolution in their textbooks. The group criticized the textbooks for failing to include discussions of so-called “weaknesses” of evolution.

Ramsey has also served as website administrator for the Greater Houston Creation Association (GHCA). The GHCA advocates for “young Earth creationism.” According to its Web site, the group is:

“a nondenominational organization of Christians who take the Bible in its original manuscripts to be the



actual inspired Word of God preserved by Him over time for our use as an unchanging source of truth. We find that the internal scriptural evidence overwhelmingly presents a young supernatural creation followed later by several world changing events of supernatural judgment including expulsion from the original paradise and ‘curse’ of the ground, a cataclysmic global flood that radically altered much of Earth’s geology, and a ‘confusion’ of language that forced the dispersion of people groups around the world. These events are as much a key to the past as observation of the present and they preclude the uniformitarian approach to understanding the distant past. We highly value the scientific method and the body of scientific knowledge based on observation and experimental testing of hypotheses (which is necessarily done in the present) but we reject the uniformitarian assumption in making inferences about the past.”

TBSE has occasionally waded into other issues areas, including the debate over what students in social studies classes should learn about religion and government. The group also has promoted Republican Party politics. In 2010, for example, the group posted on its website the GOP’s “Pledge to America” from that year’s congressional campaign.

Educational Research Analysts

Mel and Norma Gabler of Longview in East Texas began reviewing textbooks in the 1960s, eventually establishing Educational Research Analysts. Mel Gabler died in 2004, followed by Norma’s death in 2007. **Neal Frey**, a longtime textbook reviewer for the Gables, runs the organization today. The Gablers and Frey have criticized textbooks for coverage of evolution and for failing to include so-called “weaknesses” of evolution. The Texas Freedom Network has also received information indicating that Frey has been pressuring publishers going into this year’s science textbook adoption.

The Gablers were savvy manipulators of the news media. For years the couple would make a big splash by releasing lists of sometimes hundreds of “errors” they had identified in proposed textbooks up for adoption in Texas. While some were actual errors (such as incorrect dates), many of the “errors” were ideological objections to content. In recent years, however, Frey has adopted more of a behind-the-scenes approach to changing textbook content.

In 2004, for example, Frey passed on to far-right State Board of Education members a briefing paper attacking proposed health textbooks in Texas as somehow promoting homosexuality and same-sex marriage. Yet the student textbooks included no discussions of sexual orientation, and the teacher editions barely touched on the topic. But Frey’s paper and anti-gay board members argued that the books promoted same-sex marriage through the use of “asexual stealth phrases,” such as “married couples” and “married people,” rather than using language making it clear that marriage is a union of a man and a woman. Publishers agreed to include a definition of marriage in their textbooks.

Liberty Institute/Texas Values

Liberty Institute is a Plano-based litigation group that opposes separation of church and state. Texas Values is the group’s lobby arm in Austin. The attorney/lobbyist who heads Texas Values frequently speaks at State Board of Education hearings. In 2008-09, he helped organize efforts to include creationist arguments against evolution in the new science standards. Liberty Institute’s president, Kelly Shackelford, later claimed that creationists succeeded in weakening the standards on evolution because “God unleashed his people.” In accepting an award from Focus on the Family, Shackelford offered something of a play-by-play of the board’s final votes on evolution at its March 2009 meeting: “It was clear that out of nowhere everything changed on a dime. And when we thought it was over — I mean, it was shocking. But it was God. And we just kind of stood there with our mouth open and said, ‘Praise the Lord.’”



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The Texas Freedom Network Education Fund supports research and education efforts
that promote religious freedom and individual liberties.

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