

FACT SHEET: Evolution in state science standards

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Introduction

Who do you turn to when you’re in a bind concerning something you know little about? If you were confronted with a financial problem that you don’t have the personal experience to manage, you would likely consult a respected accountant. The same goes for a legal matter; you would want the opinion of a good lawyer. Even a severe toothache is an occasion to visit an expert: an experienced dentist. When making decisions concerning what should be taught in the public school science classroom, expert advice is no less important.

You have no doubt been confronted by the issue of biological evolution being taught in the public school classroom. The current headline-making conflict concerns the inclusion of evolution as a major part of the new draft of the state science standards. This has had an emotional impact on many people. Unfortunately, many of those people, including those in positions to directly influence what happens in the science classroom, are making important decisions on the matter without consulting experts. News accounts are filled with people making statements that illustrate a clear misunderstanding of basic science.

The two most prevalent fallacies made in those public statements are “evolution is just a theory” and “evolution is against God.” The corrections to these fallacies outlined in this fact sheet are not based on opinion, but are drawn from the subject matter experts. Links to respected, dependable sources are provided throughout this document.

The draft state science standards

One of the most important items to look at is the actual proposed science standards. It’s important for you to learn what the standards require Florida’s science students to know before you make any judgments or decisions.

Further reading:

-- Draft of Proposed Florida Science Standards

<http://www.fcrstem.org/Uploads/1/docs/FLDOE/Science%20Standards%20-%20without%20cover.pdf>

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FALLACY: “EVOLUTION IS JUST A THEORY.”

Example: School Board Vice Chairman Andy Tuck said, "I strongly oppose any study of evolution as fact at all. I'm purely in favor of it staying a theory and only a theory."

<http://www2.highlandstoday.com/content/2008/jan/25/board-opposes-evolution-being-taught-fact/>

What is a scientific theory?

The fallacy demonstrated above is that the theory of evolution is just a guess or hunch. That's how the word theory is commonly used, and so many people make the innocent mistake of assuming evolution's status is nothing more than speculation. The fact is that the word theory is used differently in the scientific community. A scientific theory is a carefully thought out and as-thorough-as-possible explanation for a body of facts, observations and experiments.

The theory of evolution is robust, having withstood well over a century of testing. The theory has strengthened as more facts have been discovered from many diverse fields of study. Furthermore, the theory of evolution has been accepted by a consensus of the scientific community, not because of some type of popular vote, but rather based on the strength, usefulness and explanatory power of the theory. All scientific theories, not just evolution, are invaluable tools to scientists as they learn about the universe around us.

Further Reading:

-- Science, Evolution, and Creationism: from the National Academy of Sciences

http://www.nap.edu/catalog.php?record_id=11876

-- Understanding Evolution [Site created by the University of California Museum of Paleontology supported by the National Science Foundation and the Howard Hughes Medical Institute.]

<http://evolution.berkeley.edu/>

FALLACY: “EVOLUTION IS NOT A FACT.”

Example: Highlands County school board member Wally Randall said: "The controversy as I understand it was teaching evolution as a fact rather than as a theory."

<http://www2.highlandstoday.com/content/2008/feb/03/school-board-consider-evolution-resolution/>

Is evolution theory or fact?

There is quite a bit of confusion in the public concerning the combination of the terms theory and fact when discussing evolution. The simple explanation is that there are an abundance of facts showing how life on Earth has changed over vast stretches of time. A scientific theory then seeks to explain how those facts interact and fit together to form an overall picture. So, a scientific theory is not a fact itself, but rather is a carefully reasoned explanation for what a related set of facts tells us about our world and how it works.

Further Reading:

-- Evolution as Fact and Theory, by Stephen Jay Gould

http://www.stephenjaygould.org/library/gould_fact-and-theory.html

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What about the weaknesses in evolution?

Some people claim that there are weaknesses in the theory of evolution and that those weaknesses should be taught. The fact is that there are things as yet undiscovered in all fields of science, not just evolution. These are not weaknesses, but rather exciting new areas for future scientists to explore. Furthermore, these aspects are commonly addressed in good science textbooks, with the purpose of encouraging the next generation of scientists. There's absolutely no fear in acknowledging what is currently not known. Rather, it's embraced as a constant source of exciting future scientific exploration. The bottom line: Evolution is the furthest thing from a guess. It's a scientific theory that explains an abundance of facts.

Further Reading:

-- National Science Teachers Association Position Statement

<http://www.nsta.org/about/positions/evolution.aspx>

-- List of Statements from Scientific and Scholarly Organizations

http://www.ncseweb.org/resources/articles/2712_statements_from_scientific_and_scholarly_organizations_12_19_2002.asp

FALLACY: "TEACH OTHER THEORIES."

Example: Donna Callaway has stated that she opposes evolution being taught "to the exclusion of other theories of origin of life."

http://www.palmbeachpost.com/localnews/content/local_news/epaper/2007/12/31/m1a_EVOLUTION_1216.html

Evolution is not about "origins."

There are actually two problems tangled up in the above statement. First of all, evolution as taught in the public schools addresses changes in life over time, not origins. So, complaints against evolution that focus on origins of life or even origins of the universe are irrelevant.

What are the "other theories?"

Secondly, sometimes people exclude the "origins" part and just say that evolution needs to be taught alongside other theories. (Several county school boards have passed formal resolutions critical of evolution that incorporate this fallacy.) Keeping in mind the definition of a scientific theory, there are no other theories competing with the scientific theory of evolution. There are other ideas proposed by fringe groups, but those ideas have no scientific backing (no peer-reviewed papers published in science journals, no science experiments conducted, etc.) and are in no way defined as scientific theories.

Further Reading:

-- What's Wrong with "Theory not Fact" Resolutions

http://www.ncseweb.org/resources/articles/8643_whats_wrong_with_theory_not_fact_12_7_2000.asp

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FALLACY: “EVOLUTION IS AGAINST GOD.”

Example: Nassau County Superintendent John Ruis said ... presenting it [evolution] as undisputed fact “is certainly contrary to the beliefs of many people, including myself.”

http://www.jacksonville.com/tu-online/stories/011708/met_237288652.shtml

What does evolution say about religion?

There is classroom instruction throughout Florida on physics, astronomy, geology, biology, meteorology, chemistry, and so on. Not a single one of these subjects makes any statement on the validity or non-validity of any religious belief. These subjects teach our students about the world around us through observation and repeatable experimentation. The supernatural cannot be measured or tested and so is not included in any science course. Additionally, there are many people with sincere religious belief who accept the theory of evolution. It needs to be made clear here that no student is asked to “believe” evolution. Rather, evolution is to be “understood” in the same way that the heliocentric solar system is understood.

Further reading:

-- PBS’s religion section of their evolution website:

<http://www.pbs.org/wgbh/evolution/religion/index.html>

-- Clergy Letter Project

http://www.butler.edu/clergyproject/rel_evolution_sun.htm

-- Dover Pa. court decision outlining intelligent design’s religious origins

http://www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf

Conclusion

We hope this fact sheet helps you as you deal with this important education issue. If you have any further questions, please feel free to contact Florida Citizens for Science. We also encourage you to contact the men and women who work daily in biology-related fields at Florida’s universities and biotech research facilities. Consulting the subject matter experts is of the utmost importance!

Florida Citizens for Science

<http://www.flascience.org/>