Polls and Research on Public Acceptance of Evolution

** Each subdivision is ordered chronologically by year*

United States Polls

General adults:

1) Funk, C., & Huff, T. (2010). *Virginia Commonwealth University Life Sciences*. Retrieved from http://www.vcu.edu/lifesci/images2/survey2010.pdf
2) Newport, F. (2010, December 17). *Gallup*. Retrieved from http://www.gallup.com/poll/145286/Four-Americans-Believe-Strict-Creationism.aspx
3) (2010, February). *University of Texas* and *The Texas Tribune*. Retrieved from http://static.texastribune.org/media/documents/UTTT_Feb_2010_poll3-summary.pdf
4) (2010, April 13). "Acceptance of evolution by state." *Subnormal Numbers Blogspot.* Retrieved from http://subnormalnumbers.blogspot.com/2010/04/acceptance-of-evolution-by-state.html
5) (2010). *Gallup*. Retrieved from http://www.gallup.com/poll/21814/evolution-creationism-intelligent-design.aspx
6) Newport, F. (2009, February 11). *Gallup*. Retrieved from http://www.gallup.com/poll/114544/Darwin-Birthday-Believe-Evolution.aspx
7) (2009, December 15). *The Harris Poll*. Retrieved from http://www.harrisinteractive.com/vault/Harris_Poll_2009_12_15.pdf
8) (2009, April 1). *Louisiana State University: The Public Policy Research Lab*. Retrieved from http://www.survey.lsu.edu/downloads/2009lasurveyreport_final.pdf
9) (2008, January). "Evolution and its discontents: A role for scientists in science education." *The Journal of the Federation of American Societies for Evolutionary Biology, 22*. Retrieved from http://www.fasebj.org/content/22/1/1.full
10) Newport, F. (2008, June 20). *Gallup*. Retrieved from http://www.gallup.com/poll/108226/Republicans-Democrats-Differ-Creationism.aspx
11) Plutzer, E., & Berkman, M. (2008, August 18). "Evolution, creationism, and the teaching of human origins in schools." *Public Opinion Quarterly, 72(3)*, 540-553. Retrieved from http://poq.oxfordjournals.org/content/72/3/540.abstract
12) (2008, January 26). "You say you want an evolution? A role for scientists in science education." *Elsevier* and *Science Direct, 316*, 2-5. Retrieved from http://www.elsevier.com/framework_products/promis_misc/ydbioevolutionapril2008.pdf
13) Masci, D. (2007, August 27). "How the public resolves conflicts between faith and science." *Pew Research Center Publications*. Retrieved from http://mbb.rutgers.edu/411files/SA/Pew-2007.pdf
14) (2007, June 11). *Gallup*. Retrieved from http://www.gallup.com/video/27838/Evolution-Beliefs.aspx
15) Gross, L. (2006, April 18). "Scientific illiteracy and the partisan takeover of biology." *PLoS Biology, 4(5)*. Retrieved from http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0040167
16) (2006, August 24). *The Pew Forum*. Retrieved from http://pewforum.org/uploadedfiles/Topics/Issues/Politics_and_Elections/religion-politics-06.pdf
17) Bishop, G. (2006). "Polls apart on human origins." *Public Opinion Pros*, 1-4. Retrieved from http://www.publicopinionpros.norc.org/features/2006/aug/bishop.asp
18) (2005, August 30). *The Pew Forum*. Retrieved from http://people-press.org/reports/pdf/254.pdf

19) Nisbet, M., & Nisbet, E. (2005, September). "Evolution & intelligent design: Understanding public opinion." *American Geological Institute*. Retrieved from http://www.geotimes.org/sept05/feature_evolutionpolls.html
20) (2005, September 28). "Reading the polls on evolution and creationism." *Pew Research Center.* Retrieved from http://people-press.org/commentary/?analysisid=118
21) Brem, S., Ranney, M., & Schindel, J. (2003, January 24). "Perceived consequences of evolution: College students perceive negative personal and social impact in evolutionary theory." *Science Education, 87(2)*, 181-206. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/sce.10105/abstract
22) Alters, J., & Nelson, C. (2002, August 13). "Perspective: Teaching evolution in higher education." *The Society for the Study of Evolution, 56 (10)*, 1891-1901. Retrieved from http://www.bioone.org/doi/full/10.1554/00143820%282002%29056%5B1891%3APTEIHE%5D2.0.CO%3B2
23) Lerner, L. (2000, September 21). "Good and bad science in US schools." *Nature, 407*, 287-290. Retrieved from http://www.nature.com/nature/journal/v407/n6802/full/407287a0.html
24) (2000, March). "Evolutionism and creationism in public education: An in-depth reading of public opinion." *People for the American Way Foundation*. Retrieved from http://media.pfaw.org/pdf/creationism/creationism-poll.pdf

College:

25) Paz-y-Miño C., G., & Espinosa, A. (2011, January 15). "Why accepting evolution matters." *Evolution Literacy*. Retrieved from http://pazymino1evolutionliteracy.blogs.umassd.edu/2011/01/15/new-england-professors-accept-evolution-but-they-are-religious-editorial-the-standard-times/
26) Nadelson, L., & Sinatra, G. (2009). "Educational professionals' knowledge and acceptance of evolution." *Evolutionary Psychology Journal, 7(4)*, 490-516. Retrieved from http://www.epjournal.net/filestore/ep07490516.pdf
27) Paz-y-Miño C., G., & Espinosa, A. (2009, October 13). "Acceptance of evolution increases with student academic level: A comparison between secular and religious college." *Evolution Education Outreach, 2*, 655-675. Retrieved from http://faculty.rwu.edu/aespinosa/PazyMinoC-EspinosaVol2_4Dec2009.pdf
28) Cotner, S., Brooks, D., & Moore, R. (2009, November 26). "Is the age of the earth one of our 'sorest troubles?' Student's perceptions about deep time affect their acceptance of evolutionary theory." *Evolution: International Journal of Organic Revolution, 64*, 858-864. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1558-5646.2009.00911.x/abstract
29) Paz-y-Miño C., G., & Espinosa, A. (2008, November 19). "Assessment of biology majors' versus non-majors' views on evolution, creationism, and intelligent design." *Evolution Education Outreach, 2*, 75-83. Retrieved from http://faculty.rwu.edu/aespinosa/Paz-y-Mino_EspinosaEEOpub2009.pdf
30) Lombrozo, T., Thanukos, A., & Weisberg, M. (2008, June 20). "The importance of understanding the nature of science for accepting evolution." *Evolution Education and Outreach, 1-3*, 290-298. Retrieved from http://www.springerlink.com/content/f82518w0p8531512/
31) Shtulman, A., & Calabi, P. (2008). "Learning, understanding, and acceptance: The case of evolution." *Cognitive Science Journal*. Retrieved from http://csjarchive.cogsci.rpi.edu/proceedings/2008/pdfs/p235.pdf
32) Rutledge, M., & Sadler, K. (2007 August). "Reliability of the Measure of Acceptance of the Theory of Evolution (MATE) instrument with university students." *American Biology Teacher,*

69(6), 332-335. Retrieved from http://www.bioone.org/doi/abs/10.1662/0002-7685(2007)69%5B332%3AROTMOA%5D2.0.CO%3B2

33) Wilson, D. (2005, December 13). "Evolution for everyone: How to increase acceptance of, interest in, and knowledge about evolution*." PLoS Biology*. Retrieved from http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0030364
34) (2005, March 24). "Survey indicates science teachers feel pressure to teach nonscientific alternatives to evolution." *National Science Teachers Association.* Retrieved from http://science.nsta.org/nstaexpress/nstaexpress_2005_03_28_pressrelease.htm

Pre-College:

35) Berkman, M., & Plutzer, E. (2011, January 28). "Defeating creationism in the courtroom, but not in the classroom." *American Association for the Advancement of Science, 331*, 404-405. Retrieved from http://www.sciencemag.org/content/331/6016/404.full
36) Berkman, M., Pacheco, J., & Plutzer, E. (2008, May 20). "Evolution and creationism in America's classrooms: A national portrait." *PLoS Biology, 6(5)*. Retrieved from http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0060124

Museums:

37) Evans, E., Frazier, B., Hazel, A., Kiss, A., Lane, J., Spiegel, A., & Diamond, J. (2010 August). "Tree-thinking: do pictorial representations of phylogenetic relationships help or hinder museum visitors' understanding of evolution?" *Carnegie Museum of Natural History*. Retrieved from http://evolution.berkeley.edu/UToL/evans2010.pdf
38) Evans, E., Spiegel, A., Gram, W., Frazier, B., Tare, M., Thompson, S., & Diamond, J. (2009, July 27). "A conceptual guide to natural history museum visitors' understanding of evolution." *Journal of Research in Science Teaching*. Retrieved from http://www-personal.umich.edu/~evansem/JRST-Evans-2009.pdf
39) MacFadden, B., Dunckel, B., Ellis, S., Dierking, L., Abraham-Silver, L., Kisiel, J., & Koke, J. (2007 November). "Natural history museum visitors' understanding of evolution." *American Institute of Biological Science, 57*, 875-882. Retrieved from http://www.jstor.org/stable/4539733
40) Spiegel, A., Evans, E., Gram, W., & Diamond, J. (2006, Spring). "Museum visitors' understanding of evolution." *Museums & Social Issues, 1*, 69-86. Retrieved from http://www-personal.umich.edu/~evansem/SpiegelEvansGramDiamond.pdf

International Polls

Include US:

41) (2010, July 15). "Americans are creationists; Britons and Canadians side with evolution." *Angus Reid Public Opinion*. Retrieved from http://www.visioncritical.com/wp-content/uploads/2010/07/2010.07.15_Origin.pdf
42) Williams, J. (2009, September 30). "Belief versus acceptance: Why do people not believe in evolution?" *BioEssays, 31*, 1255-1262. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/bies.200900082/full

43) Miller, J., Scott, E., & Okamoto, S. (2006, August 11). "Public acceptance of evolution." *Science Magazine, 313*, 765-766. Retrieved from http://rifters.com/real/articles/Science_Public_Acceptance_of_Evolution.pdf

Exclude US:

44) (2009 April). *Ipsus Mori*. Retrieved from http://www.ipsos-mori.com/Assets/Docs/Polls/poll-darwin-survey-shows-international-consensus-on-acceptance-of-evolution.pdf

Islamic World:

45) (2009). "Study of acceptance of evolution among Muslim physicians." *Hampshire College*. Retrieved from http://www.hampshire.edu/news/16095.htm
46) Hameed, S. (2008, December 12). "Bracing for Islamic creationism." *Science Magazine, 322*, 1637-1368. Retrieved from http://helios.hampshire.edu/~sahCS/Hameed-Science-Creationism.pdf

Miscellaneous

47) Reiss, M. (2009, April 13). *Evolution: International Journal of Organic Revolution*. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1558-5646.2009.00714.x/abstract
48) (2009, February 4). "Overview: The conflict between religion and evolution." *The Pew Forum*. Retrieved from http://pewforum.org/Science-and-Bioethics/Overview-The-Conflict-Between-Religion-and-Evolution.aspx
49) Moore, R. (2002, May-June). "Racism and public's perception of evolution." *National Center for Science Education*, *22(3)*, 16-18 & 23-25. Retrieved from http://ncse.com/rncse/22/3/racism-publics-perception-evolution

Unavailable

50) The Researcher, 2010 http://nrmera.org/files/Nadelson_Sinatra2010.pdf
Broken link, but #14 is by Nadelson and Sinatra—repeat?
51) Miller, J. , Kimmel, L. & Pardo, R. (2009, May 25). "The Public Acceptance of Evolution and the Big Bang." *American Association For Public Opinion Association.* Retrieved from from http://www.allacademic.com/meta/p17022_index.html
Have to pay
52) Donnelly, L., Kazempour, M., & Amirshokoohi, A. (2008). "High school students' perceptions of evolution instruction: Acceptance and evolution learning experiences." *Research in Science Education, 39 (5)*, 643-660. Retrieved from http://www.springerlink.com/content/r7410k51534n6011/
Have to pay

United States Polls
General Adults

1) Funk, C., & Huff, T. (2010). *Virginia Commonwealth University Life Sciences*. Retrieved from http://www.vcu.edu/lifesci/images2/survey2010.pdf
UNITED STATES (adults); n=1,001

The VCU Life Sciences Survey was conducted by landline and cell telephone with 1,001 adults nationwide, from May 12-18, 2010. The margin of error for the poll is plus or minus 3.7 percentage points.

Questions:

1) How much have you heard or read about the theory of evolution?
   - "About three-quarters (**76%**) of the public report having heard a lot or some about evolution; about a quarter has heard nothing (**10%**) or not too much (**13%**)about the theory of evolution."

2) In general, would you say the theory of evolution conflicts with your own religious beliefs, or is mostly compatible with your own religious beliefs?
   - "… **42 percent** of Americans say evolution conflicts with their religious beliefs…"
   - "… (**43 percent**) say the theory of evolution is mostly compatible with their own religious beliefs."

3) Which of these statements comes closest to your views on the origin of biological life: biological life developed over time from simple substances, but God guided this process; biological life developed over time from simple substances but God did not guide this process; God directly created biological life in its present form at one point in time?
   - "…**43%** of the nation believes that God directly created life in its present form.
   - " Another **24%** say life developed over time with guidance from God during the process; this view is compatible with an "intelligent design" or a "theistic evolution" view of life's origins."
   - "A minority of **18%** hold beliefs consistent with the theory of evolution saying that life developed over time without guidance from God."

4) From what you've heard or read, do you think the evidence on evolution is widely accepted within the scientific community, or do many scientists have serious doubts about it?
   - "A majority (**53 percent**) considers the evidence on evolution to be widely accepted within the scientific community…"
   - "…**31 percent** think many scientists have serious doubts about…" the evidence on evolution.

- There is a "…survey of scientists belonging to the Advancement of Science and conducted by the Pew Research Center for the People & the Press in 2009. In that survey, 87% of scientists in the sample said they believe that life evolved over time due to natural processes."
- "Those holding a creation view of life's origins, are split over whether the theory of evolution is widely accepted by scientists with 44% saying it is and 40% saying many scientists have serious doubts about evolution."

- "…69% of those who believe that the Bible is the actual Word of God hold a creation perspective on the origins of life. Among those who believe that the Bible is God's Word but not everything in it should be interpreted literally, 35% hold a creation perspective, 42% say life evolved with God's guidance during the process, and 11% hold a natural selection perspective. A majority (56%) of those who believe the Bible is written by men adopt a natural selection perspective, 18% say life evolved with God's guidance during the process and 12% say God directly created life in its present form."

Summary: This data pertains to a larger study primarily aimed at assessing opinions on offshore drilling. However, in attempting to more broadly understand the role of science in the everyday lives of Americans, topics such as evolution became pertinent. Their findings show that only 44% of participants had heard or read about the theory of evolution "*a lot*." Additionally, roughly the same percentage of participants stated that evolutionary theory conflicted with their religion as did those who said that it was mostly compatible with their religion (42% and 43% respectively). However, 43% of respondents believed that God directly created life. This starkly contrasts the mere 18% that believed biological life developed over time from simple substances but God did not guide the process. Interestingly, the study also assesses the degree to which respondents believe that the theory of evolution is accepted by scientists. A majority, with 53%, believe that the theory is widely accepted. However, 31% remain skeptical believing that many scientists have serious doubts.

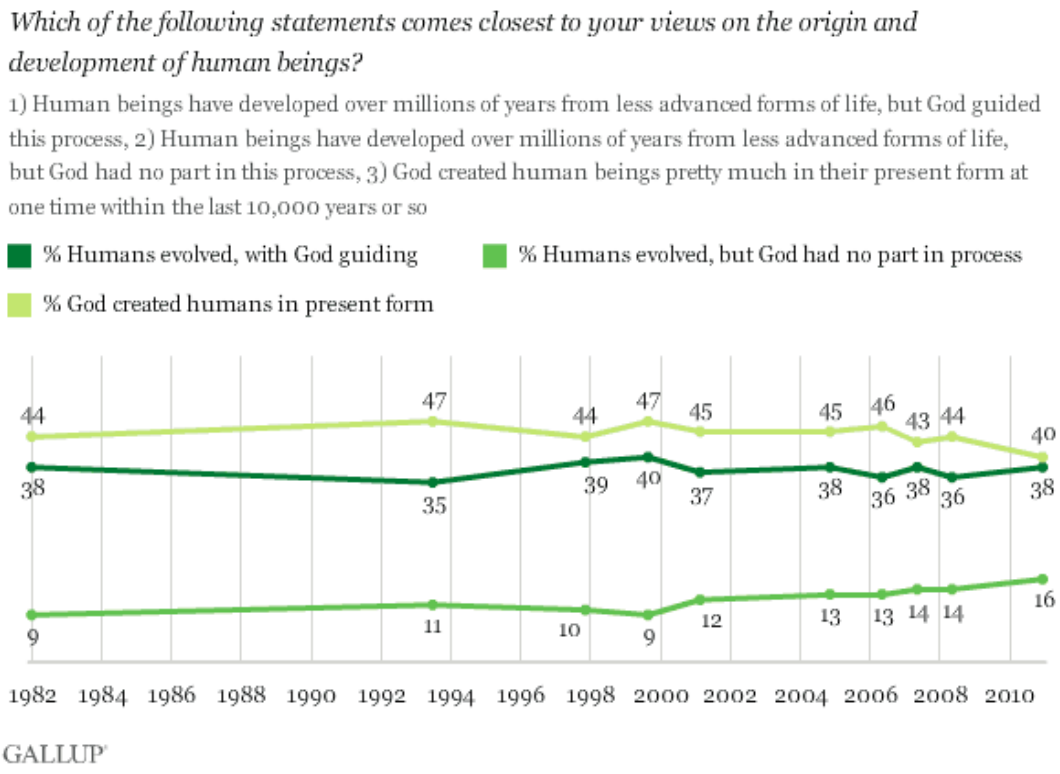
2) Newport, F. (2010, December 17). *Gallup*. Retrieved from http://www.gallup.com/poll/145286/Four-Americans-Believe-Strict-Creationism.aspx

UNITED STATES (adults); n=1,019

"Results for this Gallup poll are based on telephone interviews conducted Dec. 10-12, 2010, with a random sample of 1,019 adults, aged 18 and older, living in the continental U.S., selected using random-digit-dial sampling." The maximum margin of error is estimated to be around +/- four percentage points.

Question:

1) Which of the following statements comes closest to your views on the origins and development of human beings?
    a. Human beings have developed over millions of years from less advanced forms of life, but God guided this process
    b. Human beings have developed over millions of years from less advanced life forms, but God had no part in this process
    c. God created human beings pretty much in their present form at one time within the last 10,000 years or so



- 40% of Americans believe God created human beings in their present form about 10,000 years ago
- "38% of Americans believe God guided a process by which human beings developed over millions of years from less advanced life forms"

- 16% of Americans believe humans developed over millions of years without the involvement of God
- "Those who are less educated are more likely to hold a creationist view. Those with college degrees and postgraduate education are more likely to hold one of the two viewpoints involving evolution."
- "Americans who attend church frequently are most likely to accept explanations for the origin of humans that involve God, not a surprising finding. Still, the creationist viewpoint, held by 60% of weekly churchgoers, is not universal even among the most highly religious group."
- "Republicans are significantly more likely to attend church weekly than are others, and, as noted, Americans who attend church weekly are most likely to select the creationist alternative for the origin of humans."

Which of the following statements comes closest to your views on the origin and development of human beings?

	Humans evolved, God guided process	Humans evolved, God had no part in process	God created humans in present form within last 10,000 years
	%	%	%
Attend church weekly	31	2	60
Attend church almost every week/monthly	47	9	41
Attend church seldom/never	39	31	24

Dec. 10-12, 2010

GALLUP

Which of the following statements comes closest to your views on the origin and development of human beings?

	Humans evolved, God guided process	Humans evolved, God had no part in process	God created humans in present form within last 10,000 years
	%	%	%
Republican	36	8	52
Independent	39	21	34
Democrat	40	20	34

Dec. 10-12, 2010

GALLUP

Summary: This poll observes the percentage of American adults that believe in the theory of evolution, theistic evolution, or creationism. The data reveals that although 40% of Americans believe in the creationist viewpoint, it is actually the lowest percentage ever recorded by the Gallup poll since 1982.

Correspondingly, those who believe in the theory of evolution have risen in number since then, going from 9% in 1982 to 16% in 2010. The percentage holding "theistic evolution" has not varied significantly. Additionally, the poll assesses different demographics and the effect this has on the person's beliefs. For example, those with a postgraduate degree hold the highest percentage rates for believing in the evolutionary theory, and the lowest for believing in creationism. Also, the poll looks at political parties for information. Republicans, who "…are significantly more likely to attend church weekly than are others, and, as noted, Americans who attend church weekly are most likely to select the creationist alternative for the origin of humans." Therefore, this poll dissects the lines upon which Americans hold their viewpoint regarding human evolution.

3) (2010, February). *University of Texas* and *The Texas Tribune*. Retrieved from http://static.texastribune.org/media/documents/UTTT_Feb_2010_poll3-summary.pdf

Ross, R. (2010, February 17). Texans: Dinosaurs, humans walked the earth at same time. *The Texas Tribune*. Received from http://www.texastribune.org/texas-education/public-education/texans-dinosaurs-humans-walked-the-earth-at-same/
**Any source material quoted from Ross' article will be referenced by his last name.

UNITED STATES (Texas registered voters); n=800

This survey was conducted statewide in Texas between February 1st and 7th, 2010. There are 800 participants, all of which are registered voters. The margin of error is +/- 3.46%.

Questions:

1) Which of the following statements comes closest to your views on the origin and development of human beings?
   - Human beings have developed over millions of years from less advanced forms of life, but God guided the process—**38%**
   - Human beings have developed over millions of years from less advanced forms of life, and God had no part in the process—**12%**
   - God created human beings pretty much in their present form about 10,000 years ago—**38%**
   - Don't know—**12%**
2) Which of the following statements comes closest to your views on the origin and development of life on earth? Life on earth has. . .
   - Existed in its present form since the beginning of time--**22%**
   - Evolved over time, entirely through "natural selection," with no guidance from God--**15%**
   - Evolved over time, entirely through "natural selection," but with a guiding hand from God--**53%**
   - Don't know--**10%**
3) Please tell us whether you agree or disagree with the following statement: "Human beings, as we know them today, developed from earlier species of animals."
   - Agree--**35%**
   - Disagree--**51%**
   - Don't Know--**15%**
4) Please tell us whether you agree or disagree with the following statement: "The earliest humans lived at the same time as the dinosaurs."
   - Agree--**30%**
   - Disagree--**41%**
   - Don't Know--**30%**
5) How important would you say that religious beliefs are to your daily life?
   - Extremely important--**52%**
   - Somewhat important--**30%**
   - Not very important--**11%**

- Not at all important--**7%**

6) What is your religious affiliation? **[No open response on "other"]**
   - Agnostic--4%
   - Assembly of God*--2%
   - Atheist--2%
   - Baptist*--**20%**
   - Buddhist--0%
   - Catholic*--**20%**
   - Church of Christ--3%
   - Church of God--1%
   - Disciples of Christ--1%
   - Episcopal/Anglican*--2%
   - Hindu--0%
   - Jewish--1%
   - Lutheran*--2%
   - Methodist*--6%
   - Mormon--1%
   - Muslim/Islam--1%
   - Nondenominational Christian*--10%
   - Orthodox/Eastern Orthodox*--0%
   - Pentecostal*--3%
   - Presbyterian*--3%
   - Protestant (non-specific)*-- 3%
   - Reformed*--0%
   - Unitarian/Universalist--0%
   - United Church of Christ*--0%
   - Spiritual but not religious--8%
   - Other*--7%
   - Don't Know—1%

***[Asked if respondent selected a choice with * next to it for RELIG]** Do you consider yourself to be a "born again" or "evangelical" Christian?

- Yes--**51%**
- No--**50%**

7) Aside from weddings and funerals, how often do you attend religious services or participate in religious activities?
   - More than once a week--**14%**
   - Once a week--**21%**
   - A few times a month--**13%**
   - Once or twice a year--**29%**
   - Never--**23%**
8) What race do you consider yourself to be?
   - White--**61%**
   - African American--**14%**
   - Hispanic or Latino--**20%**

- Asian/Pacific Islander--**1%**
- Native American--**0%**
- Multi-racial--**4%**

Summary: This survey of Texan registered voters asks a number of questions regarding both evolution and demographics. “38 percent said human beings developed over millions of years with God guiding the process and another 12 percent said that development happened without God having any part of the process. Another 38 percent agreed with the statement ‘God created human beings pretty much in their present form about 10,000 years ago’” (Ross). However, “Asked about the origin and development of life on earth without injecting humans into the discussion… 53 percent said it evolved over time, ‘with a guiding hand from God’” (Ross). Additionally, three in ten Texas voters agrees with the statement that humans lived at the same time as dinosaurs. Key demographics that participated in this study include Catholics and Baptists (20% each), Whites (61%), married individuals (61%), and people whose highest degree comes from high school (35%-highest percentage option).

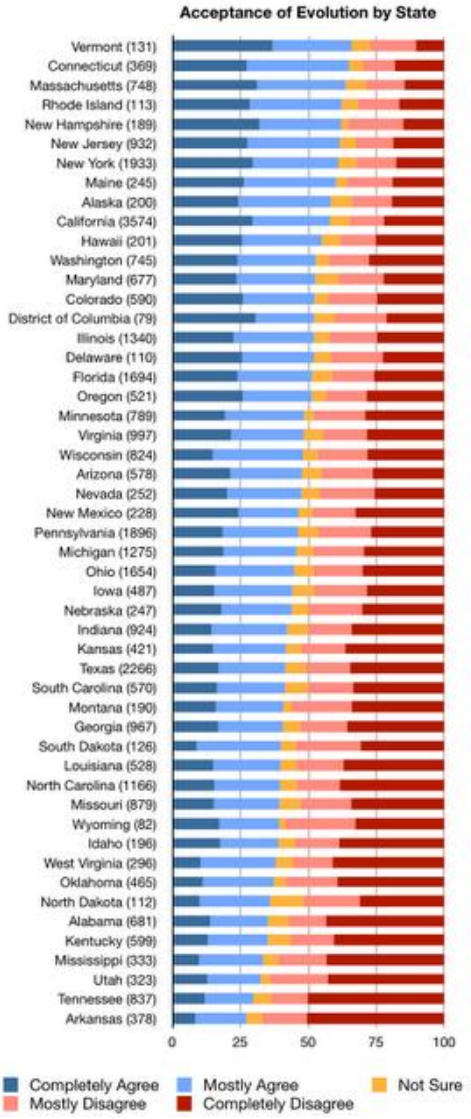
4) (2010, April 13). "Acceptance of evolution by state." *Subnormal Numbers Blogspot.* Retrieved from http://subnormalnumbers.blogspot.com/2010/04/acceptance-of-evolution-by-state.html

   Uses data from:

   1) Datasets. *Pew Forum*. Retrieved from http://pewforum.org/Datasets/Dataset-Download.aspx
   2) Mead, L., & Mates, A. (2009, August 7). Why science standards are important to a strong science curriculum and how states measure up. *Evolution: Education and Outreach*. Retrieved from http://salamander.uky.edu/srvoss/508f09/Mead.pdf

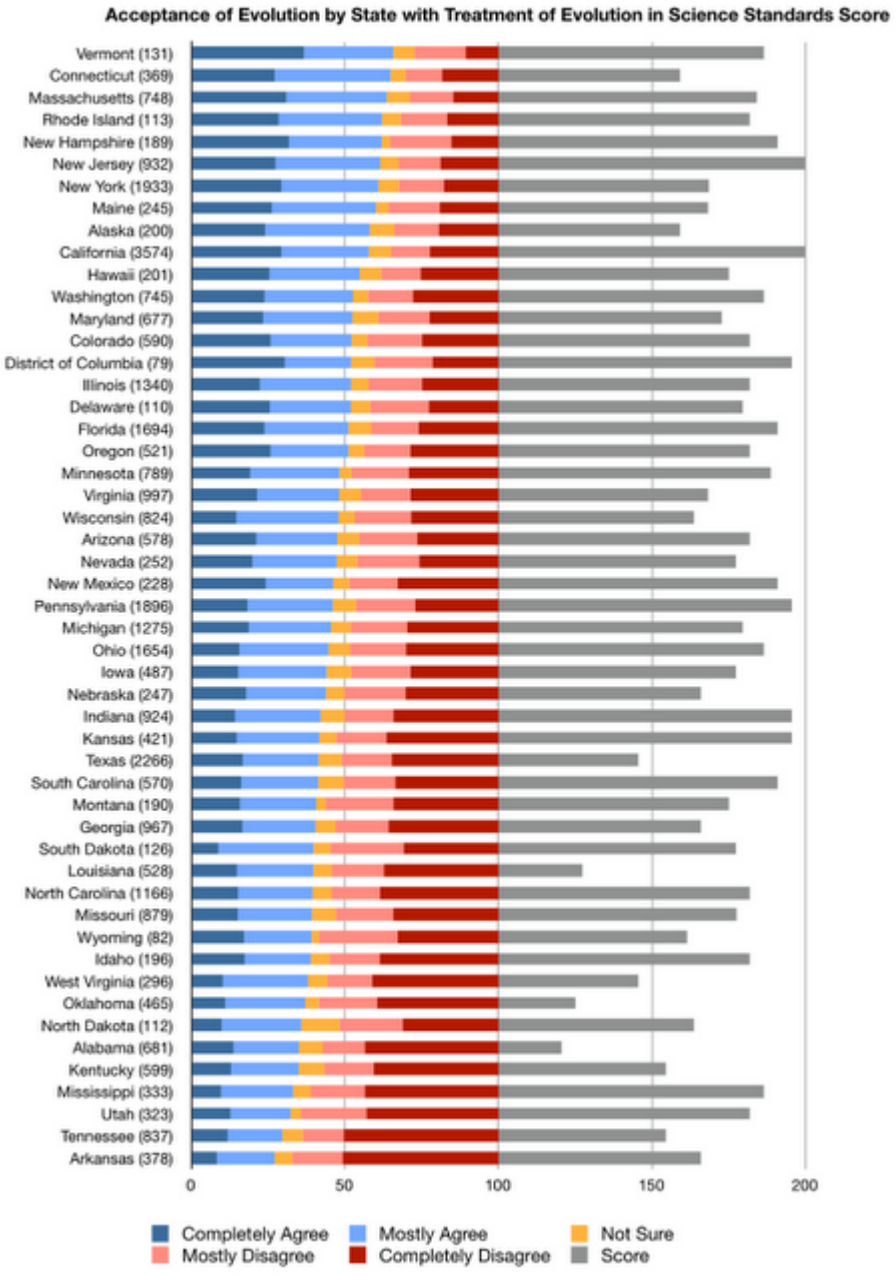
Questions:

1) Evolution is the best explanation for the origins of human life on earth:
   Completely Agree, Mostly Agree, Mostly Disagree, Completely Disagree, Don't Know/Refused



*1

2) Acceptance of evolution combined with scores for treatment of evolution in the state's science standards.



*2

Summary: This article uses data from other websites in order to create visual displays. The first graph presents statistics from the Pew Research Center, and specifically looks at acceptance of evolution according to state. Vermont was the state with the most participants saying "completely agree" to the statement, while Arkansas had the least say "completely agree."A general trend does appear with states in the Northeast agreeing in higher numbers than those in the South. With regards to state standards, Alabama appears to receive the worst grade while New Jersey and California tie for the highest scores. Interestingly, a strong correlation between state standards and likelihood of accepting evolution does not present itself in this graph.

5) (2010). *Gallup*. Retrieved from http://www.gallup.com/poll/21814/evolution-creationism-intelligent-design.aspx

UNITED STATES (adults)

This compilation of Gallup polls from 1982 to 2010 does not specify its methodology. However, typical Gallup polls choose sample sizes around 1,000 participants, and use telephones to interview the sample population of American adults.

Questions:

1) Which of the following statements comes closest to your views on the origin and development of human beings -- [ROTATE 1-3/3-1: 1) Human beings have developed over millions of years from less advanced forms of life, but God guided this process, 2) Human beings have developed over millions of years from less advanced forms of life, but God had no part in this process, 3) God created human beings pretty much in their present form at one time within the last 10,000 years or so]?

	Man developed, with God guiding	Man developed, but God had no part in process	God created man in present form	Other/ No opinion
	%	%	%	%
2010 Dec 10-12	38	16	40	6
2008 May 8-11	36	14	44	5
2007 May 10-13	38	14	43	4
2006 May 8-11	36	13	46	5
2004 Nov 7-10	38	13	45	4
2001 Feb 19-21	37	12	45	5
1999 Aug 24-26	40	9	47	4
1997 Nov 6-9	39	10	44	7
1993 Jun	35	11	47	7
1982	38	9	44	9

2) We'd like to ask about your views on two different explanations for the origin and development of life on earth. Do you think -- [ITEMS ROTATED] -- is -- [ROTATED: definitely true, probably true, probably false, (or) definitely false]?

- Evolution, that is, the idea that human beings developed over millions of years from less advanced forms of life

	Definitely true	Probably true	Probably false	Definitely false	No opinion
2007 Jun 1-3	18%	35	16	28	3

- Creationism, that is, the idea that God created human beings pretty much in their present form at one time within the last 10,000 years

	Definitely true	Probably true	Probably false	Definitely false	No opinion
2007 Jun 1-3	39%	27	16	15	3

3) How familiar would you say you are with each of the following explanations about the origin and development of life on earth -- very familiar, somewhat familiar, not too familiar, or not at all familiar? How about -- [ITEMS ROTATED]?

- Evolution

	Very familiar	Somewhat familiar	Not too familiar	Not at all familiar	No opinion
2007 Jun 1-3	41%	41	12	5	1

- Creationism

	Very familiar	Somewhat familiar	Not too familiar	Not at all familiar	No opinion
2007 Jun 1-3	50%	36	9	4	1

4) If a presidential candidate stated that he or she DID not believe in the theory of evolution, would that make you -- [ROTATED: much more likely to vote for that candidate, a little more likely, not make a difference either way, would it make you a little less likely, (or) much less likely to vote for that candidate]?

	Much more likely	A little more likely	Not make a difference	A little less likely	Much less likely	No opinion
Registered voters						
2007 Jun 1-3	8%	7	53	14	15	3
National adults						
2007 Jun 1-3	8%	7	54	13	15	3

5) Which of the following statements comes closest to your views on the origin and development of human beings -- [ROTATED: human beings have evolved over millions of years from other forms of life and God guided this process, human beings have evolved over millions of years from other forms of life, but God had no part in this process, or God created human beings in their present form exactly the way the Bible describes it]?

	Evolved, God guided	Evolved, God had no part	God created man exactly how Bible describes it	Other (vol.)	No opinion
2005 Sep 8-11	31%	12	53	1	3

(vol.) = Volunteered response

6) How much have you, personally, thought about these different explanations for how human beings came to exist on earth -- a great deal, a moderate amount, not much, or not at all?

	Great deal	Moderate amount	Not much	Not at all	No opinion
2005 Sep 8-11	41%	35	17	6	1

7) How much does it matter to you which of those theories is correct -- a great deal, a moderate amount, not much, or not at all?

	Great deal	Moderate amount	Not much	Not at all	No opinion
2005 Sep 8-11	40%	26	19	14	1

8) Which comes closer to your view about the relationship between science and religion -- they generally agree with each other, they generally conflict with each other, or they are not related to each other in any meaningful way?

	Agree with each other	Conflict with each other	Not related in a meaningful way	No opinion
2005 Sep 8-11	24%	35	36	5

9) On a different subject, do you think each of the following explanations about the origin and development of life on earth should or should not be taught in public school science classes, or are you unsure? How about -- [RANDOM ORDER]?

2005 Aug 8-11	Yes, should	No, should not	Unsure	No answer
Evolution	61%	20	19	*
Creationism	54%	22	23	1
Intelligent design	43%	21	35	1
* Less than 0.5%				

10) How familiar would you say you are with each of the following explanations about the origin and development of life on earth -- very familiar, somewhat familiar, not too familiar, or not at all familiar? How about -- [RANDOM ORDER]?

2005 Aug 5-7	Very familiar	Somewhat familiar	Not too familiar	Not at all familiar	No opinion
Evolution	45%	37	10	7	1
Creationism	45%	29	15	9	2

Intelligent design	17%	28	27	25	3

11) For each of the following, please say whether you believe it is -- [ROTATED: definitely true, probably true, probably false, (or) definitely false] as an explanation for the origin and development of life on earth? How about -- [RANDOM ORDER]?

Combined Responses:

2005 Aug 5-7	**Definitely true**	**Probably true**	**Probably false**	**Definitely false**	**Not familiar with**	**No opinion**
Creationism	29%	29	18	8	11	5
Evolution	20%	35	14	20	8	3
Intelligent design	8%	23	22	10	28	9

Summary Table:

2005 Aug 5-7	**Definitely/ Probably true**	**Definitely/ Probably false**	**Not familiar/ No opinion**
Creationism	58%	26	16
Evolution	55%	34	11
Intelligent design	31%	32	37

12) If the public schools in your community taught the theory of evolution, -- that is, the idea that human beings evolved from other species of animals -- would you be upset, or not?

AND:

If the public schools in your community taught the theory of creationism -- that is, the idea that human beings were created by God in their present form and did not evolve from other species of animals -- would you be upset, or not?

Combined Responses:

2005 Mar 21-23	
	%
Not upset if either taught	45
Upset if evolution taught, but not creationism	30
Upset if creationism taught, but not evolution	18
Upset if both taught	4
No opinion	3

13) Just your opinion, do you think that Charles Darwin's theory of evolution is -- [ROTATED: a scientific theory that has been well-supported by evidence, (or) just one of many theories and one that has not been well-supported by evidence], or don't you know enough about it to say?

	Supported by evidence	Not supported by evidence	Don't know enough to say	No opinion
2004 Nov 7-10	35%	35	29	1
2001 Feb 19-21	35%	39	25	1

14) How informed would you say you are about the theory of evolution? Do you feel that you are very informed about the theory of evolution, somewhat informed, only a little informed, or not informed at all?

	Very informed	Somewhat informed	Not too informed	Not informed at all	No opinion
2001 Feb 19-21	34%	47	11	6	2

How about creationism?

	Very informed	Somewhat informed	Not too informed	Not informed at all	No opinion
2001 Feb 19-21	40%	40	10	7	3

15) Would you say that you believe more in -- [ROTATED: the theory of evolution (or) the theory of creationism] to explain the theory of the origin of human beings, or are you unsure? Do you lean more towards -- [ROTATED: the theory of evolution (or) the theory of creationism]?

	Theory of evolution	Lean toward evolution	Lean toward creationism	Theory of creationism	No opinion
2001 Feb 19-21	28%	5	9	48	10

Summary: With roughly 40% of participants responding that the origins of human life was a topic they thought about a great deal, this study attempts to address various factors surrounding this polemic and important subject. On the whole, those who believe in creationism find themselves to be very informed on the topic (40%) and very familiar with it (50%). When asked to define both evolution and creationism, 39% felt comfortable responding “definitely true” to creationism’s definition; whereas only 18% of respondents felt comfortable doing the same for evolution’s definition. Correspondingly, evolution had lower numbers of familiarity and knowledge amongst participants, with only 34% reporting to being very informed on it and 41% saying they were comfortable with their knowledge of the theory. Despite the overall lack of understanding regarding the evolution theory, only 61% thought evolution should be taught in public high school science classes. Therefore, there seems to be a cyclical nature with regards to the nation’s lack of understanding regarding evolution, and an unwillingness to directly address the issue in science classes.

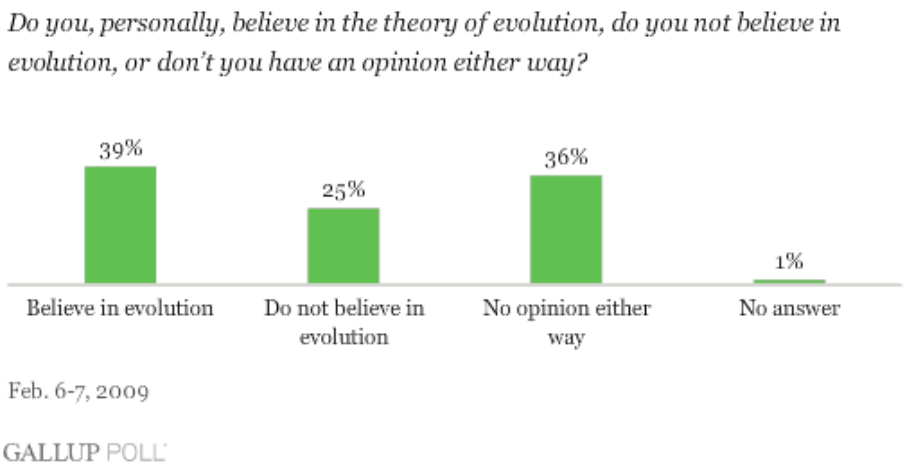
6) Newport, F. (2009, February 11). *Gallup*. Retrieved from http://www.gallup.com/poll/114544/Darwin-Birthday-Believe-Evolution.aspx

UNITED STATES (adults); n=1,018

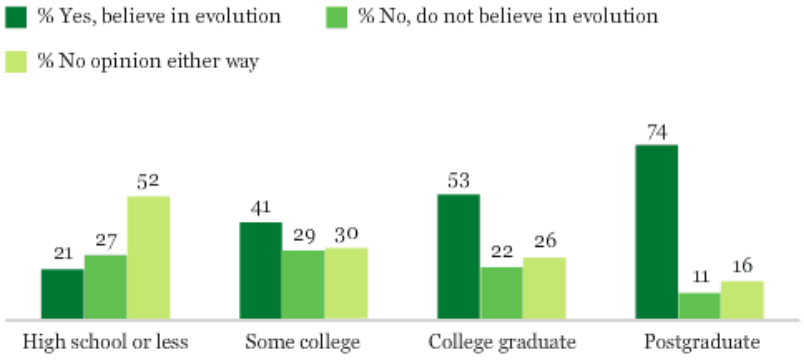
"Results are based on telephone interviews with 1,018 national adults, aged 18 and older, conducted Feb. 6-7, 2009, as part of Gallup Poll Daily tracking." The maximum margin of sampling error is estimated to be around +/- three percentage points.

Questions:

1) Do you, personally, believe in the theory of evolution, do you not believe in evolution, or don't you have an opinion either way?
    - **39%** believe in evolution
    - **25%** do not believe in evolution
    - **36%** have no opinion either way
    - **1%** refused to answer
    - **21%** of those with a high school degree or less believe in evolution, while **74%** of those with a postgraduate believe in evolution
    - Only **24%** of those who attend church weekly believe in evolution, **30%** of those who attend nearly weekly or monthly, and **55%** of those who seldom or never attend church
    - **49%** of participants in the age group 18 to 34 believe in evolution, **39%** with the ages 35 to 54, and only **31%** of those age 55 and older



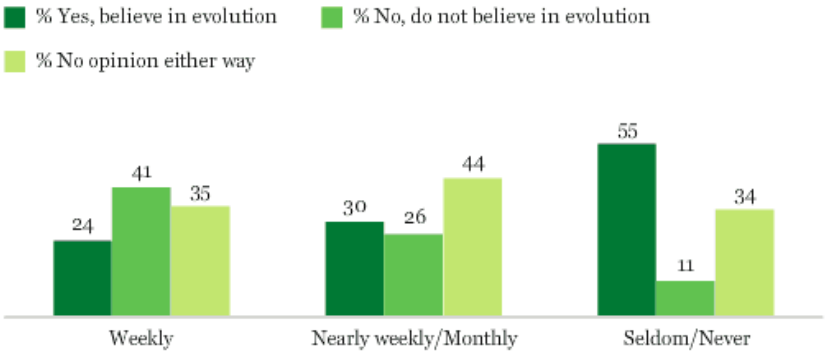
Belief in Evolution, by Education Level



Feb. 6-7, 2009

GALLUP POLL

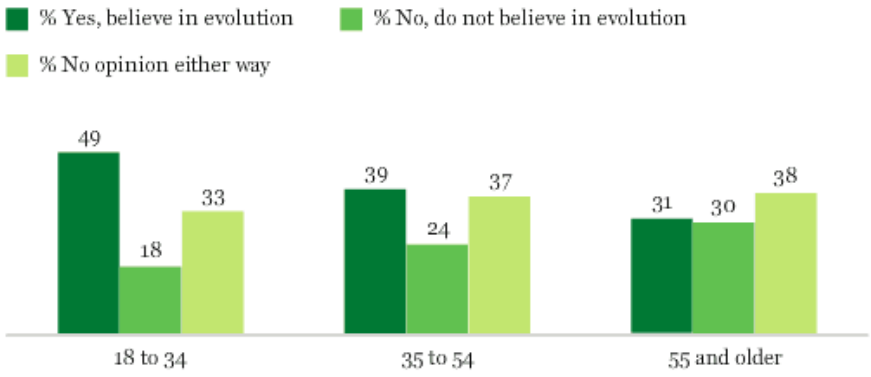
Belief in Theory of Evolution, by Church Attendance



Feb. 6-7, 2009

GALLUP POLL

Belief in Theory of Evolution, by Age

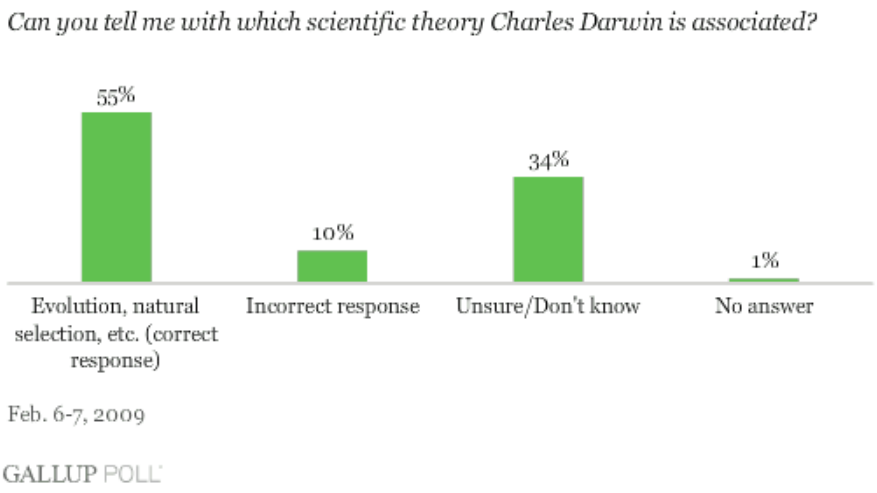


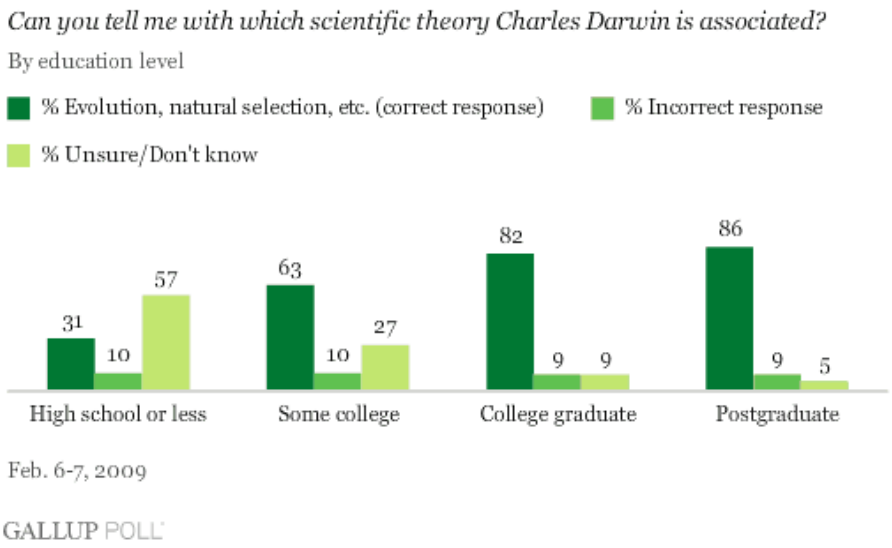
Feb. 6-7, 2009

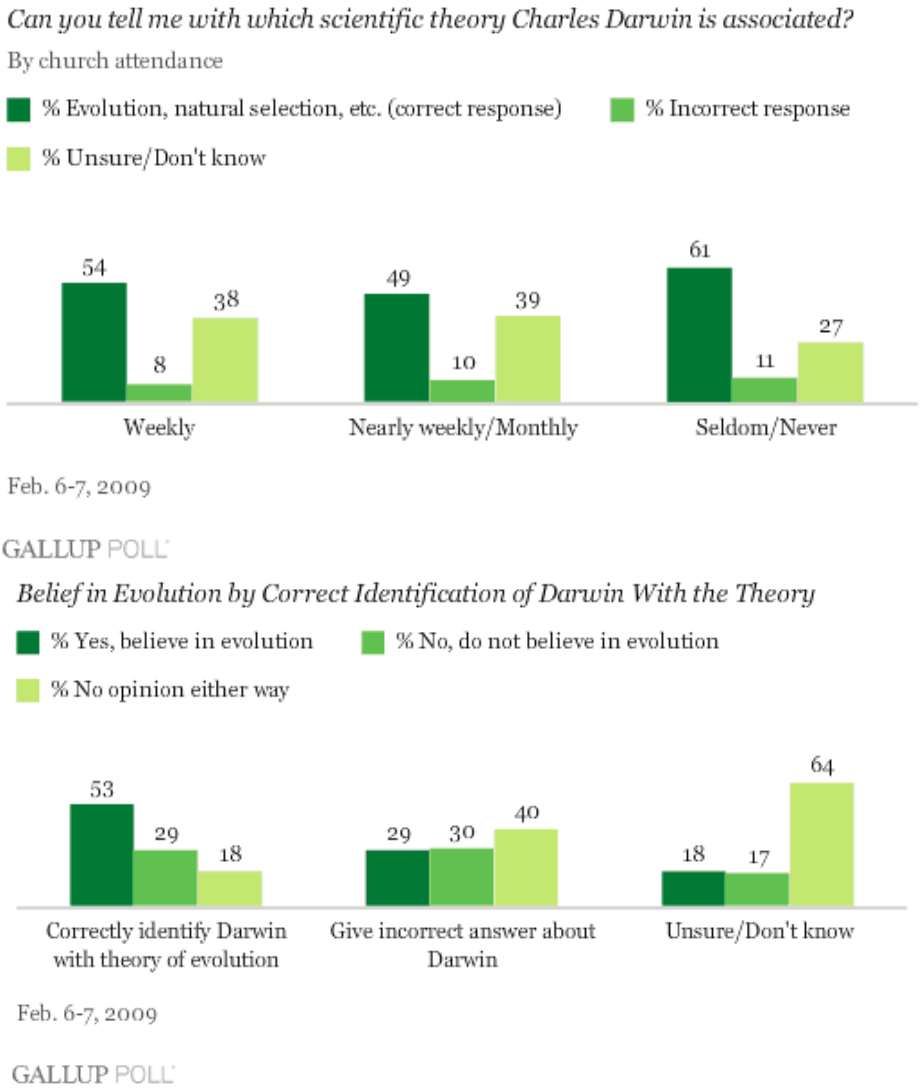
GALLUP POLL

2) Can you tell me with which scientific theory Charles Darwin is associated?
   - **55%** correctly answered "evolution, natural selection, etc."

- **10%** gave the incorrect response
- **34%** were unsure
- **1%** did not answer
- Correct identification is only **31%** with a high school degree or less, but **86%** amongst those with a postgraduate degree
- **54%** of participants who attend church regularly answered correctly, and **61%** of those who seldom or never visit church answered correctly
- **53%** of those correctly associated Darwin with evolution actually *believe* in evolution
- **29%** of those who answered incorrectly regarding Darwin's theory then in turn believed in evolution







Summary: This poll specifically observes Americans' knowledge regarding the theory of evolution and Charles Darwin, as well as their belief in his work. While 55% of Americans were able to correctly associate Darwin with the theories of evolution and natural selection, only 39% say they believe in his theory, less than half. The study attempts to reveal causes of such percentages by observing educational backgrounds, age groups, and church attendance. They find that "Americans who have lower levels of formal education are significantly less likely than others to be able to identity Darwin with his theory, and to have an opinion on it either way." Religion as well becomes a strong predictor of attitude towards Darwin and his theory since those who attend church most frequently (weekly or regularly) are the least likely to believe in evolution. Thus, this Gallup Poll makes the relationship between religious beliefs and acceptance of evolution very clear, while also assessing public knowledge surrounding Darwin and his work.

7) (2009, December 15). *The Harris Poll*. Retrieved from http://www.harrisinteractive.com/vault/Harris_Poll_2009_12_15.pdf

UNITED STATES (adults); n=2,303

2,303 adults were surveyed online between November 2nd and 11th, 2009. "Respondents for this survey were selected from among those who have agreed to participate in Harris Interactive surveys."

- 82% of respondents believe in God, the same number as the Harris polls from 2005 and 2007
- 45% believe in Darwin's theory of evolution
- "Large majorities also believe in miracles (76%), heaven (75%), that Jesus is God or the Son of God (73%), in angels (72%), the survival of the soul after death (71%), and in the resurrection of Jesus (70%)."
- 61% believe in hell
- 61% believe in the virgin birth
- 60% believe in the devil
- 42% believe in ghosts
- 32% believe in UFOs
- 26% believe in astrology
- 23% believe in witches
- 20% believe in reincarnation- that they were once another person
- Catholics:
    - More likely to believe in God than all adults (94% compared to 82%)
    - However, they are also somewhat more likely to believe in Darwin's theory of evolution (51% compared to 45%)
- Protestants:
    - Also more likely to believe in God than all adults, though less than Catholics (92% compared to 82%)
    - They are more likely than all adults to believe in creationism as well (56% vs. 40%)
    - Correspondingly, they are less likely than the average adult to believe in Darwin's theory of evolution (32% vs. 45%)
- Born-again Christians:
    - Much more likely to believe in God than all adults (97%)
    - Also more likely to believe in creationism (68% vs. 40%)
    - Less likely to believe in Darwin's theory (16% vs. 45%)
- Jews:
    - Less likely than all adults to believe in miracles, heaven, the survival of the soul, angels, hell, and the devil
    - By far the most likely to believe in Darwin's theory of evolution (80% vs. 45%)
    - Least likely to believe in creationism (20% vs. 40%)

- "Many people consider themselves Christians without necessarily believing in some of the key beliefs of Christianity. However, this is not true of born-again Christians."
- "In addition to their religious beliefs, large minorities of adults, including many Christians, have 'pagan' or pre-Christian beliefs such as a belief in ghosts, astrology, witches and reincarnation."

TABLE 1
WHAT PEOPLE DO AND DO NOT BELIEVE IN

"Please indicate for each one if you believe in it, or not"
Base: All Adults

		Believe In		Don't Believe In	Not Sure	Believe In		Change
						2005	2007	2005-2009
God	%	82		9	9	82	82	-
Miracles	%	76		13	12	73	79	+3
Heaven	%	75		13	12	70	75	+5
Jesus is God or the Son of God	%	73		16	11	70	72	+3
Angels	%	72		15	12	68	74	+4
Survival of the soul after death	%	71		10	19	70	69	+1
The resurrection of Jesus Christ	%	70		17	13	66	70	+4
Hell	%	61		24	16	59	62	+2
The Virgin birth (Jesus born of Mary)	%	61		22	17	58	60	+3
The Devil	%	60		27	13	61	62	-1
Darwin's theory of evolution	%	45		32	22	N/A	42	N/A
Ghosts	%	42		38	20	40	41	+2
Creationism	%	40		30	30	N/A	39	N/A
UFOs	%	32		39	29	34	35	-2
Astrology	%	26		52	22	25	29	+1
Witches	%	23		59	17	28	31	-5
Reincarnation – that you were once another person	%	20		53	28	21	21	-1

TABLE 2
WHAT PEOPLE BELIEVE IN – BY RELIGION

"Please indicate for each one if you believe in it, or not"
Base: All Adults

	Total	Religion			
		Catholic	Protestant	Jewish	Born-Again Christian
	%	%	%	%	%
God	82	94	92	79	97
Miracles	76	81	87	63	95
Heaven	75	86	90	48	97
Jesus is God or the Son of God	73	90	91	6	97
Angels	72	83	88	36	95
Survival of the soul after death	71	82	85	37	91
The resurrection of Jesus Christ	70	87	88	5	97
Hell	61	70	73	21	89
The Virgin birth (Jesus born of Mary)	61	74	79	5	92
The Devil	60	69	77	7	89
Darwin's theory of evolution	45	51	32	80	16
Ghosts	42	44	33	10	37
Creationism	40	37	56	20	68
UFOs	32	32	26	20	25
Astrology	26	26	20	19	21
Witches	23	22	23	8	27
Reincarnation – that you were once another person	20	19	13	18	14

Summary: This poll gathers percentages of sampled Americans who indicate various religious beliefs as well as their belief in other supernatural phenomena, such as UFOs and ghosts. Broadly, the poll reveals that more "Many more people believe in miracles, angels, hell and the devil than in Darwin's theory of evolution…" While 45% of respondents reported believing in evolution, 61% reported believing in hell and 60% report believing in the devil. Additionally, the data indicates that certain religious groups are more likely to believe in the theory of evolution than others. For example, the Jewish population reports the highest percentages for belief in evolution (80%), while Born-again Christians report the lowest with only 16% saying they believe in the theory. Overall, the poll demonstrates the effect that religious belief has on the acceptance of the theory of evolution while also looking at its relationship to other "pagan" beliefs.

8) (2009, April 1). *Louisiana State University: The Public Policy Research Lab*. Retrieved from http://www.survey.lsu.edu/downloads/2009lasurveyreport_final.pdf

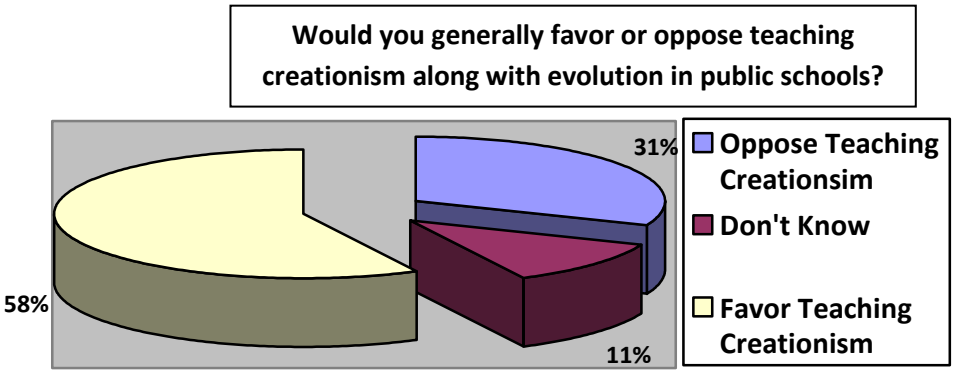
UNITED STATES (Louisiana residents); n=993

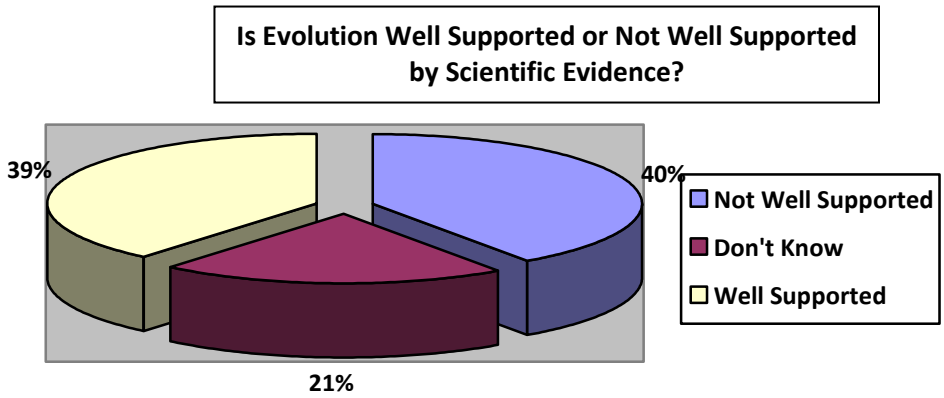
"Our first sampling frame was based on random digit dialing of landline telephone numbers. The second sampling frame came from identifiable blocks of Louisiana cell phone numbers. Responses to this block of numbers include both wireless-only respondents and dual users, respondents with both a landline and cell phone number." "The combined survey includes 993 respondents including 567 respondents selected from the landline telephone survey and 426 respondents selected from available cell phone blocks. The overall survey has a margin of error of +/- 3.1 percentage points and the landline survey has a margin of error of +/- 4.1 percentage points."

Questions:

1) When teaching students about human origins, would you generally favor or oppose teaching creationism along with evolution in public schools? (LANDLINE SURVEY ONLY – N=567).
    - Don't know-- **11.4%**
    - Favor teaching creationism-- **57.5%**
    - Oppose teaching creationism-- **31.0%**
2) Do you think the scientific theory of evolution is well supported by evidence and widely accepted within the scientific community, or that it is not well supported by evidence and many scientists have serious doubts about it? (LANDLINE SURVEY ONLY – N=567).
    - Don't know-- **20.9%**
    - Well supported-- **38.8%**
    - Not well supported-- **40.3**
3) Have you ever contacted a public official, written a letter to a newspaper, or attended a public meeting to express your opinion about the teaching evolution in Louisiana public schools? (LANDLINE SURVEY ONLY – N=567).
    - Don't know--1.0%
    - Yes--10.5%
    - No--88.5%
4) And have you ever been encouraged by a religious leader, pastor, or minister to support or oppose the teaching of creationism or intelligent design in Louisiana public schools? (LANDLINE SURVEY ONLY – N=567)
    - Don't kno--1.0%
    - Yes--14.7%
    - No--84.3%

- A majority of Louisianans, or 57.5%, support teaching creationism in the public schools
- 31% oppose teaching creationism
- 11% are unsure or do not know how
- 40.3% of respondents said that evolution is not well supported by evidence and accepted in the scientific community
- While 38.8% believe that evolution is well supported
- 20.9% said they did not know or were unsure as to the evidence for evolution





Summary: While Louisiana State University primarily conducted this survey to measure public opinion on the state and its public policies, a number of questions are pertinent to the issue of evolution. Large percentages of Louisiana residents favored teaching creationism in public schools (58%), and did NOT believe that evolution was well supported (40%). In each case, these were the majority view held by Louisianans. Furthermore, small percentages of respondents reported both contacting a public official or another source in order to express their opinion about teaching evolution, as well as having been encouraged by a religious leader to either support or oppose the teaching of creationism or I.D. in the classroom (10.5% and 14.7% respectively). These numbers demonstrate the strong tendency to both believe in creationism and advocate the teaching of it in classrooms amongst Louisianans.

9) (2008, January). "Evolution and its discontents: A role for scientists in science education." *The Journal of the Federation of American Societies for Evolutionary Biology, 22*. Retrieved from http://www.fasebj.org/content/22/1/1.full

UNITED STATES (adults); n=1,000

A coalition of 17 scientific societies and various science teachers hired a professional research firm to conduct this survey, which involved asking 1,000 likely US voters their opinions on evolution, science, and science education.

Questions:

1) What's your view on evolution of all living things?

- Asked half respondents:
  - 61% accepted that "all living things have evolved over time."
  - Of those, 36% thought that all living things, "evolved due to natural processes such as natural selection."
  - 25% though "a supreme being guided the evolution of living things for the purpose of creating life in the form it exists today."
- Other half:
  - 53% accepted that "humans and other living things" evolved.
  - 32% this happened through natural processes, and 21% thought they evolved with guidance
- 28% and 31% respectively agreed with statements that "all living things" or "humans and other living things" were created in their present form

2) What is your opinion on the teaching of human origins?

  - 32% were unsure about the teaching of creationism
  - 41% were unsure about teaching intelligent design
  - 22% expressed uncertainty about teaching evolution
  - "…more respondents favored teaching evolution (53%) than creationism (36%) or intelligent design (27%) in public school science classes."

3) Asked to respond to the following three scientific statements:

- The continents or land masses on which we live have been moving for millions of years and will continue to move in the future
  - 79% correctly agreed
- Antibiotics kill viruses as well as bacteria
  - 43% correctly disagreed
- The earliest humans lived at the same time as dinosaurs
  - 53% correctly disagreed
- "Respondents who answered all three questions correctly were much more likely to respond that humans and other living things evolved (78%) rather than that they were created in their present form (11%), and more favored teaching evolution (78%) than creationism (27%) or intelligent design (24%)."

4) Opinions on the contributions of science to society:

  - 63% said developing medicines and curing diseases was the most important contribution

    - " Proponents of teaching evolution (65%), creationism (62%), or intelligent design (63%) were equally likely to view these contributions as science's most important."
- "…61% thought that understanding the contribution that evolution makes to modern medical science, including understanding and treating diseases such as avian influenza, was a convincing reason to teach evolution in science classes."
- "A majority of respondents rated learning to draw conclusions from evidence (80%), to think critically (78%), and how science is conducted (63%) as very important purposes of public school science education."

5) Opinions on role of scientific community and importance of science education:
    - "Sixty-nine percent of respondents had favorable feelings toward scientists, and even more viewed medical researchers (72%) and doctors (76%) favorably."
    - "While fewer people (59%) rated public school science teachers highly, public school teachers in general were the most widely favored group (79%)."
    - When presented with a list of people who could explain science to the public, "88% expressed interest in hearing from a scientist, and almost as many were interested in hearing from a science teacher (85%) or a doctor or nurse (84%)."
    - "On the topics of evolution, creationism, and intelligent design, most respondents expressed interest in hearing from scientists (77%), science teachers (76%), and clergy (62%). Fewer people were interested in hearing from Supreme Court Justices on evolution (37%) or from school board members and celebrities on science (34% and 16%, respectively) and evolution (30% and 11%, respectively)."

Summary: While this survey initially focuses on gauging public acceptance of evolution, it later more broadly addresses the scientists' role in public science education. While about two thirds (61%) of respondents agreed to the statement that all living things had evolved over time (this includes evolutionary theory and intelligent design), nearly a third (28% and 31%) reported to believe that humans and other living things were created in their present form. However, much less dissent was reported in regards to the importance of scientists and their contributions to society. A vast majority of participants saw scientific contributions to medicine as very important, and thought that understanding the contribution that evolution makes to modern medical science was a convincing reason to teach evolution in science classes. Therefore, there lies an opportunity for scientists to reach out to the public and help explain the evolutionary theory and its importance. "In communicating the value of science, scientists must emphasize the outcomes that matter to people— advancing medicine, improving health, fostering critical thinking—and they must do so clearly and understandably."

10) Newport, F. (2008, June 20). *Gallup*. Retrieved from http://www.gallup.com/poll/108226/Republicans-Democrats-Differ-Creationism.aspx

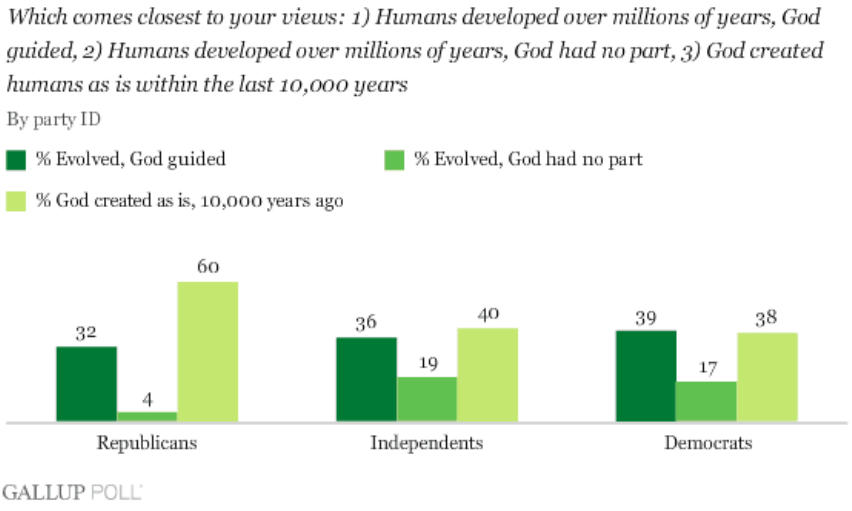
UNITED STATES (adults); n=1,017

The survey consists of 1,017 telephone interviews (both land line and cellular) with national adults, aged 18 and older, that were conducted between May 8th and 11th, 2008. They say with 95% confidence that the maximum margin of sampling error is ±3 percentage points.

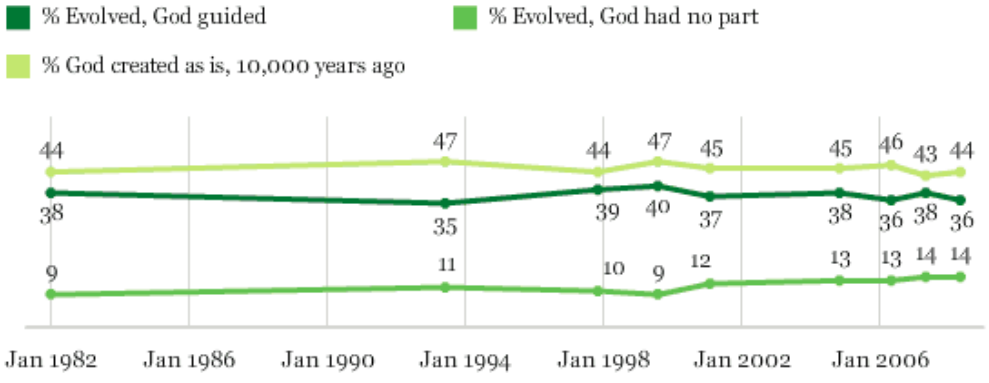
Questions:

1) Which comes closest to your views?
    - Humans developed over millions of years, God guided
    - Humans developed over millions of years, God had no part
    - God created humans as is within the last 10,000 years

- 60% of Republicans say humans were created by God 10,000 years ago in their present form
    - 40% of Independents
    - 38% of Democrats
- "Between 43% and 47% of Americans have agreed during this 26-year time period with the creationist view that God created human beings pretty much in their present form at one time within the last 10,000 years or so."
- "Between 35% and 40% have agreed with the alternative explanation that humans evolved, but with God guiding the process…" in the past 26 years.
- In the past 26 years, "9% to 14% have chosen a pure secularist evolution perspective that humans evolved with no guidance by God."
- Republicans are significantly more likely to attend church weekly than are others, and Americans who attend church weekly are highly likely to select the creationist alternative for the origin of humans



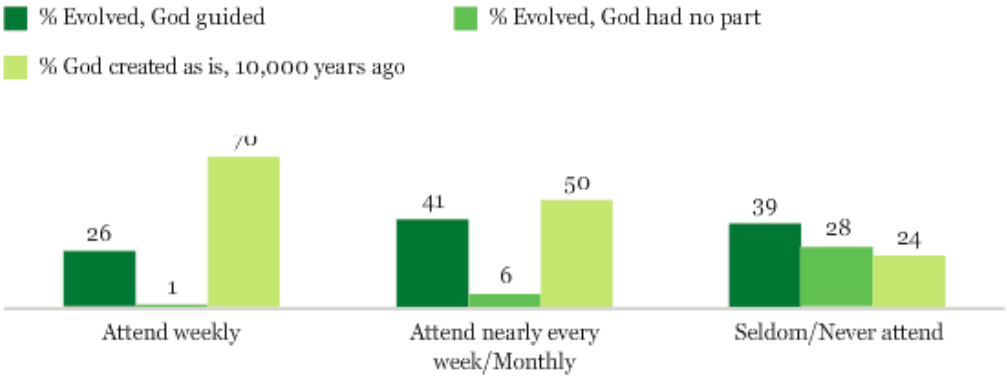
Which comes closest to your views: 1) Humans developed over millions of years, God guided, 2) Humans developed over millions of years, God had no part, 3) God created humans as is within the last 10,000 years



GALLUP POLL

Which comes closest to your views: 1) Humans developed over millions of years, God guided, 2) Humans developed over millions of years, God had no part, 3) God created humans as is within last 10,000 years

By church attendance



GALLUP POLL

Summary: This Gallup poll specifically observes the relationship between political party and belief in creationism. Unsurprisingly, Republicans are both more likely to attend church on a regular basis and more likely to side with creationism. Since the percentage of overall Americans who believe in creationism has changed little in the past 26 years, the stance a candidate takes on this issue has the potential to greatly affect voter turnout and support from conservative Republicans.

11) Plutzer, E., & Berkman, M. (2008, August 18). "Evolution, creationism, and the teaching of human origins in schools." *Public Opinion Quarterly, 72(3)*, 540-553. Retrieved from http://poq.oxfordjournals.org/content/72/3/540.abstract

UNITED STATES (adults); 431<n<2812

Their analysis incorporates questions from 10 different Gallup polls, 5 Harris polls, 8 from the ongoing NSF-funded survey of scientific literacy, 4 from the NORC General Social Survey, and 13 additional commercial and academic survey organizations. "The polls span a period from 1981 through March 2007."

Questions:

1) True or False: Human beings, as we know them today, developed from earlier species of animals.
    - "…across three different question formats we can say that roughly 45–50 percent of the public believes that human beings evolved from earlier species."
2) Do you believe apes and man have a common ancestry or not?
    - Between 46 and 51% say "yes"
3) In your opinion, how true is this: human beings developed from earlier species of animals? (In the Gallup poll, this read: For each of the following, please say whether you believe it is—definitely true, probably true, probably false, definitely false as an explanation for the origin and development of life on the earth?)
    - Survey finds that "…from 1993 through 2005 roughly 15 percent of the public believes it is *definitely true* that humans "developed from earlier species of animals" while roughly 30 percent believes it is *probably true*."
    - "The ordinal response categories reveal that the equivocation among evolution supporters is *not mirrored among evolution skeptics,* as those who believe that humans *definitely* did not develop from earlier species outnumber those who say evolution is *probably not true* by a factor of 2 to 1."
4) Which of the Following Statements Comes Closest to Your Views on the Origin and Development of Human Beings? (1) Human Beings Have [Man Has] Developed over Millions of Years from Less Advanced Forms of Life, but God Guided This Process. (2) Human Beings Have [Man Has] Developed over Millions of Years from Less Advanced Forms of Life, but God Had no Part in This Process. (3) God Created Human Beings [Man] Pretty much in Their Present Form at One Time within the Last 10,000 Years or so
    - On average, 47% of Americans take the literal Biblical view—creationism
    - "In this series, running from 1982 to 2006, the percentage of the public that believes in evolution *unguided by God* never exceeds 17 percent."
5) Which Do You Think Is a More Likely Explanation for the Origin of Human Life on the Earth—the Biblical Account of Creation or Darwinian Evolution?

- "This question elicits the lowest support of evolution of any item we have seen. We suspect that this is because the adjective 'Darwinian' has connotations that are incompatible with a belief in evolution that is guided by God."

6) Please Tell Me Whether You Agree or Disagree with the Following Statement: "Darwin's Theory of Evolution Is Proven by Fossil Discoveries"

   - Percentage of those who agree (either strongly or somewhat) falls just short of the majority
   - "The marginals reported here (from the Harris Interactive web site) show the same kind of asymmetry as we saw in table 3 on a different question: those agreeing that the evidence supports evolution are not quite certain but among those who disagree, about two-thirds do so strongly."

7) Just Your Opinion, Do You Think That Charles Darwin's Theory of Evolution Is a Scientific Theory That Has Been Well Supported by Evidence, or Just One of the Many Theories and One That Has Not Been Well Supported by Evidence, or Don't You Know Enough about It to Say?

   - "…a quarter or more of the public admit to not knowing enough to offer an opinion. When compared to the results from the Harris polls reported in table 6, it appears that the "don't know" category draws evenly from both of the primary response categories."

8) How Informed [Familiar with] Would You Say You Are about the Theory of Evolution, Somewhat Informed, only a Little Informed, or Not Informed at all?

   - Just over a third of the public reports being "very informed" about the theory of evolution (table 8) and 40 percent "very informed" about "the theory of creationism" (table 9). Combined with the high percentages of "don't know" responses when offered as an explicit alternative (table 7), it is clear that levels of knowledge are relatively low.

9) Same question as number 8, but survey taken in 2001.

   - The results are similar

10) Do you believe that is possible or not possible to believe in both God and Evolution?

    - Approximately 35 percent of the public believes that it is "not possible to believe in both God and evolution."

11) Do You Favor or Oppose Making It Mandatory to Teach the Biblical Version of Evolution in the Classrooms as well as Darwinian Scientific Theory Which Is Now Taught?

12) Would You Generally Favor or Oppose Teaching Creation *along with* Evolution in Public Schools?

    - "Overall, nearly two-thirds of the public endorses teaching creationism *along with* evolution when evolution alone is the implied alternative."

13) Would You Generally Favor or Oppose Teaching Creation *Instead of* Evolution in Public Schools?

    - "…a third or more consistently endorse *replacing* evolution's place in the science curriculum with biblical creationism."

14) Do You Think Public Schools Should Teach only the Scientific Theory of Evolution, only the Biblical Theory of Creation, or Should Schools Offer Both Theories?

- "…recent polls suggest that only 12–15 percent of the public endorses the status quo policy in their state, with substantial majorities favoring inclusion of religion-based alternatives."
- "…there is a disconnect between public opinion and public policy."

Tables 1
National Science Foundation: Now, I Would like to Ask You a Few Short Quiz-Type Questions Such as You Might See on a Television Game Show. For Each Statement That I Read, Please Tell Me if It Is True or False. Human Beings, as We Know Them Today, Developed from Earlier Species of Animals. Is That True or False?

Date	True (%)	False (%)	Don't know (%)	*N*
NSF 11/85	45	47	6	2,003
NSF 6/88	46	43	11	2,041
NSF 9/90	45	41	14	1,744
NSF 11/92	45	42	14	1,995
Harris 2/16/94–3/6/94[a]	44	46	11	1,255
NSF 3/95	44	40	16	2,006
NSF 5/97	44	40	15	2,000
NSF 3/99	45	39	15	1,882
NSF 2/01[b]	53	34	12	1,574
Harris 6/17/05–6/21/05[a]	38	54	8	1,000

- NSF, National Science Foundation Survey of Scientific Literacy conducted by Northern Illinois University and ORC-Macro; Harris, Harris Poll.

Table 2
Do You Believe Apes and Man Have a Common Ancestry or Not?

Date	Do (%)	Do not (%)	Don't know (%)	*N*
7/15/96–7/21/96	51	43	5	1,004
6/17/05–6/21/05	46	47	7	1,000

- Harris Poll

Table 3
NORC-GSS: For Each Statement Below, just Check the Box That Comes Closest to Your Opinion of How True It Is. In Your Opinion, How True Is This? Human Beings Developed from Earlier Species of Animals

Date	Definitely true (%)	Probably true (%)	Probably not true (%)	Definitely not true (%)	Can't choose (%)	*N*
NORC 2/5/93–4/26/93	14	30	14	34	8	1,350
NORC 1/27/94–5/1/94	10	30	17	31	8	1,228
NORC 2/1/00–5/15/00	14	28	16	33	10	1,095
NORC 8/18/04–1/4/05	15	30	15	39	2	1,406
Gallup 8/5/05–	20	35	14	20	11	1,004

Date	Definitely true (%)	Probably true (%)	Probably not true (%)	Definitely not true (%)	Can't choose (%)	*N*
8/7/05[a]						

- NORC, National Opinion Research Center General Social Survey; Gallup, Gallup Poll and Gallup/CNN/USA Today.

Table 4
Gallup: Which of the Following Statements Comes Closest to Your Views on the Origin and Development of Human Beings? (1) Human Beings Have [Man Has] Developed over Millions of Years from Less Advanced Forms of Life, but God Guided This Process. (2) Human Beings Have [Man Has] Developed over Millions of Years from Less Advanced Forms of Life, but God Had no Part in This Process. (3) God Created Human Beings [Man] Pretty much in Their Present Form at One Time within the Last 10,000 Years or so

Date	Evolution unguided by God (%)	Evolution guided by God (%)	Creation by God within last 10,000 years (%)	Other or don't know (%)	*N*
Gallup 7/23/82–7/26/82	9	33	38	20	1,518
Gallup 11/21/91–11/24/91	9	40	47	4	1,005
Gallup 6/18/93–6/21/93	11	35	47	6	1,003
Gallup 11/6/97–11/9/97	10	39	44	6	1,003
Gallup 8/24/99–8/26/99	9	40	47	3	1,028
Gallup 2/19/01–2/21/01	12	37	45	5	1,016
NORC 8/18/04–1/4/05[a]	12	41	42	6	2,812
Gallup 11/7/04–11/10/04	13	38	45	4	1,016
CBS/NYT 11/18/04–11/21/04[b]	13	27	55	5	885
PSA 12/2/04–12/3/04[c]	11	36	47	6	1,009
CBS 10/3/05–10/5/05[b]	15	29	48	8	808
CBS 10/3/05–10/5/05[d]	15	30	51	4	808
Gallup 5/8/06–5/11/06	13	36	46	5	1,002
CBS 4/6/06–4/9/06[b]	17	30	44	9	431
CBS 4/6/06–4/9/06[d]	17	23	53	7	468
PSA 3/28/07–3/29/07[c]	13	30	48	9	1,004

- Gallup, Gallup Poll and Gallup/CNN/USA Today; NORC, National Opinion Research Center General Social Survey; CBS/NYT, CBS/New York Times; PSA, Princeton Survey Associates; CBS, CBS News Poll.

Table 5
Which Do You Think Is a More Likely Explanation for the Origin of Human Life on the Earth—the Biblical Account of Creation or Darwinian Evolution?

Date	Darwinian evolution	Biblical account	God created and then evolution (volunteered %)	Neither or don't know (%)	*N*
2/9/97–4/13/97	21	59	6	14	1,225
2/4/98–3/22/98	29	56	6	10	1,257

- Southern Focus

Table 6
Please Tell Me Whether You Agree or Disagree with the Following Statement. “Darwin's Theory of Evolution Is Proven by Fossil Discoveries”

	1/04 (*N* = 1000)	6/17/05–6/21/05 (*N* = 1004)
Strongly agree (%)	19	15
Somewhat agree (%)	24	30
Somewhat disagree (%)	16	19
Strongly disagree (%)	35	29
Don't know (%)	6	6

- Harris Poll

Table 7
Just Your Opinion, Do You Think That Charles Darwin's Theory of Evolution Is a Scientific Theory That Has Been Well Supported by Evidence, or Just One of the Many Theories and One That Has Not Been Well Supported by Evidence, or Don't You Know Enough about It to Say?

Date	Well supported by evidence (%)	Just one theory not well supported (%)	Don't know (%)	*N*
Gallup 2/19/01–2/21/01	35	39	25	1,016
Gallup 11/7/04–11/10/04	35	35	29	1,016
Charlton 12/10/04–12/13/04	34	35	31	800

- Gallup, Gallup Poll and Gallup/CNN/USA Today; Charlton, Research!America Poll conducted by Charlton Research

Table 8
How Informed [Familiar with] Would You Say You Are about the Theory of Evolution, Somewhat Informed, only a Little Informed, or Not Informed at all?

Date	Very familiar/ informed (%)	Somewhat familiar/ informed (%)	Not too familiar/ informed (%)	Not at all familiar/ informed (%)	*N*
2/19/01–2/21/01[a]	34	47	11	6	1,016
8/5/05–8/7/05[b]	45	37	10	7	1,004

- Gallup Poll

Table 9
How Informed [Familiar with] Would You Say You Are about the Theory of Creationism, Somewhat Informed, only a Little Informed, or not Informed at All?

Date	Very familiar/ informed (%)	Somewhat familiar/ informed (%)	Not too familiar/ informed (%)	Not at all familiar/ informed (%)	*N*

Date	Very familiar/ informed (%)	Somewhat familiar/ informed (%)	Not too familiar/ informed (%)	Not at all familiar/ informed (%)	*N*
2/19/01–2/21/01[a]	40	40	10	7	1,016
8/5/05–8/7/05[b]	45	29	15	9	

- Gallup Poll

Table 10
Do You Believe That It Is Possible or Not Possible to Believe in Both God and Evolution?

Date	Possible (%)	Not possible (%)	Don't know/NA (%)	*N*
Time/YSW 12/2/81–12/4/81	57	36	7	1,007
CBS 10/3/05–10/5/05	67	29	4	808
CBS 4/6/06–4/9/06	62	33	5	899

- Time/YSW, Time magazine poll conducted by Yankelovich, Skelly, and White; CBS, CBS News Poll.

Table 11
Time or Time/CNN: Do You Favor or Oppose Making It Mandatory to Teach the Biblical Version of Evolution in the Classrooms as well as Darwinian Scientific Theory Which Is Now Taught?

Date	Favor (%)	Oppose (%)	Don't know (%)	*N*
Time 9/15/81–9/17/81	50	40	10	1,222
Time 7/23/85–7/25/85	52	39	10	1,013
Time/CNN 9/19/91–9/20/91	53	39	8	500
Time/CNN 10/10/91	47	41	12	500
Time/CNN 1/22/93–1/25/93	55	37	8	1,800

- Time/CNN, Time/CNN poll conducted by Yankelovich, Clancy, and Shulman (before 1992) or Yankelovich Partners (after 1992).

Table 12
Would You Generally Favor or Oppose Teaching Creation *along with* Evolution in Public Schools?

Date	Favor (%)	Oppose (%)	Don't know (%)	*N*
SF 2/4/98–2/24/98[a]	67	27	6	1,257
Gallup 6/25/99–6/27/99[b]	68	29	3	1,016
CBS/NYT 11/18/04–11/21/04	65	29	6	885
Newsweek 12/2/04–12/3/04	60	28	12	1,009
Pew 3/17/05–3/27/05	57	33	10	1,090
Pew 7/7/05–7/17/05	64	26	10	2,000
Pew 7/6/06–7/19/06	58	35	7	996

- SF, Southern Focus Poll, Institute for Research in Social Science, University of North Carolina; Gallup, Gallup Poll and Gallup/CNN/USA Today; CBS/NYT, CBS News Poll /New York Times; PSA/Newsweek, Newsweek poll conducted by

Date	Favor (%)	Oppose (%)	Don't know (%)	*N*

Princeton Survey Associates.

Table 13
Would You Generally Favor or Oppose Teaching Creation *Instead of* Evolution in Public Schools?

Date	Favor (%)	Oppose (%)	Don't know (%)	*N*
6/25/99–6/27/99 (Gallup)	44	50	5	1,016
11/18/04–11/21/04 (CBS/NYT)	37	51	12	885
12/2/04–12/3/04 (PSA/Newsweek)	40	44	16	1,009
3/17/05–3/27/05 (Pew)	33	54	13	1,090
7/7/05–7/17/05 (Pew)	38	49	13	2,000

- Gallup, Gallup Poll and Gallup/CNN/USA Today; CBS/NYT, CBS/New York Times; PSA/Newsweek, Newsweek poll conducted by Princeton Survey Associates.

Table 14
NBC/AP: Do You Think Public Schools Should Teach only the Scientific Theory of Evolution, only the Biblical Theory of Creation, or Should Schools Offer Both Theories?

Date	Evolution only (%)	Both/all/ combination (%)	Biblical creation only (%)	Intelligent design only (%)	*N*
NBC/AP 10/25/81–10/26/81[a]	8	76	10	–	1,598
CCD 12/1/87–12/15/87[b]	11	69	11	–	1,889
Harris 6/17/05–6/21/05[c]	12	55	23	4	1,000
VCU 9/14/05–9/29/05[d]	15	47	21	5	1,002

- NBC/AP, NBC/Associated Press poll conducted by Peter Hart; CCD, Center for Communication Dynamics for the Williamsburg Charter Association; Harris, Harris Poll; VCU, Virginian Commonwealth University Life Sciences Survey.

Summary: This essay compiles a number of polls, ranging in date from 1981to March 2007, which question respondents on issues concerning evolution. Some of the interesting trends include the fact that, “the equivocation among evolution supporters is *not mirrored among evolution skeptics,* as those who believe that humans *definitely* did not develop from earlier species outnumber those who say evolution is *probably not true* by a factor of 2 to 1.” This lack of confidence in evolution can also be reflected by the fact that only a third of the public responds to agrees to being “very informed” about the theory of evolution. Meanwhile, less than a majority of respondents believe that Darwin’s theory of evolution is well supported by evidence. Despite the lack of general knowledge on the topic, however, a third or more of the respondents consistently voted for *replacing* evolution’s place with creationism in the science curriculum. A possible explanation for this could be the fact that approximately 35% of the public does not believe that it is possible to believe in both God and Evolution.

12) (2008, January 26). "You say you want an evolution? A role for scientists in science education." *Elsevier* and *Science Direct, 316*, 2-5. Retrieved from http://www.elsevier.com/framework_products/promis_misc/ydbioevolutionapril2008.pdf

UNITED STATES (adults); n≈1,000

Hired a professional research firm to conduct a national survey of approximately 1,000 likely U.S. voters *(*Materials and methods page unable to load for inclusion of further detail*)

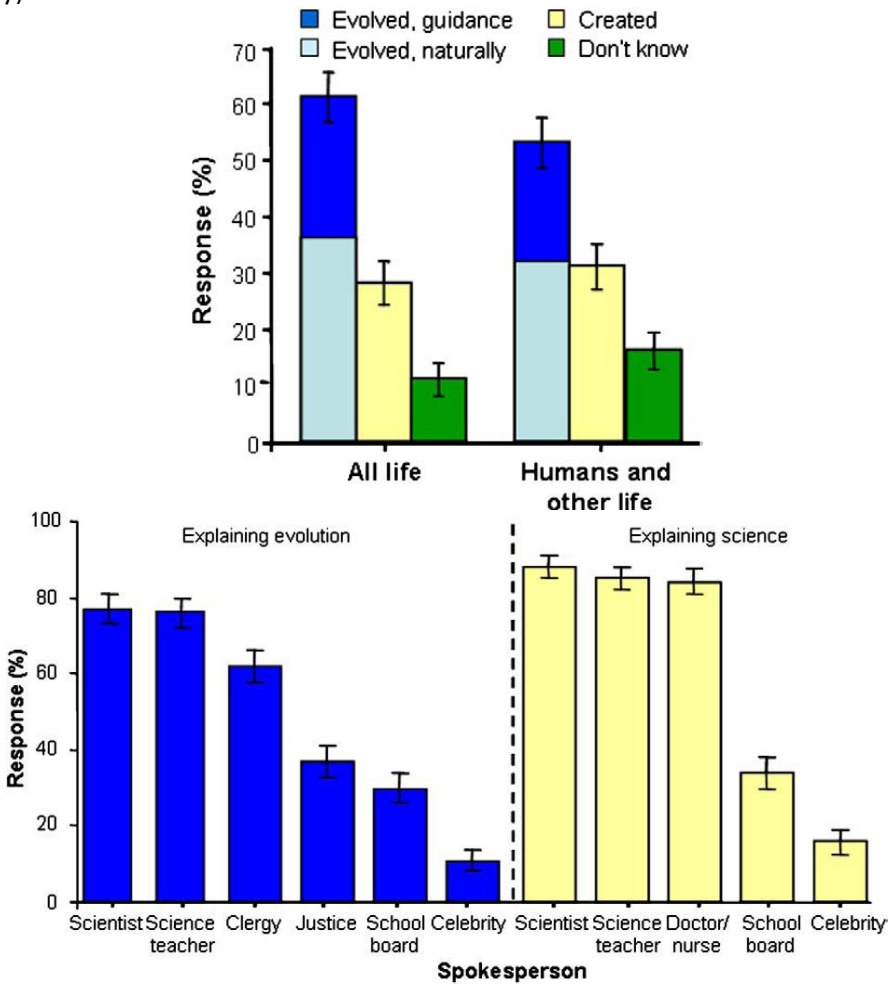
Questions:

1) Agree or Disagree: "The continents or land masses on which we live have been moving for millions of years and will continue to move in the future"
    - 79% correctly agree
2) Agree or Disagree: "Antibiotics kill viruses as well as bacteria"
    - 43% correctly disagreed
3) Agree or Disagree: "The earliest humans lived at the same time as the dinosaurs"
    - 53% correctly disagreed

- "Respondents who answered all three questions correctly were much more likely to respond that humans and other living things evolved (78%) than that they were created in their present form (11%), and more favored teaching evolution (78%) than creationism (27%) or intelligent design (24%)."
- Although 69% of survey participants had some college education (27% were college graduates and 14% had attended graduate school), only 23% gave correct responses to all three of the preceding statements

- After asking half the respondents about their views on the evolution of "all living things," they found that 61% accepted that "all living things have evolved over time." Of those, 36% thought all living things "evolved due to natural processes such as natural selection" and 25% thought "a supreme being guided the evolution of living things for the purpose of creating life in the form it exists today."
- When other half was asked to consider human evolution, 53% accepted that "humans and other living things" evolved. This majority included 32% who accepted that humans and other living things evolved through natural processes and 21% who thought they had evolved with guidance.
- 28% and 31% agreed with statements that "all living things" or "humans and other living things," respectively, were created in their present form.
- 16% of respondents who were asked about the evolution of "humans and other living things" and 11% of those asked about the evolution of "all living things" did not know or would not disclose their views
- "Thirty-two percent of respondents in our study were unsure about teaching creationism and 41% were uncertain about teaching intelligent design. By comparison, 22% expressed uncertainty about teaching evolution."
- "Within this sample, 63% of respondents ranked developing medicines and curing diseases as the most important contributions of science to society. Proponents of teaching evolution (65%), creationism (62%), or intelligent design (63%) were equally likely to view these contributions as science's most important."
- "Among a sample of respondents, 61% thought that understanding the contribution that evolution makes to modern medical science, including to understanding and treating diseases such as avian influenza, was a convincing reason to teach evolution in science classes."

- In terms of the nature of science and its importance, “a majority of respondents rated learning to draw conclusions from evidence (80%), to think critically (78%), and how science is conducted (63%) as very important purposes of public school science education.”
- “Sixty-nine percent of respondents had favorable feelings toward scientists and even more viewed medical researchers (72%) and doctors (76%) favorably.”
- “While fewer people (59%) rated public school science teachers highly, public school teachers in general were the most widely favored group (79%).”
- “On the topics of evolution, creationism, and intelligent design, most respondents expressed interest in hearing from scientists (77%), science teachers (76%), and clergy (62%). Fewer people were interested in hearing from Supreme Court Justices on evolution (37%), or from school board members and celebrities either on science (34% and 16%, respectively) and evolution (30% and 11%, respectively).”



Summary: In addition to gauging public opinion on the topic of evolution, this study also uniquely gathers public consensus on the role and importance of science and scientists. While only 36% of their respondents agreed to life evolving over time through processes such as natural selection, 61% responded “that understanding the contribution that evolution makes to modern medical science… was a convincing reason to teach evolution in science classes.”Additionally, 69% agreed to having favorable feelings towards scientists, with 77% reporting their interest in hearing the scientist’s opinion on the topic of evolution. Therefore, “There is a clear need for scientists to become involved in promoting science education.”

13) Masci, D. (2007, August 27). "How the public resolves conflicts between faith and science." *Pew Research Center Publications*. Retrieved from http://mbb.rutgers.edu/411files/SA/Pew-2007.pdf

The essays makes references to various polls conducted prior to 2007 from sources including the Pew Forum, Rice University, Virginia Commonwealth University, Time Magazine, and Gallup.

- "…a significant number of scientists – roughly a third according to a 2006 Rice University survey of more than 750 professors in the natural sciences – do not believe in God, compared with only one-in-twenty in the general population."
- "…according to a 2006 survey from the Pew Forum on Religion & Public Life and the Pew Research Center for the People & the Press, 42% of Americans reject the notion that life on earth evolved and believe instead that humans and other living things have always existed in their present form. Among white evangelical Protestants – many of whom regard the Bible as the inerrant word of God – 65% hold this view. Moreover, in the same poll, 21% of those surveyed say that although life has evolved, these changes were guided by a supreme being. Only a minority, about a quarter (26%) of respondents, say that they accept evolution through natural processes or natural selection alone."
- "In the same 2006 Pew poll, nearly two-thirds of adults (62%) say that they believe that scientists agree on the validity of evolution. Moreover, Americans, including religious Americans, hold science and scientists in very high regard."
- "A 2006 survey conducted by Virginia Commonwealth University found that most people (87%) think that scientific developments make society better. Among those who describe themselves as being very religious, the same number –87% – share that opinion."
- "When asked what they would do if scientists were to disprove a particular religious belief, nearly two-thirds (64%) of people say they would continue to hold to what their religion teaches rather than accept the contrary scientific finding, according to the results of an October 2006 Time magazine poll."
- "…in a May 2007 Gallup poll, only 14% of those who say they do not believe in evolution cite lack of evidence as the main reason underpinning their views; more people cite their belief in Jesus (19%), God (16%) or religion generally (16%) as their reason for rejecting Darwin's theory."
- "Only 28% of respondents in the same Time poll say that scientific advancements threaten their religious beliefs. These poll results also show that more than four-fifths of respondents (81%) say that "recent discoveries and advances" in science have not significantly impacted their religious views. In fact, 14% say that these discoveries have actually made them more religious. Only 4% say that science has made them less religious."

Summary: Although the relationship between science and religion tends to be portrayed as somewhat paradoxical, Masci suggests that there really is no clash between the two in the minds of most Americans. Despite a near-majority of Americans (42%) rejecting the notion that life on earth has evolved, 62% do recognize the consensus among scientists on the validity of evolution. This discrepancy can be accounted for, according to Masci, by the fact that "the general public simply chooses not to believe the scientific theories and discoveries that seem to contradict long-held religious or other important beliefs."As such, the primary reasons for Americans' underpinnings of evolution include Jesus, God, and religion as opposed to lack of evidence. Therefore, the oft-depicted battle between science and religion may not be as bitter and heated as most suggest.

14) (2007, June 11). *Gallup*. Retrieved from http://www.gallup.com/video/27838/Evolution-Beliefs.aspx

This is an online video that presents data from a Gallup poll conducted between May 21st and 24th 2007. No methodology is specified during the video, however, Gallup tends to use phone interviews from samples around 1,000 to present data for a generalized American public.

Questions:

1) Do you, personally, believe in evolution, or not?
   - Yes—**49%**
   - No, do not—**48%**
   - No opinion—**2%**
2) Do you, personally, believe in evolution, or not? *Percent yes by Education Level*
   - Post-graduate—**74%**
   - College graduate—**48%**
   - Some college—**50%**
   - High school or less—**41%**
3) Do you, personally, believe in evolution, or not? *Percent yes by Church Attendance*
   - Weekly—**24%**
   - Nearly weekly/Monthly—**52%**
   - Seldom/Never—**71%**
4) Do you, personally, believe in evolution, or not? *Percent of Republicans*
   - Yes—**30%**
   - No, do not—**68%**
5) Do you, personally, believe in evolution, or not? *Percent of Independents*
   - Yes—**61%**
   - No, do not—**37%**
6) Do you, personally, believe in evolution, or not? *Percent of Democrats*
   - Yes—**57%**
   - No, do not—**40%**
7) What is the most important reason why you do not believe in evolution?
   - I believe in Jesus Christ—**19%**
   - I believe in God—**16%**
   - Due to my religion/faith—**16%**
   - Not enough evidence—**14%**
   - I believe the Bible—**12%**

Summary: Beginning with percentages of general beliefs, these polls quickly look to more specific varying factors that may present a correlation with acceptance of evolution. While roughly equal amounts of respondents believed or not believed in evolution, different demographics were far *more* likely to report "yes" than others. For example, acceptance was much higher amongst participants who had post-graduate degrees, and whose political beliefs either marked them as Independent or Democrat. Meanwhile, those who attended church more frequently and affiliated themselves with the Republican party were much *less* likely to accept Darwin's theory. Lastly, the primary reason for rejecting the theory of evolution was answered by the statement, "I believe in Jesus Christ." Therefore, political and religious views appear to have a significant relationship with acceptance of evolution.

15) Gross, L. (2006, April 18). "Scientific illiteracy and the partisan takeover of biology." *PLoS Biology, 4(5)*. Retrieved from http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0040167

Here, Gross uses all the quantitative data collected by Miller (#43 for primary source) to interpret public attitudes toward science technology.

Questions:

1) True or False: Human beings, as we know them, developed from earlier species of animals.

*Asked from 1985 to 2005

- "Over the past 20 years, the proportion of Americans who reject this concept has declined (from 48% to 39%), as has the proportion who accept it (45% to 40%)."
- "Confusion, on the other hand, has increased considerably, with those expressing uncertainty increasing from 7% in 1985 to 21% in 2005."

2) Acceptance of religion on a scale from "Definitely False" to "Definitely True"

*Asked from 1993 to 2003

- "One-third of Americans think evolution is 'definitely false'; over half lean one way or another or aren't sure."
- "Only 14% expressed unequivocal support for evolution—a result Miller calls 'shocking.'"

3) To gauge the extent of fundamentalism's reach into American life, Miller evaluated adults' responses to three statements:

- The Bible is the actual word of God and is to be taken literally
- There is a personal God who hears the prayers of individual men and women
- Human beings were created by God as whole persons and did not evolve from earlier forms of life
    - In 2005, 43% of American adults agreed with all three statements.

Summary: A growing shift from extreme positions taken by Americans on evolution, to ones more moderate and unsure suggests there may be some sort of anti-science movement taking place in the country. Reacting to this, Miller says, "We ought not to say, 'Gee, Americans are stupid,' but, 'There are a lot of Americans who would be willing to listen to us if we were to go out and make good arguments.'" He sees plenty of opportunity to reach out to the public and moderate political candidates in order to spread the word on evolution. The place to begin, he says, is sparking interest.

16) (2006, August 24). *The Pew Forum*. Retrieved from http://pewforum.org/uploadedfiles/Topics/Issues/Politics_and_Elections/religion-politics-06.pdf
*Referenced in #48

UNITED STATES (adults); n=2,003

Results from these surveys derive from telephone interviews conducted nationwide from July 6th to July 19th in 2006, with a sample of 2,003 adults. They are 95% confident in saying that the error attributable to sampling is +/- 2.5 percentage points.

Questions:

1) Is the US a Christian Nation?

	June 1996 %	Mar 2002 %	Mar 2005 %	July 2006 %
Yes	60	67	71	67
No	34	25	26	28
Don't know	6	8	3	5

- Demographics: "…even among seculars nearly half (48%) view the U.S. this way. More whites than blacks characterize the United States as a Christian country (by 70% to 58%), and people ages 50 and older are more likely to express this view than are younger people (by 74% to 63%). Opinions also differ along party lines, with more Republicans (76%) than either Democrats (63%) or independents (67%) viewing the U.S. a Christian nation even among seculars nearly half (48%) view the U.S. this way. More whites than blacks characterize the United States as a Christian country (by 70% to 58%), and people ages 50 and older are more likely to express this view than are younger people (by 74% to 63%). Opinions also differ along party lines, with more Republicans (76%) than either Democrats (63%) or independents (67%) viewing the U.S. a Christian nation."

2) What Should be the More Important Influence on U.S. Laws?

	Bible %	The People's will %	DK %
Total	32	63	5
Men	29	67	4
Women	37	58	5
White	30	65	5
Black	50	48	2
Age			
18-29	22	74	4
30-49	33	62	5
50-64	32	63	5
65+	44	50	6
Education			
College graduate	20	75	5
Some college	30	66	4
HS graduate	38	58	4
Less than HS	46	47	7
Political View			
Conservative Republican	49	45	6

Mod/Lib Republican	29	63	8
Independent	25	71	4
Conserv/Mod Democrat	36	60	4
Liberal Democrat	19	77	4
Religious Denomination			
Total Protestant	44	51	5
White evangelical	60	34	6
White mainline	16	78	6
Black Protestant	53	44	3
Total Catholic	23	72	5
White, non-Hispanic	21	75	4
Secular	7	91	2
Religious attendance			
Weekly or more	52	43	5
Monthly or less	25	70	5
Seldom or never	12	84	4
Biblical literalism			
Take Bible literally	65	31	4
Word of God, not literal	20	75	5
Not word of God	3	95	2

3) Is Religion's Influence Growing or Shrinking?

	On American Life	**On American Government**
	%	%
Increasing	**34**	**42**
Good thing	21	15
Bad thing	11	24
Decreasing	**59**	**45**
Good thing	6	8
Bad thing	50	36
No change (vol.)	2	6
Don't know	5	7
NET: Want more*	71	51
NET: Want less**	17	32

* Increasing is good or decreasing is bad

** Increasing is bad or decreasing is good

4) Regarding Religion's Influence on Government…

	Rep	**Dem**	**Ind**
	%	%	%
Increasing	**35**	**45**	**48**
Good thing	23	14	12
Bad thing	10	28	32
Decreasing	**52**	**43**	**42**
Good thing	8	9	9
Bad thing	44	33	32
No change (vol.)	6	6	5
Don't know	7	6	5
NET: Want more*	67	47	44
NET: Want less**	18	37	41

* Increasing is good or decreasing is bad

** Increasing is bad or decreasing is good

5) Should Houses of Worship express views on Politics?

	Keep Out	Express Views	DK
	%	%	%
Total	46	51	3
July 2005	44	51	5
March 2001	43	51	6
June 1996	43	54	3
Feb 1968*	53	40	7
March 1957* 44 48 8=100			
White	47	50	3
Black	35	62	3
18-29	43	54	3
30-49	42	56	2
50-64	49	48	3
65+	52	44	4
Conservative Republican	34	65	1
Mod/Lib Republican	49	48	3
Independent	48	49	3
Conserv/Mod Democrat	45	52	3
Liberal Democrat	59	38	3
East	53	44	3
Midwest	46	52	2
South	41	56	3
West	46	49	5
Total Protestant	39	58	3
White evangelical	34	63	3
White mainline	52	44	4
Black Protestant	29	68	3
Total Catholic	52	45	3
White, non-Hispanic	54	44	2
Secular	59	36	5

* 1957 and 1968 figures from Gallup

6) Does your Clergy ever speak out on…

	Total	White Evangelical	White Main	Black Protestant	Catholic
	%	%	%	%	%
Hunger and poverty	92	90	91	91	96
Abortion	59	62	37	58	75
Situation in Iraq	53	54	50	65	51
Laws regarding homosexuals	52	54	35	62	50
Environment	48	45	42	60	45
Evolution/intelligent design	40	48	37	45	27
Death penalty	31	26	19	41	41
Stem cell research	24	21	11	18	38
Immigration	21	16	12	24	31

Based on those who attend religious services at least monthly.

7) Do you consider yourself part of the religious left, or the religious right?

	Religious left	**Religious right**
	%	%
Total	7	11
White	6	10
Black	14	19
18-29	14	13
30-49	6	10
50-64	6	9
65+	7	15
Conserv Repub	4	25
Mod/Lib Rep	6	7
Independent	7	7
Cons/Mod Dem	9	8
Liberal Democrat	15	8
Total Protestant	8	15
White evangelical	7	20
White mainline	7	6
Total Catholic	6	7
White non-Hisp	4	8
Secular	3	4

8) As a progressive Christians, what are your views on these politics and issues…

	Total public	***Progressive Christian*? Yes**	**No**
Views on politics & issues...	%	%	%
Party affiliation (% Democrat)	33	44	29
Bush job approval	36	30	45
Oppose gay marriage	56	52	66
Strict environmental laws are 'worth the cost'	57	66	46
Iraq war was right decision	43	37	54
Religious beliefs			
Religion 'very important'	60	64	68
Bible is literal word of God	35	33	43

9) Is the GOP friendly to religion?

% saying GOP is friendly to religion	**2005**	**2006**	***Change***
	%	%	
Total	55	47	*-8*
Total Protestant	59	47	*-12*
White evangelical	63	49	*-14*
White mainline	56	55	*-1*
Total Catholic	55	41	*-14*
White non-Hispanic	58	47	*-11*
Secular	58	57	*-1*

And the Democratic Party?

The Democratic Party is...	**Rep** %	**Dem** %	**Ind** %
Friendly	14	40	23
Unfriendly	44	5	17
Neutral	31	47	48
Don't know	11	8	12

10) Who has gone too far?

	Conserv. Christians in imposing their religious values %	**Liberals in keeping religion out of government** %
Total	**49**	**69**
Republican	**31**	**87**
Conservative	24	90
Mod/Liberal	46	82
Democrat	**59**	**60**
Mod/Conserv	51	70
Liberal	80	38
Independent	**56**	**65**

11) What is your view on the Christian conservative movement?

	Fav-orable %	**Unfav-orable** %	**Can't rate** %
Total	44	36	20
July 2005	42	34	24
March 2002	45	29	27
March 2001	42	31	27
Total Protestant	57	23	20
White Evangelical	71	17	12
White Mainline	44	33	23
Total Catholic	39	38	23
White non-Hisp	36	42	22
Secular	12	68	20
College graduate	34	50	16
Some college	36	44	20
High school or less	52	25	23
Conservative Repub	75	16	9
Mod/Lib Repub	47	34	19
Independent	37	44	19
Conserv/Mod Dem	43	31	26
Liberal Democrat	23	60	17

12) Views on Evolution

Humans and other living things have...	**Total** %	**White Evang** %	**White Mainline** %	**Total Catholic** %	**Secular** %
Existed in present form only	42	65	32	33	12
Evolved over time	51	28	62	59	83

Guided by supreme being	*21*	*20*	*26*	*31*	*9*
Through natural selection	*26*	*6*	*31*	*25*	*69*
Don't know how evolved	*4*	*2*	*5*	*3*	*5*
Don't know	7	7	6	8	5

13) Do Scientists Agree about Evolution?

	Yes	**No**	**DK**
	%	%	%
Total	62	28	10
July 2005	54	33	13
White Protestant	54	33	13
Evangelical	43	42	15
Mainline	67	23	10
Total Catholic	67	23	10
White Non-Hisp	73	23	4
Secular	82	15	3

14) Is there solid evidence that the earth is getting warmer?

	Total	**White Evang.**	**White Mainline**	**Total Catholic**	**Secular**
	%	%	%	%	%
Yes	79	70	79	77	88
Result of human activity	***50***	***37***	***48***	***52***	***62***
Result of natural causes	*23*	*27*	*24*	*21*	*20*
Don't know cause	*6*	*6*	*7*	*4*	*6*
No	17	25	18	19	9
Don't know/mixed	4	5	3	4	3

15) Do Scientists agree about Global Warming?

	Yes	**No**	**DK**
	%	%	%
Total	59	29	12
White Protestant	54	34	12
Evangelical	51	37	12
Mainline	58	30	12
Total Catholic	59	31	10
White Non-Hisp	61	33	6
Secular	72	15	13

16) Is Global Warming a serious problem?

How serious a problem is global warming?	**Total**	**White Evang.**	**White Mainline**	**Total Catholic**	**Secular**
	%	%	%	%	%
Serious (net)	79	68	78	86	88
Very serious	***43***	***29***	***40***	***48***	***48***
Somewhat serious	*36*	*39*	*38*	*38*	*40*
Not too serious	11	16	14	7	7
Not at all serious	9	15	8	6	4
Don't know	1	1	0	1	1

17) How do Environmental Regulations affect the country?

	Hurt the economy	**Are worth the cost**	**Both/ Neither/DK**
	%	%	%
Total	31	57	12
White Protestant	34	53	13
Evangelical	38	47	15
Mainline	30	61	9
Total Catholic	33	57	10
White Non-Hisp	34	57	9
Secular	14	76	10

18) What are the major influences on your environmental views?

	Environmental regulations...	
Biggest influence on this issue	**Hurt**	**Help**
	%	%
Seen on news	26	24
Personal experience	24	22
Education	18	30
Religious beliefs	9	7
Friends/family	8	6
Something else	14	10
Don't know	1	1

19) What's your opinion of the environmentalist movement?

	Fav-orable	**Unfav-orable**	**Can't rate**
	%	%	%
Total	63	25	12
Total Protestant	56	31	13
White Evangelical	49	40	11
White Mainline	62	25	13
Total Catholic	70	18	12
White non-Hispanic	71	22	7
Secular	78	13	9
Conserv. Republican	43	50	7
Mod/Lib Repub	54	29	17
Independent	71	20	9
Conserv/Mod Dem	72	15	13
Liberal Democrat	78	17	5

20) What is your view on Biblical Literalism?

		The Bible is...		
	Literal word of God	**God's word, not literal**	**Not word of God**	**Other/ DK**
Total	35	43	18	4
Men	31	43	23	3
Women	39	43	14	4
White	31	46	19	4
Black	58	30	7	5

18-29	29	44	24	3
30-49	35	44	17	4
50-64	32	45	18	5
65+	44	38	13	5
College graduate	19	51	26	4
Some college	29	46	20	5
High school or less	45	38	14	3
East	24	49	24	3
Midwest	34	46	17	3
South	48	36	12	4
West	24	45	25	6
Total Protestant	47	42	8	3
White evangelical	62	35	2	1
White mainline	17	59	19	5
Black Protestant	64	27	4	5
Total Catholic	24	58	15	3
White, non-Hisp	18	64	16	2
Secular	5	29	59	7

21) What are your views on God and the Biblical Prophecy surrounding Israel?

	Believe that Israel...	
	Was given by God to the Jews	**Fulfills prophecy of second coming**
	%	%
Total	42	35
White	40	33
Black	55	49
East	24	22
Midwest	40	36
South	56	45
West	37	29
Total Protestant	53	47
White evangelical	69	59
White mainline	27	19
Black Protestant	60	56
Total Catholic	27	22
White, non-Hisp	29	21
Bible is...		
Literal word of God	70	62
Word of God, not literal	34	26
Not Word of God	10	6

22) Do you sympathize more with…

	Israel	**Pales-tinians**	**Both/ neither**	**DK**
	%	%	%	%
Total	44	9	25	22
Israel was given by God to the Jews?				
Yes	63	4	16	17
No	36	18	30	16

Israel is the fulfillment of biblical prophecy?				
Yes	60	7	14	19
No	38	14	32	16

23) What's your opinion on the Second Coming of Jesus Christ?

	Believe in 2nd coming	***Time of Christ's return...*** **Is revealed in Bible**	**In your lifetime**
	%	%	%
Total	79	33	20
Total Protestant	83	36	23
White evangelical	95	39	33
White mainline	60	19	7
Black Protestant	92	53	34
Total Catholic	70	27	12
White non-Hispanic	69	23	8
Bible is...			
Literal word of God	95	52	37
Word of God, not literal	76	24	11

Summary: With 67% of Americans considering the US a Christian nation, the relationship between religion and science becomes increasingly interesting to observe. With 51% of Americans saying Houses of Worship should express political views, the dividing line between church and state appears increasingly blurred. Accordingly, 69% of respondents believe the liberals to have gone too far keeping religion out of government and 44% view the Conservative Christian movement favorably. In terms of the effect these outlooks have on their view of evolution, 42% of participants believe humans to only have existed in their present form. Overall, participants seemed more convinced by the global warming argument, however. A majority of 79% believed that there was both solid evidence to prove its validity and that it was a serious problem in the country. This heightened awareness and acceptance global warming compared to evolution suggests that religion has a much more powerful influence on the latter, hindering the nation's acceptance of Darwin's theory.

17) Bishop, G. (2006). "Polls apart on human origins." *Public Opinion Pros*, 1-4. Retrieved from http://www.publicopinionpros.norc.org/features/2006/aug/bishop.asp
*References #18, 29

UNITED STATES (adults); n varies

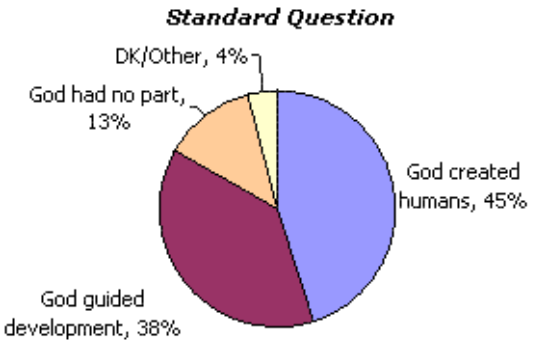
Bishop collects various polls taken around the year 2005 and compares the results depending upon how the questions regarding evolution and creationism are asked. He finds very large fluctuations made by the respondents, primarily due to the wording of the questions. Among the polls he used to demonstrate his point include the Gallup poll, the Harris poll, the Virginia Commonwealth University survey, and polls from NBC and CBS.

- Two polls from Gallup
- First asked if "God created human beings pretty much in their present form at one time within the last 10,000 years or so?" and the second asked if, "God created human beings in their present form exactly the way the Bible described it?"
- "Gallup's more precise way of putting the biblical alternative attracted a significantly higher percentage of respondents than it ever had—in fact, a clear creationist majority!"

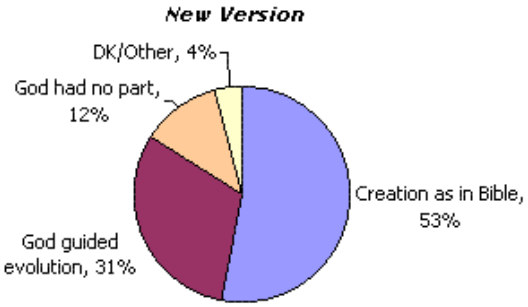
Figure 1

Strict Biblical Version Attracts Majority

Question: Which of the following statements comes closest to your views on the origin and development of human beings? Human beings have developed over millions of years from less advanced forms of life, but God guided this process, or human beings have developed over millions of years from less advanced forms of life, but God had no part in this process, or God created human beings pretty much in their present form at one time within the last 10,000 years or so?



Question: Which of the following statements comes closest to your views on the origin and development of human beings? Human beings have evolved over millions of years from other forms of life, and God guided the process, human beings have evolved over millions of years from other forms of life, but God had no part in this process, or God created human beings in their present form exactly the way the Bible describes it?



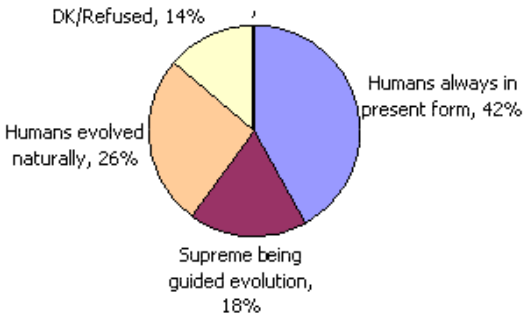
Note: The latest asking of the standard question yielded the following results: God created humans, 46%; God guided development, 36%; God had no part, 13%; DK/Other, 5%.
Source: Surveys by the Gallup Organization, November 2004 and September 8-11, 2005.

- Pew Research Center poll from 2005 did not explicitly mention God in its questions about human origins
- Got results similar to the first Gallup poll, where the Bible was not mentioned in the creationist statement

Figure 2

No Explicit Mention of God

Question: Some people think that humans and other living things have evolved over time. Others think that humans and other living things have existed in their present form since the beginning of time. Which of these comes closest to your view? [If evolved] And do you think that humans and other living thing have evolved due to natural processes such as natural selection, or do you think that a supreme being guided the evolution of living things for the purpose of creating humans and other life in the form it exists today?



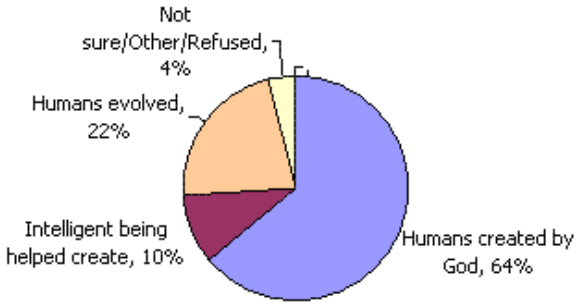
Source: Survey by Pew Research Center, July 7-17, 2005.

- Harris Poll from 2005 asked about intelligent design in a way that did not explicitly mention God, instead saying “powerful force” or “intelligent being”
- Got much lower percentages believing in theistic evolution then

Figure 3

Intelligent Design Position Offered

Question: Which of the following do you believe about how human beings came to be? Human beings evolved from earlier species. Human beings were created directly by God. Human beings are so complex that they required a powerful force or intelligent being to help create them?



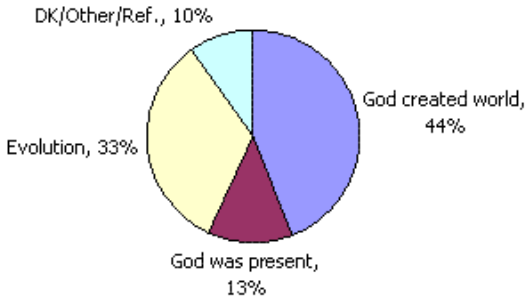
Source: Survey by Harris Interactive, June 17-21, 2005.

- An NBC news poll got very specific in its question on creationism, asking respondents to clarify: "Do you mean that God created the world in six days and rested on the seventh as described in the Book of Genesis, OR that god was a divine presence in the formation of the universe?"
- Resulted in a vast majority siding with the first explanation of creationism, though a shocking 33% also sided with evolution

Figure 4

Genesis versus Divine Presence?

Question: Which do you think is more likely to actually be the explanation for the origin of human life on earth: evolution... or... the biblical account of creation? [If "biblical account of creation"] And by this, do you mean that God created the world in six days and rested on the seventh as described in the Book of Genesis or that God was a divine presence in the formation of the universe?



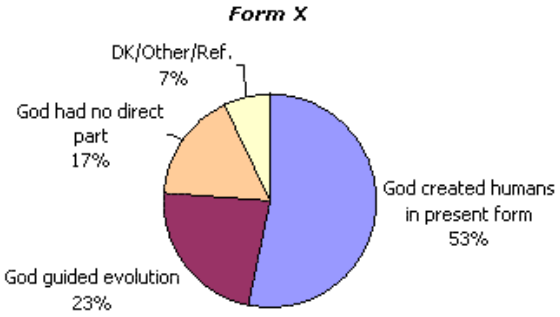
Source: Survey by NBC News, March 8-10, 2005.

- Two CBS polls show that the qualifier added to creationism regarding dates, "within the last 10,000 years" markedly lowers the response rate for that option

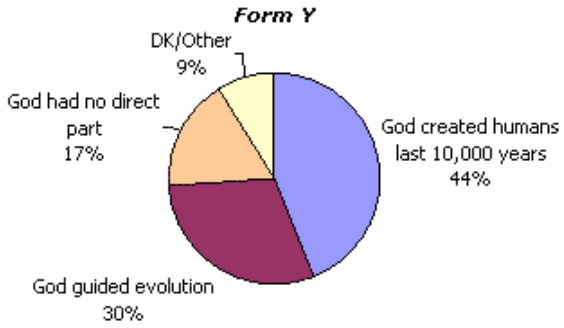
Figure 5

Even Minor Changes Make Difference

Question: Which of the following statements comes closest to your views on the origin of human beings?...Human beings evolved from less advanced life forms over millions of years, and God did not directly guide this process. Human beings evolved from less advanced life forms over millions of years, but God guided this process. God created human beings in their present form?



Question: Which of the following statements comes closest to your views on the origin and development of human beings? Human beings have evolved over millions of years from other forms of life, and God guided the process, human beings have evolved over millions of years from other forms of life, but God had no part in this process, or God created human beings in their present form within the last ten thousand years?



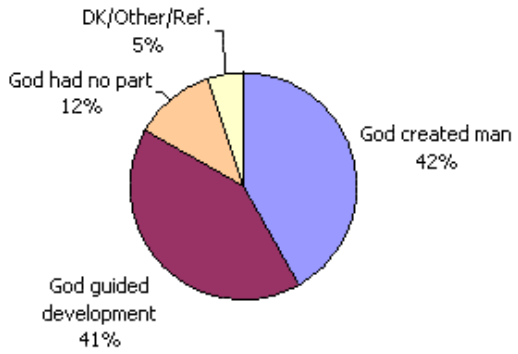
Source: Survey by CBS News, April 6-9, 2006.

- A NORC General Survey from 2004 to 2005 asked two questions regarding evolution
- The first elicited a majority creationist view, with 42% saying they believed God created man in his present form within the last 10,000 years
- However, when asked next if "Human beings developed from earlier animal species," 45% said true

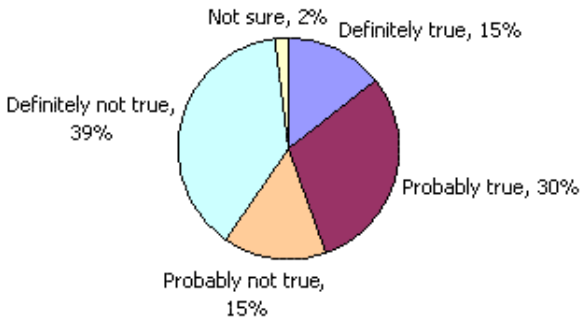
Figure 6

Another Messy Complication

Question: As I read off three statements, please tell me which one comes closest to your views about the origin and development of man... God created man pretty much in his present form at one time within the last 10,000 years. Man has developed over millions of years from less advanced forms of life. God had no part in this process. Man has developed over millions of years from less advanced forms of life, but God guided this process, including man's creation.



Question: From the statement I'll read, look at this card and tell me which answer comes closest to your opinion on how true it is... Definitely true, probably true, probably not true, definitely not true... Human beings developed from earlier species of animals.



Source: Survey by NORC-GSS, August 18, 2004-January 4, 2005.

Summary: "All of this goes to show how easily what Americans appear to believe about human origins can be readily manipulated by how the question is asked. As we have seen, depending on the wording of the question the percentage of apparent biblical creationists can vary from as little as 42 percent to as high as 64 percent; the percentage of theistic evolutionists or believers in "intelligent design" from as much as 41 percent to as little as 10-18 percent; and the percentage of Darwinist or naturalistic evolutionists, from as low as 10-13 percent to as high as 33-46 percent." Therefore, when creating these surveys meant to gauge public acceptance of evolution, the wording of the questions should be extremely carefully considered.

18) (2005, August 30). *The Pew Forum*. Retrieved from http://people-press.org/reports/pdf/254.pdf
*Referenced in #17, 20, 48

UNITED STATES (adults); n=2,000

"Results for this report are based on a telephone survey of a nationwide sample 2,000 adults, 18 years of age or older, from July 7-17, 2005. For results based on the total sample, one can say with 95% confidence that the error attributable to sampling is plus or minus 2.5 percentage points. For results based on Form 1 (N=1,000) or Form 2 (N=1,000) only, the error attributable to sampling is plus or minus 3.5 percentage points."

Questions:

1) In terms of religion and political parties:
"Who has too much control?"

	Religious conservatives over Rep. Party	**Non-religious liberals over Dem. Party**
	%	%
Agree	**45**	**44**
Disagree	43	42
Don't know	12	14

"Who's Most concerned with…"

	Protecting religious values	**Protecting ind. freedoms**
	%	%
Republicans	**51**	30
Democrats	28	**52**
Both (Vol.)	5	4
Neither (Vol.)	5	7
Don't know	11	7

"Which party is religion-friendly?"

	Republican	**Democratic**
Party's attitude toward religion	%	%
Friendly	55	29
Neutral	23	38
Unfriendly	9	20
Don't know	13	13

2) Life on Earth Has…

	%
Existed in its present form since the beginning of time	42
Evolved over time	48
Evolution guided by a supreme being	*18*
Evolution through natural selection	*26*
Don't know how evolved	*4*
Don't know	10

3) Parents asked to report if the subject of _____ made their child uncomfortable?

	Yes	No	DK
Subject of...	%	%	%
Homosexuality	8	91	1
Evolution	6	93	1
Religion	5	94	1

Based on parents of children in school K-12 (N=554).

4) Have liberals gone too far in trying to keep religion out of schools and government?

	Yes	No	DK
	%	%	%
Total	**67**	**28**	**5**
White	67	29	4
Black	75	21	4
College grad	54	42	4
Some college	65	32	3
H.S. or less	75	18	7
Northeast	55	37	8
Midwest	69	25	6
South	77	18	5
West	58	38	4
Republican	81	13	6
Conservative	87	9	4
Mod/Liberal	71	21	8
Democrat	56	38	6
Mod/Conserv	67	27	6
Liberal	33	64	3
Independent	65	32	3
White Protestant	80	17	3
Evangelical	87	10	3
Mainline	69	27	4
White Catholic	63	31	6
Secular	42	50	8

5) Have conservatives gone too far in trying to impose their religious values on country?

	Yes	No	DK
	%	%	%
Total	**45**	**45**	**10**
White	43	47	10
Black	48	40	12
College grad	60	35	5
Some college	48	45	7
H.S. or less	35	50	15
Northeast	48	38	14
Midwest	41	47	12
South	39	52	9
West	55	35	10
Republican	26	65	9
Conservative	16	76	8
Mod/Liberal	47	43	10
Democrat	57	35	8
Mod/Conserv	46	44	10
Liberal	83	16	1

Independent	55	35	10
White Protestant	33	58	9
Evangelical	21	70	9
Mainline	50	41	9
White Catholic	47	42	11
Secular	61	27	12

6) What are your views on evolution?

Humans and other living things have...	**Total** %	**White Evang.** %	**White Mainline** %	**White Catholic** %	**Secular** %
Existed in present form only	42	70	32	31	15
Evolved over time	48	20	60	61	71
Guided by supreme being	*18*	*12*	*24*	*28*	*10*
Through natural selection	*26*	*6*	*31*	*28*	*56*
Don't know how evolved	*4*	*2*	*5*	*5*	*5*
Don't know	10	10	8	8	14

By Education Level:

Humans and other living things have...	**College Grad** %	**Some College** %	**H.S. or less** %
Existed in present form only	27	42	50
Evolved over time	66	51	36
Guided by supreme being	*20*	*21*	*15*
Through natural selection	*40*	*26*	*18*
Don't know how evolved	*6*	*4*	*3*
Don't know	7	7	14

By Region:

Humans and other living things have...	**North-east** %	**West** %	**Mid-west** %	**South** %
Existed in present form only	32	36	42	51
Evolved over time	59	57	45	38
Guided by supreme being	*20*	*18*	*19*	*17*
Through natural selection	*32*	*35*	*22*	*19*
Don't know how evolved	*7*	*4*	*4*	*2*
Don't know	9	7	13	11

7) Do you think scientists agree about evolution?

	Yes %	**No** %	**DK** %
Total	**54**	**33**	**13**
*Among those believing in**			
Creation	41	46	13
Evolution	73	21	6
With guidance	*62*	*31*	*7*
Natural selection	*82*	*13*	*5*

* **Creation** refers to those who say living things have always existed in their present forms.
Evolution refers to those who think living things have evolved over time.
With guidance refers to those who think evolution

was guided by a supreme being
Natural selection refers to those who think evolution occurred through natural processes.

8) How certain are you of your views on development of life?

	Very certain	Fairly certain	Not too/ Not at all certain	DK
	%	%	%	%
Total	**46**	**31**	**21**	**2**
Among those believing in...				
Creation	63	24	11	2
Evolution	32	40	27	1
With guidance	*39*	*42*	*19*	*0*
Natural selection	*28*	*41*	*29*	*2*
Bible is...				
Literal word of God	69	18	11	2
Word of God, but not literal	34	40	24	2
Not word of God	30	37	31	2

9) What's the most important influence on your view of the development of life?

	Religion	Education	Other/ DK
	%	%	%
Total	**42**	**28**	**30**
Among those believing in...			
Creation	60	9	31
Evolution	26	47	27
With guidance	*42*	*30*	*28*
Natural selection	*15*	*60*	*25*
Bible is...			
Actual word of God	62	10	28
Word of God, but not literal	41	31	28
Not word of God	8	58	34

10) How do you favor teaching creationism?

	Along with evolution...		*Instead of evolution...*	
	Fav.	Opp.	Fav.	Opp.
	%	%	%	%
Total	**64**	**26**	**38**	**49**
Among those believing in...				
Creation	65	26	56	32
Evolution	66	27	22	67
With guidance	*78*	*18*	*35*	*54*
Natural selection	*62*	*33*	*14*	*79*
White Protestant	67	25	46	43
Evangelical	67	24	60	29
Mainline	66	27	26	62
White Catholic	68	20	31	54
Secular	55	30	17	63

11) Who should have the primary say on how evolution is taught?

	Parents	Scientists/ Teachers	School Boards	DK
	%	%	%	%
Total	**41**	**28**	**21**	**10**
Among those believing in...				
Creation	54	16	22	8
Evolution	31	42	20	7
With guidance	*36*	*34*	*22*	*8*
Natural selection	*27*	*47*	*20*	*6*
White Protestant	51	18	21	10
Evangelical	59	10	21	10
Mainline	40	28	22	10
White Catholic	39	30	23	8
Secular	25	41	22	12
Conservative Republican	58	16	17	9
Moderate/Liberal Repub	40	26	26	8
Independent	36	33	23	8
Moderate/Conserv Dem	39	30	24	7
Liberal Democrat	27	49	17	7

12) How well do public schools deal with…?

	Evolution	Religion	Sex education	Homo-sexuality
Excellent	5	6	7	3
Good	26	18	31	14
Only Fair	33	24	28	24
Poor	20	39	19	34
Don't know	16	13	15	25

Based on parents of children in public or private school K-12 (N=554).

13) Do religious organizations play a constructive role in addressing society's challenges?

Houses of worship contribute...	March 2001 %	July 2005 %
A great deal	23	20
Some	52	46
Not much	18	23
Nothing at all	4	7
Don't know	3	4

14) Do you believe homosexuals should be allowed to serve openly in the military?

Allow gays to serve openly...	July 1994 %	July 2005 %
Strongly favor	16	15
Favor	36	43
Oppose	19	17
Strongly oppose	26	15
Don't know	3	10

Summary: This survey covers many aspects surrounding the debate between evolution and creationism. A convincing 48% of participants believed that life on earth has evolved, though only 26% believe so

through natural processes. Like other studies, it reveals religion and education to be indicators of these beliefs. Additionally, however, it shows percentages of beliefs according to region, revealing that the Northeast is the region that most supports living things evolving over time (59%), while the South is the region with inhabitants most likely to believe that humans existed only in their present form (51%). Also, 64% of participants favored teaching creationism alongside evolution, though 41% (the majority) thought evolution is a subject best taught by parents. Accordingly, the majority of parents responded that public schools deal with the topic of evolution only "fairly well" with 33%, and only 5% saying "excellent." Lastly, only 54% of respondents believed scientists to agree on the theory of evolution, and only 46% said that they felt "very certain" of their own views on the topic. Altogether, this data suggests there is still a lot of uncertainty regarding the development of life among most Americans. This most likely stems from the fact that evolution does not appear to be effectively taught or learned, which results in both uninformed students and the formation of common misconceptions.

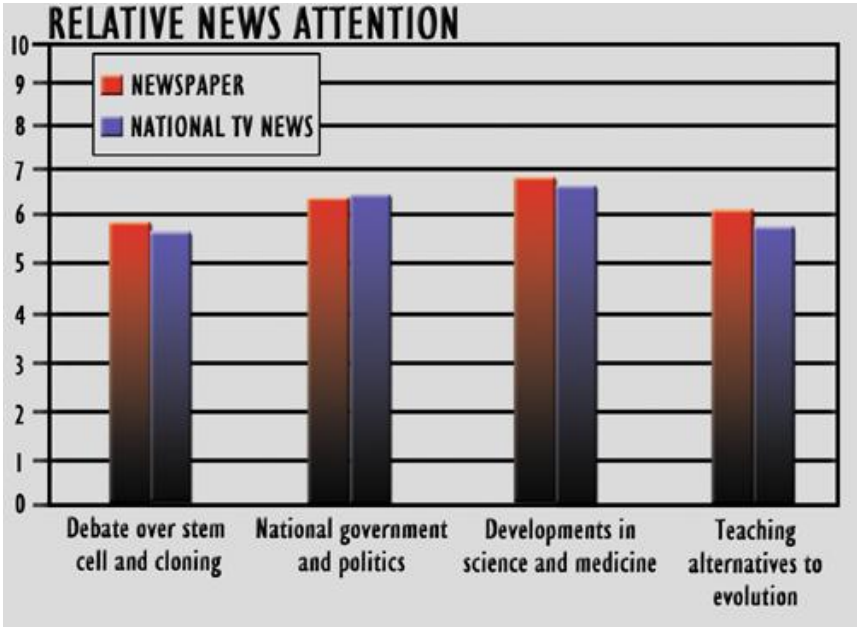
19) Nisbet, M., & Nisbet, E. (2005, September). "Evolution & intelligent design: Understanding public opinion." *American Geological Institute*. Retrieved from http://www.geotimes.org/sept05/feature_evolutionpolls.html

UNITED STATES (adults); n=774

In addition to their own national survey, they analyzed a few existing polls from several national news organizations. They wanted a variety of sources so they could be more confident despite variations in question wording. Their survey was a "Nationally representative random-digit-dial telephone survey, conducted March 19 to April 29, 2005, by the Survey Research Institute at Cornell University, interviewing 774 adults age 18 and older. The margin of error for the survey is +/-3.5 percent at the 95 percent confidence level. Principal investigator is Matthew C. Nisbet of the School of Communication at the Ohio State University."

Questions: All were intended to be answered on a scale of 1 to 10

1) How attentive are you "…to newspaper and TV news coverage of a number of contemporary issues, including the debate over teaching alternatives to evolution?"
   - "In comparison to other major political topics, those surveyed pay relatively close attention to the debate on teaching alternatives to evolution."
   - With regards to other channels of information outside of mainstream news coverage:
   - "…only 4.9 percent of respondents reporting that in the last two years, they had been contacted about the issue by mail or phone; 9.1 percent reporting they had been encouraged in church to take a position on the issue; 7.4 percent reporting they had received relevant information or materials in church; and only 11.3 percent indicating they had received an email or saw information online about the matter."



2) Do you agree or disagree that the theory of evolution is "based on an overwhelming body of scientific evidence, which strongly confirms that its key ideas are correct?"
   Do you disagree or disagree that the concept of Intelligent Design is based on an overwhelming body of scientific evidence, which strongly confirms that its key ideas are correct?

   - "…a bare majority of adult Americans (56.3 percent) agreed that an overwhelming body of scientific evidence supports evolution, while a very sizeable proportion (44.2 percent) thought precisely the same thing about ID."

3) "Do you agree or disagree that the theory of evolution/concept of intelligent design is based on an overwhelming body of scientific evidence, which strongly confirms that its key ideas are correct?"

    - "…many members of the public underestimate the scientific evidence in support of evolution, and overestimate the evidence supporting intelligent design."

	EVOLUTION	INTELLIGENT DESIGN
STRONGLY AGREE	19.7%	10.8%
AGREE	36.6%	33.4%
DISAGREE	20.6%	30.5%
STRONGLY DISAGREE	16.8%	13.4%
DON'T KNOW/REFUSED	16.8%	11.8%

Summary: The survey conducted by the authors of this essay reveals interesting information regarding the media exposure surrounding the debate on teaching evolution. While evolution appears to be as relatively exposed as other issues such as stem cell research and politics, similar percentages of respondents reported believing evolution to be backed by scientific evidence (56.3%) as those did those believing the same thing about Intelligent Design (44.2%). Furthermore, the survey revealed a general underestimation of scientific evidence in support of evolution, with below 50% of participants reporting to agree with that statement (about 44% thought the same about Intelligent Design). Overall, this suggests that the intelligent design movement has been very successful in injecting itself into more media coverage, while using strategic interpretations and definitions to ensure such success. In order "To counter the ID movement, evolution supporters need to employ public engagement strategies that go beyond the scientific dimensions of the debate." Additionally, "…public engagement efforts should be interactive, and move beyond just one-way efforts at media campaigning."Events such as town meetings would help "facilitate moderation, trust and understanding on the part of both sides of the debate."

20) (2005, September 28). "Reading the polls on evolution and creationism." *Pew Research Center.* Retrieved from http://people-press.org/commentary/?analysisid=118
*References #18

This essay compiles a variety of different polls and compares the results on certain topics. Among the sources include the Pew Research Center, NBC News, Fox News, Gallup, and Harris

Questions:

1) Views on the Origins of Life

Conflicting Views on the Origins of Life

Some people think that humans and other living things have evolved over time. Others think that humans and other living things have existed in their present form since the beginning of time. Which of these comes closest to your view?
(If 'Evolved'...) And do you think that humans and other living things have evolved due to natural processes such as natural selection, or do you think that a supreme being guided the evolution of living things for the purpose of creating humans and other life in the form it exists today?
Source: Pew Research Center July 7-17, 2005

	Evolved ----- over time -----			
	Through natural processes	With guidance	Existed in present form only	DK
	26	18	42	14

Which do you think is more likely to actually be the explanation for the origin of human life on earth: evolution...or...the biblical account of creation?
(If 'The biblical account of creation,'...) And by this do you mean: that God created the world in six days and rested on the seventh as described in the Book of Genesis or that God was a divine presence in the formation of the universe?
Source: NBC News March 8-10, 2005

		--- Biblical account ---		
	Evolution	God was a divine presence	God created world in six days	DK
	33	13	44	10

Which one of the following statements comes closest to your views on the origin and development of human beings?...
(1st and 3rd options are rotated)
--Humans developed over millions of years from less advanced forms of life, but God guided this process.
--Human beings have developed over millions of years from less advanced forms of life, but God had no part in this process.
--God created human beings pretty much in the present form at one time within the last 10,000 years or so.
Source: Gallup

	Evolution, God had no part in process	Evolution, God guided guided the process	God created in present form	DK
November 7-10, 2004	13	38	45	4
February 19-21, 2001	12	37	45	5
August 24-26, 1999	9	40	47	4
November 6-9, 1997	10	39	44	7
June 18-21, 1993	11	35	47	7
July 23-26, 1982	9	38	44	9

2) Evolution and Creationism compatibility?

Evolution and Creationism Not Viewed as Incompatible

For each of the following, please say whether you believe it is definitely true, probably true, probably false or definitely false as an explanation for the origin and development of life on earth. How about...	True	False	DK
Evolution?	55	34	11
Creationism?	58	26	16
Intelligent Design?	31	32	37

Source: Gallup August 5-7, 2005

Which do you think is more likely to actually be the explanation for the origin of human life on Earth: the theory of evolution as outlined by Darwin and other scientists, the Biblical account of creation as told in the Bible, or are both true?	Darwinian evolution	Both	Biblical creation	DK
	15	26	50	9

Source: Fox News August 25-26, 1999 (Based on registered voters)

(For each statement, just check the box that comes closest to your opinion of how true it is...Definitely true, probably true, probably not true, definitely not true).... Human beings developed from earlier species of animals	True	Not true	DK
Source: General Social Survey 2004*	45	54	2
2000	42	49	10
1994	40	48	8
1993	44	48	8

*In 2004, respondents were shown a card with response options and gave verbal answers.

3) Is there scientific support/evidence behind evolution?

Many Doubt Scientific Evidence for Evolution

From what you've heard or read, is there general agreement among scientists that humans evolved over time, or not?	Yes	No	DK
	54	33	13

Source: Pew Research Center July 7-17, 2005

Do you think the scientific theory of evolution is well-supported by evidence and widely accepted within the scientific community, or that it is not well-supported by evidence and many scientists have serious doubts about it?	Supported and widely Accepted	Many have Doubts	DK
	45	42	13

Source: Newsweek December 2-3, 2004

Please tell me whether you agree or disagree with the following statement. Darwin's theory of evolution is proven by fossil discoveries...	Agree	Disagree	DK
	45	48	6

Source: Harris Interactive June 17-21, 2005

Just your opinion, do you think that Charles Darwin's theory of evolution is – a scientific theory that has been well-supported by evidence, or just one of the many theories and one that has not been well-supported by evidence, or don't you know enough about it to say?	Supported	Not supported	DK
Source: Gallup November 7-10, 2004	35	35	30
Source: Gallup February 19-21, 2001	35	39	26

4) Views on evolution/creationism in the curriculum.

Public Consistently Favors *Adding* Creationism to Curriculum

Pew Research Center, July 2005

Would you generally favor or oppose...	Favor	Oppose	DK
...Teaching creationism along with evolution in public schools?	64	26	10
...Teaching creationism instead of evolution in public schools?	38	49	13

Gallup/CNN/USA Today, June 1999

(I'm going to read a variety of proposals concerning religion and public schools. For each one, please tell me whether you would generally favor or oppose it.)...			
...Teaching creation along with evolution in public schools.	68	29	3
...Teaching creation instead of evolution in public schools.	40	55	5

Public Supports Introducing Students to Evolution and Creationism

On a different subject, do you think each of the following explanations about the origin and development of life on earth should or should not be taught in public school science classes, or are you unsure? How about...	Should	Should Not	Unsure
Evolution	61	20	19
Creationism	54	22	23
Intelligent Design	43	21	36

Source: Gallup August 8-11, 2005

Last year the National Academy of Sciences recommended that evolution be taught to all public school students as the most convincing theory for how human beings developed. Do you agree or disagree that evolution should be taught in all public schools?	Agree	Disagree	Unsure
	56	35	8

Source: Fox News August 25-26, 1999 N=902(RV)

The Kansas State Board of Education recently approved new standards for teaching science in public schools that remove the teaching of evolution from the mandatory curriculum. Do you agree or disagree with the Board's attempt to take the teaching of evolution out of the schools?	Agree	Disagree	Unsure
	33	57	10

Source: Fox News August 25-26 1999 N=902(RV)

(I'm going to read some areas of instruction that high schools might offer. Please say whether you think each one should be required instruction, could be offered as an elective but should not be required, or should not be taught at all.) How about...	Required	Offered, but not required	Not offered
the theory of evolution?	28	49	21
the theory of creationism?	25	56	16

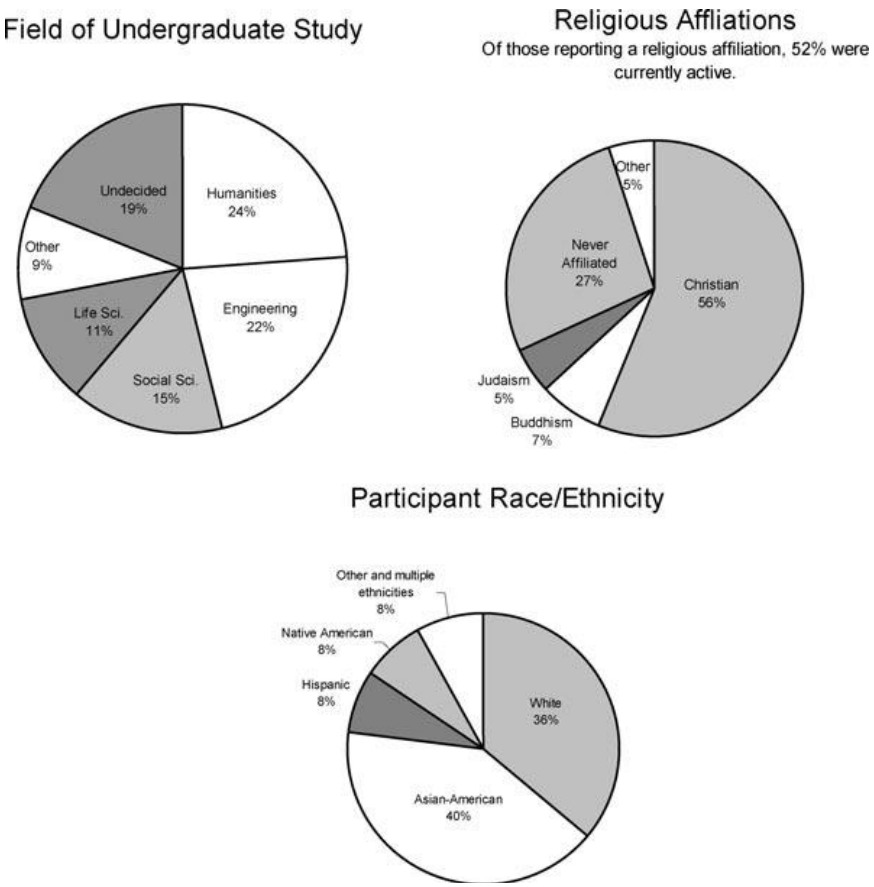
Source: Gallup August 24-26, 1999

Summary: These surveys address a number of fundamental issues with the theory of evolution and in its instruction in public schools across the country. Pew's own survey reveals that only 26% of its respondents believed that live evolved through natural processes, while a majority (42%) believed that human beings existed only in their present form. Looking at different polls on the teaching of evolution, the majority (61%) did support teaching evolution in science class; however, 54% of those respondents also supported teaching creationism. Overall, only 56% of respondents to Fox News Survey agreed that evolution should be taught in all public schools. This reluctant attitude may be explained by the fact people still find scientific evidence of Darwin's theory to be lacking. For example, 48% of respondents in a Harris Interactive survey disagreed with the statement that Darwin's theory of evolution is proven by fossil discoveries. Therefore, these surveys collectively demonstrate the lack of acceptance of evolution and the unwillingness of many Americans to have it taught in public high schools nationwide.

21) Brem, S., Ranney, M., & Schindel, J. (2003, January 24). "Perceived consequences of evolution: College students perceive negative personal and social impact in evolutionary theory." *Science Education, 87(2)*, 181-206. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/sce.10105/abstract

UNITED STATES (college-educated adults); n=135

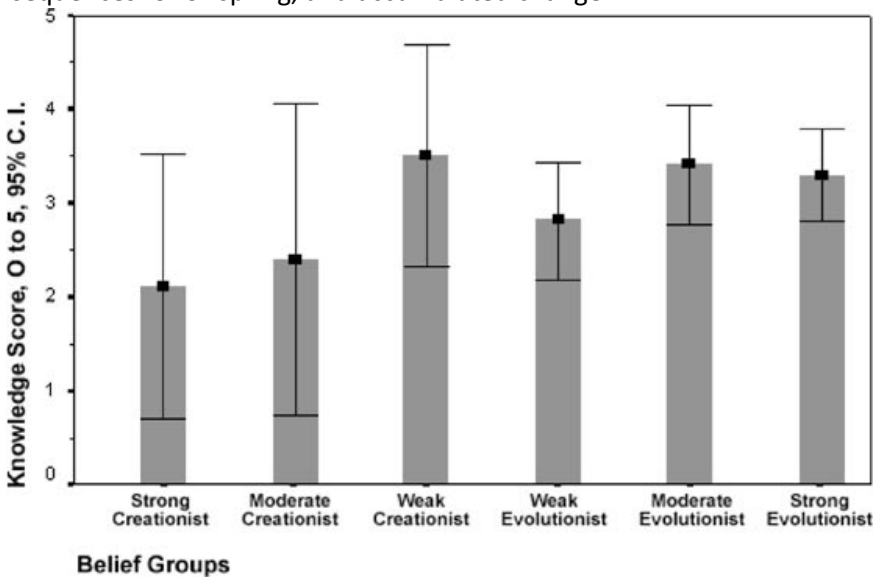
"The purpose of this study was to explore college students' perceptions regarding the social and personal impact of evolutionary theory, as these interact with other elements in the conceptual ecology." The participants, although all highly educated, come from diverse religious and ethnic backgrounds. The data collection occurred for six weeks in 1999.
Additionally, "All recruitment took place on the campus of a major, public university in the Western United States. Prior to participation, no participant knew the subject of the study; they were simply offered $10 to complete some questionnaires. No special interest groups were targeted, and the recruitment booth was set up at a central location on the campus. No participant withdrew from the study. Seventeen participants did not have time to complete the semi-structured written section, but no one refused to complete it, and the only factor appears to have been time. We believe that these precautions minimized selection bias and differential demands."



Questions:

1) They first asked for a concise evaluation of evolutionary knowledge by asking for an evolutionary explanation of an adaptation.

- Scored with a rubric covering key aspects of evolution: variation, selection pressure, differential survival, consequences for offspring, and accumulated change



Participants then completed a Likert-scale questionnaire that addressed the following topics:

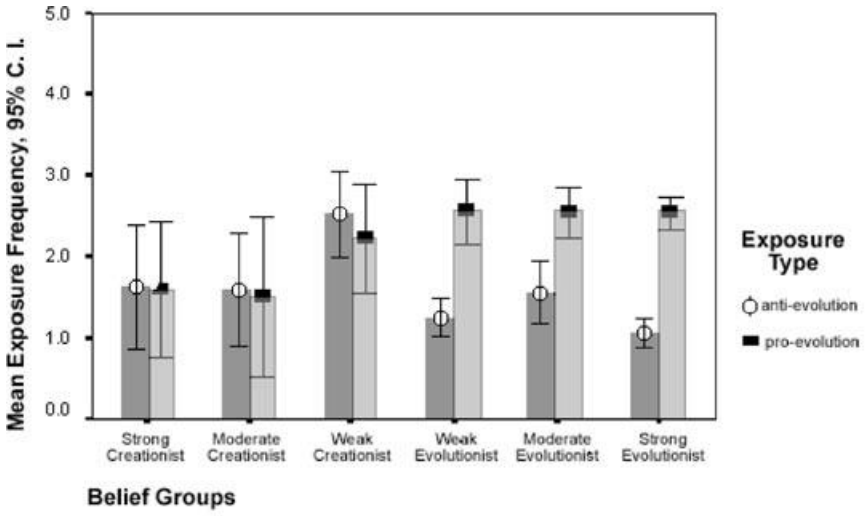
2) Belief statements were presented on a scale ranging from −3 (*Strongly Disagree*) to +3 (*Strongly Agree*):

1. All forms of life evolved from earlier forms, and no supreme being or beings has ever played any role in the evolution of life on Earth.
2. All forms of life evolved from earlier forms, but evolution was first set in motion by a supreme being or beings and then left running without any additional intervention by the supreme being or beings.
3. All forms of life evolved from earlier forms, but a supreme being or beings intervenes from time to time to shape or override the evolutionary process.
4. Some forms of life evolved from earlier forms, but human beings were created in more or less their present form by a supreme being or beings.
5. All forms of life were first brought into being in more or less their present form by a supreme being or beings.

3) Questions regarding exposure to sources supporting and conflicting with evolution were presented on this scale:

Never	Less Than Once a Year	Once a Year	Several Times a Year	Once a Month	Once a Week or More

1. I discuss evolution with clergy who tend to *accept* evolution.
2. I discuss evolution with clergy who tend to *reject* evolution.
3. I discuss evolution with family members who tend to *accept* evolution.
4. I discuss evolution with family members who tend to *reject* evolution.



Note: 0 = "Never," 1 = "Less than once a year," 2 = "Once a year," 3 = "Several times a year," 4 = "Once a month," and 5 = "Once a week or more."

4) Perceived impact of evolutionary theory: Impact questions were presented on a scale ranging from −3 (*much harder*) to +3 (*much easier*):

Purpose

1. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to know how they should live their lives?
2. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to lose their focus on what is important in life?

Spirituality

3. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to believe that there is an afterlife?
4. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to believe that there is a supreme being or beings?

Racism

5. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to consider some races and ethnic groups "less advanced" than others?
6. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to believe that all races of human beings are related to one another?

Self-determination

7. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to believe that great athletes, artists and thinkers were born with talents that the rest of us don't have?
8. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to believe that with hard work one can overcome most physical and intellectual obstacles?

Selfishness

9. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to rationalize becoming obsessed with getting ahead?
10. If everyone accepted the theory of evolution as true beyond any doubt, do you think that people would find it harder or easier to believe that human beings are always looking out for their own best interests?

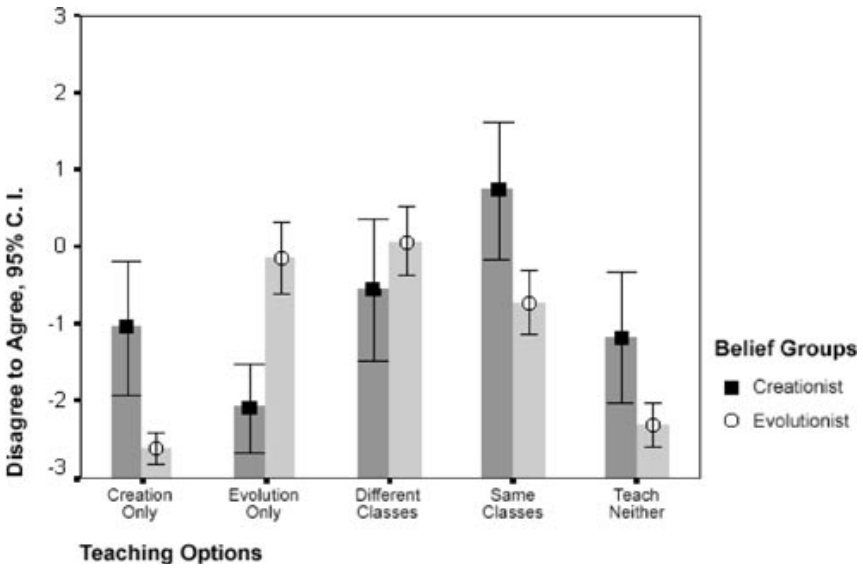
The Perceived Impact of Evolutionary Theory

Perceived Impact

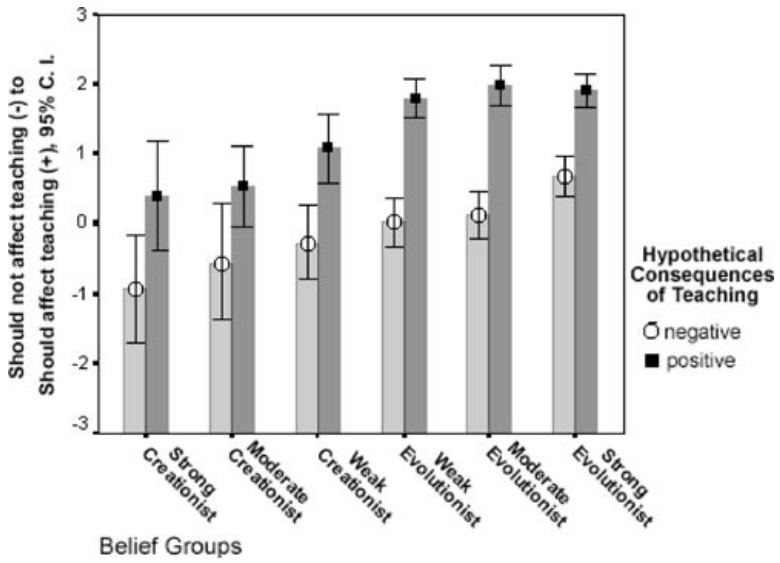
Area of Impact	No Impact (%)	Of those seeing an impact . . . Reduces (%)	Increases (%)
Sense of purpose			
Creationists	18	78	22
Evolutionists	31	75	25
Racism			
Creationists	15	28	72
Evolutionists	21	41	59
Self-determination			
Creationists	13	77	23
Evolutionists	21	74	26
Selfishness			
Creationists	26	17	83
Evolutionists	39	17	83
Spiritual beliefs			
Creationists	16	83	17
Evolutionists	20	83	17

In all cases, evolutionists were more likely than creationists to assert that there would be no impact. Those seeing an impact consistently see that impact as negative; all differences are significant at p=0.05.

5) Teaching of Evolution: Statements on teaching were presented on a scale ranging from −3 (*Strongly Disagree*) to +3 (*Strongly Agree*)
   1. Creationism and evolution should always be taught side by side in the same class in schools.
   2. Only creationism should be taught in schools, not evolution.
   3. Only evolution should be taught in schools, not creationism.
   4. Creationism and evolution should both be taught in school, but need not be taught in the same class.
   5. Neither creationism nor evolution should be taught in school.



- Teaching evolution and creationism side by side was favored in every subgroup



- "Again, the qualitative data reveals conflict. Few participants, creationist or evolutionist, initially claimed that they wanted to exclude evolution from the curriculum because of the outcome. However, as they elaborated their view, it became clear that they came to this position for very different reasons."

6) Participants were then asked to answer an open-ended question regarding their beliefs on the origins and development of life and their teaching in schools.

- "…greater exposure to information about evolution, whether pro- or antievolution, is associated with greater negativity regarding the consequences of believing in evolution. Likewise, greater knowledge of the principles and mechanisms of evolution are associated with greater negativity. Even if you accept evolutionary theory, learning more is associated with a bleaker view."
- "…the implications of evolutionary science for religious and spiritual beliefs has been with us since the theory was first introduced. Furthermore, a review of the popular literature shows that stories about evolutionary theory that have a sensational element may get greater play than the science pages. The sensational aspects are usually violence or disease."

Summary: This survey primarily attempts to measure the perceived impact of the evolutionary theory on one's personal life. This was measured in terms of its effect on sense of purpose, racism, spiritual beliefs, self-determination, and selfishness. Despite the fact that substantial percentages of participants (ranging from 13 to 39%) would flatly state that evolution had "No Impact" on these personal factors, those who did perceive an impact tended to view that impact negatively. Specifically, they saw it "…as decreasing spirituality, increasing selfishness and racism, and interfering with one's sense of purpose and self-determination."Additionally, the question regarding teaching evolution revealed that participants across all belief groups found it important to teach evolution and creationism side by side. Overall, this suggests that there is greater negativity associated with greater exposure to evolution (whether pro or antievolution). Therefore, such a large-scale issue would require multiple changes in the status quo. Amongst those would be increased communication of, reflection upon, and respect for multiple perspectives. "Understanding the influence of science on individuals and society seems our best chance for using science in their service."

22) Alters, J., & Nelson, C. (2002, August 13). "Perspective: Teaching evolution in higher education." *The Society for the Study of Evolution, 56 (10)*, 1891-1901. Retrieved from http://www.bioone.org/doi/full/10.1554/00143820%282002%29056%5B1891%3APTEIHE%5D2.0.CO%3B2

UNITED STATES (though does include one study on Australians, very broad)

In attempting to uncover reasons for the lack of understanding of evolution amongst the public, Alters and Nelson more broadly begin to discuss issues with the educational system and teaching methods. The essay begins by incorporating numerous polls, but becomes much more analytical and qualitative by the end.

- "For example, another national poll reports that of those who recall ever having heard the term evolution, only 50% chose the correct layman's definition (People for the American Way Foundation 2000, p. 38). The poll also reports confusion with the term "theory" and confusion about, or rejection of, the factuality of evolution. With regard to theory, 74% agreed that "evolution is commonly referred to as the *theory* of evolution because it has not yet been proven scientifically" (p. 41)."
- In terms of college graduates, "35% think that "the earliest humans lived at the same time as the dinosaurs" and 42% indicated that they don't think "human beings, as we know them today, developed from earlier species of animals," a figure that is scarcely distinguishable from that for the public at large (National Science Board 2000, p. A-549).
- "Students are rarely involved in frequent student-faculty interaction during class; in many classes students are asked and respond to questions for less than 10% of the class time." "Even when professors do ask questions of students in classes, approximately 90% are recall of merely memorizable facts, with just a few percent requiring evaluation skills." (Gardiner 1998)
- "To become active learners, students need professors to use methods that involve them in grasping important concepts, but only 10–30% of professors use methods other than traditional lectures as their primary pedagogy." (Gardiner 1998)

Summary: In order to improve the vast deficiencies found in the current teaching models, Alters and Nelson propose the constructivist model. The constructivist approach in the classroom asserts that "… an instructor should provide situations in which students examine the adequacy of their prior conceptions, allowing them to argue about and test them. The contradictions students may face during this testing process can provide the opportunity for them to acquire more scientifically appropriate concepts. As students practice this process, they also become increasingly skilled in the procedures used in concept acquisition." Essentially, this approach results in more active learning for the students. Despite the possible obstacles of stubborn misconceptions and religious complications, it is an approach worth considering in order to advance acceptance of evolution.

23) Lerner, L. (2000, September 21). "Good and bad science in US schools." *Nature, 407*, 287-290. Retrieved from http://www.nature.com/nature/journal/v407/n6802/full/407287a0.html

This essay examines 49 of the 50 states (Iowa excludes itself), as well as the District of Columbia, in terms of their statewide science standards. They use a list of anti-evolution tactics (listed below) to measure their treatment of biological evolution on a scale from A to F.

Anti-evolution tactics:

- Standards include many of the central principles of evolution — usually briefly — but the word evolution is avoided. Inaccurate and misleading euphemisms such as 'change over time' are used instead of the 'E-word'.
- Biological evolution is ignored. Geological evolution, the history of the Solar System and cosmology may be treated, often even using the word evolution. Fossils are sometimes mentioned, but only in the context of geology, not biology.
- Evolution of plants and animals is treated to some degree but human evolution is ignored.
- All scientific discussions that imply an old Earth or Universe are deleted.
- Creationist jargon is used.
- All textbooks must carry a disclaimer that calls evolution controversial or labels it a theory, not a fact, misusing these terms in their everyday rather than their scientific senses.
- Some or all of the historical sciences are treated lightly but no attempt is made to elucidate the connections among them.

- "Of the 31 states that have satisfactory-to-excellent treatments of biological evolution, only nine treat human evolution explicitly and another 11 by implication; the rest do not cover human evolution at all."
- "Of the 19 states in the less-than-satisfactory ranks, 10 cripple their treatment of evolution through sedulous avoidance of the 'E-word', one state uses the word only once and one state hides it. Of these 12 states, eight attempt to teach some evolution, but do a poor-to-awful job of dealing with the subject. The seven remaining states that receive less than satisfactory grades do mention the word evolution but do not do a good job of covering the concept."
- "Of the 19 states receiving unsatisfactory grades, three ignore the topic of biological evolution altogether, and one not only shuns biological evolution, it also deletes all references, direct or indirect, to the age of the Earth or the Universe, even including radioactive decay (see *Nature* **406,** 552; 2000)."

Distribution of grades across states and D.C.

Grade	*Number of states*	*Treatment of evolution*
A	10	Excellent or very good
B	14	Good
C	7	Satisfactory
D	6	Unsatisfactory
F	12	Useless or absent
F-	1	Disgraceful

Summary: This essay aims to "grade" states on their science standards according to their various uses of anti-evolutionary tactics. The results were disappointing even in the highest graded tiers, with only nine states of the top of 31 having standards to teach evolution explicitly. "This being the case, the

publication and maintenance of scientifically accurate academic standards is a vital quality-control function of the states. Given the far-reaching ramifications of evolution in the life sciences as well as in other sciences, a complete and proper exposition of evolution is an essential constituent of state science standards."

24) (2000, March). "Evolutionism and creationism in public education: An in-depth reading of public opinion." *People for the American Way Foundation*. Retrieved from http://media.pfaw.org/pdf/creationism/creationism-poll.pdf

UNITED STATES (adults); n=1,500

This is a representative, national survey of 1,500 Americans, conducted through telephone interviews from November 3 to 12, 1999. The duration of the interviews was about 15 minutes, and a "follow-up telephone interview of a subset of initial respondents was conducted in mid December." "An RDD (Random-Digit-Dial) sampling methodology was utilized to ensure that the results are projectable to the American public as a whole. Sampling error for a sample of this size is ± 2.6% at the 95% confidence interval."

Questions:

1) Teaching Evolution/Creationism in Public Schools
   a. What should be taught in public schools: Evolution, Creationism, or both?
   b. Should Creationism be taught about in science classes, in other classes, or what?
   c. Should Evolution and/or Creationism be taught as "scientific theory" or instead be taught as "belief"?

66% Support Evolution-oriented Positions

- 20% say teach only Evolution without any mention of Creationism at all.
- 17% say teach only Evolution in science class, however, religious explanations can be discussed in another class (outside of science class).
- 29% say Creationism can be discussed in science class, but discussed as a "belief", **not** a scientific theory (while Evolution should be taught as a "scientific theory" in science class).

13% Support Treating Evolution and Creationism Equally

- 13% say both Evolution and Creationism should be taught as "scientific theories" in science class.

16% Support Creationism-oriented Positions

- 16% say teach only Creationism (with no mention of Evolution).

5% Are Not Sure

- 4% say teach both Evolution and Creationism, but are not sure exactly how to do it.
- 1% have no opinion at all on the topic.

		Age Groups				
	All Americans%	Young Adults (18-24) %	Gen X (25-34) %	Boomer (35-54) %	Silents (55-69) %	Seniors (70+) %
Evolution-Oriented	**66**	**77**	**60**	**69**	**59**	**47**
Teach Evolution only	20	26	17	20	18	21
Teach only Evolution in science class, religious explanation for human development in another class	17	22	19	17	15	8
Teach Evolution as "scientific theory". Creationism can be discussed, but must be discussed as a "belief"	29	29	24	32	26	18

		Educational Attainment			
	All Americans %	High School or Less %	Some College %	College Grad %	Post Grad %
Evolution-Oriented	**66**	**60**	**64**	**67**	**71**
Teach Evolution only	20	17	17	24	24
Teach only Evolution in science class, religious explanation for human development in another class	17	15	17	19	18
Teach Evolution as "scientific theory". Creationism can be discussed, but must be discussed as a "belief"	29	28	30	24	29

		Regions				
	All Americans %	North -east %	Central %	West %	South %	"Bible-Belt"%
Evolution-Oriented	**66**	**71**	**65**	**62**	**61**	**62**
Teach Evolution only	20	25	19	20	17	16
Teach only Evolution in science class, religious explanation for human development in another class	17	20	17	15	16	16
Teach Evolution as "scientific theory." Creationism can be discussed, but must be discussed as a "belief"	29	26	29	27	28	30

		Party ID		
	All Americans%	Republican %	Democrat %	Independent %
Evolution-Oriented	**66**	**62**	**66**	**67**
Teach Evolution only	20	16	20	24
Teach only Evolution in science class, religious explanation for human development in another class	17	17	18	17
Teach Evolution as "scientific theory."	29	29	28	26

Creationism can be discussed, but must be discussed as a "belief"

2) Agree or Disagree: A person can believe in Evolution and still believe God created humans and guided their development.
   - 68% of all Americans agree
   - 28% disagree
   - 4% not sure
3) Agree or disagree: Evolution is one of those issues that is too important to be decided by each and every school board across the country. There needs to be a standard, national approach to whether or not Evolution is taught in the public schools.
   - 66% of all Americans agree
   - 29% of all Americans disagree
   - 5% not sure
   - 68% of parents with children in public school agree
   - 28% of those parents disagree
   - 4% not sure

		Regions				
	All Americans %	Northeast %	Central %	West %	South %	"Bible Belt" %
Agree	**66**	**70**	**63**	**67**	**65**	**64**
Disagree	29	26	33	26	29	32
Not sure	5	4	4	7	6	4

4) "The Kansas State Board Of Education has recently voted to delete Evolution from their new state science standards. Do you support or oppose this decision?"
   - 28% of all Americans agree
   - 60% of all Americans oppose
   - 12% of all Americans not sure
   - 32% of parents with children in public school agree
   - 59% of parents oppose
   - 95 of parents are not sure

5) How well understood is creationism?
   a. Have you ever heard of the term Creationism?
      - 53% of all Americans said yes
      - 45% of all Americans said no
      - 2% of all Americans not sure
   b. How familiar are you with Creationism?

	Americans who have heard of Creationism (53% of total) %	All Americans %
Very Familiar	41	22
Somewhat Familiar	39	21
Not that familiar	20	10
Never heard of Creationism	NA	47

c. Which of the following best fits your description of Creationism?

	Americans who have Heard of Creationism (53% of total) %	All Americans %
"Strict" Definition		
"Creationism means God created humans exactly as the Bible says, starting within the past 10,000 years or so with Adam and Eve in the Garden of Eden"	59	31
"Loose" Definition		
"Creationism means God created humans, but it does not necessarily mean it happened exactly as the Bible says it did"	36	19
Not sure	5	3
Never heard of creationism	NA	47

6) How well understood is evolution?

a. Have you ever heard the term evolution?

- 95% of all Americans say yes
- 5% of all Americans say no

b. How familiar are you with the Evolution?

	Among those who Have heard of the term (95% of public) %	All Americans %
Very Familiar	45	42
Somewhat Familiar	43	41
Not that familiar	12	11
Not sure	*	*
Never heard of Evolution	NA	5

c. Which of the following best fits your definition of evolution with regards to human beings?

	Among those who Have heard of the term (95% of public) %	All Americans %
Incorrect Definition		
"Evolution means human beings have developed from apes over the past millions of years"	34	32
Correct Definition		
"Evolution means human beings have developed from less advanced forms of life over millions of years"	50	48
Means something else / Not sure	16	15
Never heard of Evolution	NA	5

7) Do you agree or disagree with the following: Evolution is commonly referred to as the **Theory** of Evolution because it has not yet been proven scientifically?

- Among those who have heard of evolution (95% of all Americans)…
- 74% agree
- 20% disagree
- 6% not sure

- 49% say it is far from being proven

8) How important is this issue to you, namely whether or not Creationism should be taught in schools?
   - 40% of all Americans say it is extremely important
   - 41% of all Americans say it is somewhat important
   - 17% of all Americans say it is not that important
   - Percentages are very similar for parents with children in public school

Summary: This very thorough survey reveals some recurring trends surrounding evolution, but also sheds light on some of its other less common topics. To begin, the poll reveals that Democrats, the Northeast region, and persons with postgraduate degrees are more likely to support teaching from evolutionist standpoint in public high schools. In total, surprisingly, 66% of their respondents did favor such positions, which emphasizes evolution more than creationism in high schools (even though some believed creationism should still be discussed as a belief). The survey also shockingly revealed that more Americans claim to be "Very familiar" with evolution than creationism (42% compared to 22%). However, 32% of the respondents representing all Americans chose the *incorrect* definition of evolution. Additionally, among those who had heard of evolution (95% of the total population), an overwhelming 74% believed that evolution was called a "theory" since it had not yet been scientifically proven. Thus, despite revealing a general awareness surrounding evolution, this survey also suggests that education surrounding the topic could be improved.

College Samples

25) Paz-y-Miño C., G., & Espinosa, A. (2011, January 15). "Why accepting evolution matters." *Evolution Literacy*. Retrieved from http://pazymino1evolutionliteracy.blogs.umassd.edu/2011/01/15/new-england-professors-accept-evolution-but-they-are-religious-editorial-the-standard-times/

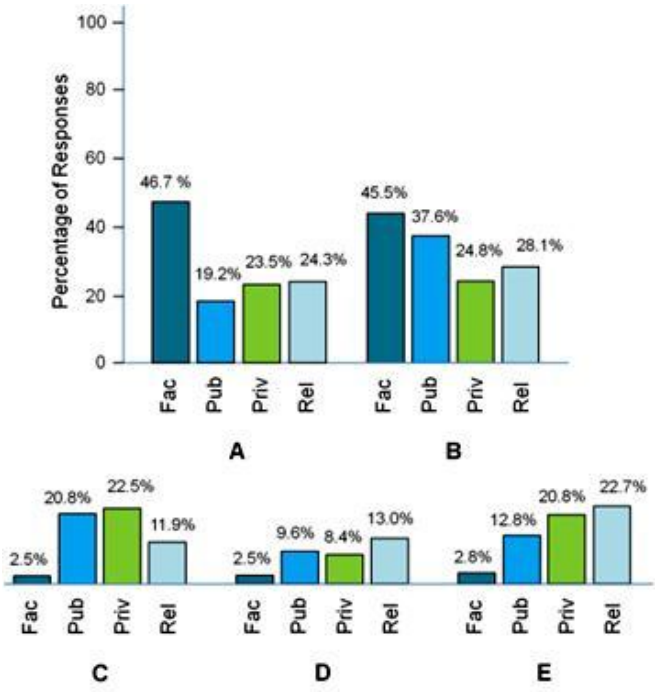
Paz-y-Miño C., G., & Espinosa, A. (2010, December 18). Why accepting evolution matters. *Evolution Education Outreach*. Retrieved from http://faculty.rwu.edu/aespinosa/NewEnglandFac_PazyMinoC_Espinosa_2011.pdf

**The first source, from *Evolutionary Literacy*, references the second source from *Springer Science+Business*. Both are used in the following abstract, though differentiated by year instead of author (since both are by the same Paz-y- Miño and Espinosa).

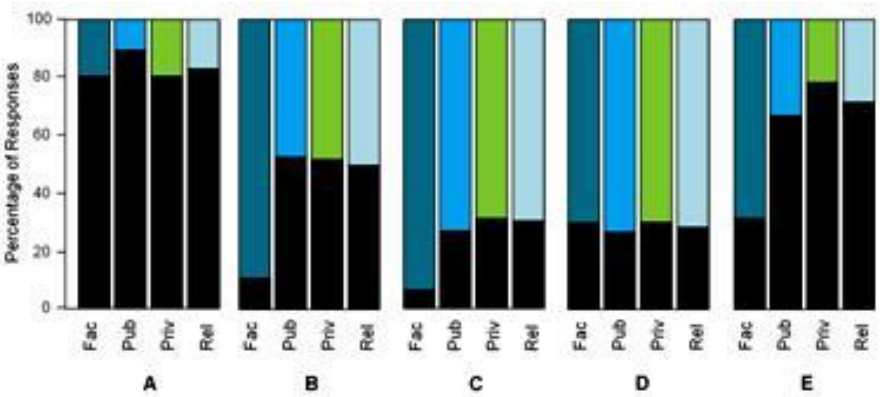
UNITED STATES (professors, public and private college students, and religious institutions); 161<n<298

They surveyed 244 faculty — 90 percent Ph.D. holders in 40 disciplines at 35 colleges and universities from the Northeast region, ***Connecticut***, ***Maine***, ***Massachusetts***, ***New Hampshire***, ***Rhode Island*** and ***Vermont*** specifically. Additionally, they survey "college students from public secular (*n* = 161), private secular (*n* = 298), and religious (*n* = 185) institutions." (2011)

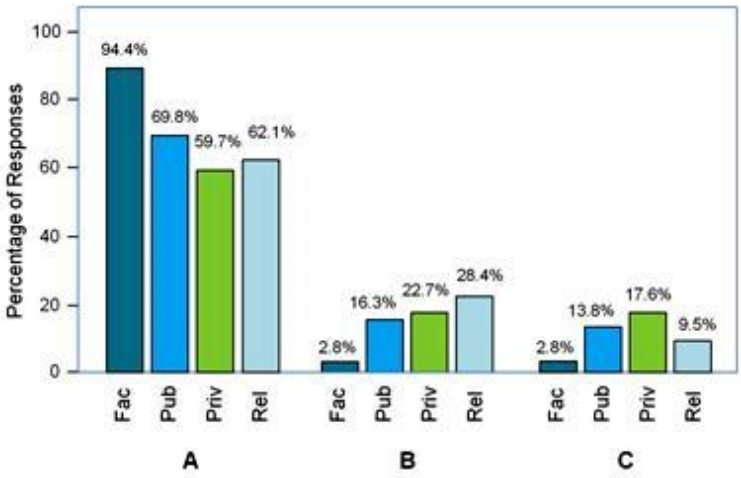
- "94/**3%** of the faculty vs. 64/**14%** of the students admitted to accepting evolution openly and/or privately, and 82/**18%** of the faculty vs. 58/**42%** of the students thought that evolution is definitely true or probably true, respectively. Only **3%** of the faculty vs. **23%** of the students thought that evolution and creationism are in harmony. Although **92%** of faculty and students thought that evolution relies on common ancestry, one in every four faculty and one in every three students did not know that humans are apes; **15%** of the faculty vs. **34%** of the students believed, incorrectly, that the origin of the human mind cannot be explained by evolution, and **30%** of the faculty vs. **72%** of the students was Lamarckian (believed in inheritance of acquired traits)." (2010)
- "Our study revealed that 91 percent of the New England professors were very or somehow concerned about the controversy of evolution versus creationism versus "intelligent design" and its implications for science education. In fact, 96 percent of them supported the exclusive teaching of evolution in science classes and a 4 percent minority favored equal time to evolution and creationism (the latter declared unconstitutional by the **Supreme Court in 1987**). And 92 percent of the faculty perceived intelligent design as not scientific and as proposed to counter evolution, or as doctrine consistent with creationism." (2011)
- "We asked the professors if faith in God is necessary for morality, if religion is important in their lives, and if they pray. Only 5 percent agreed with the need of a God to secure proper social behavior, but 30 percent considered religion to be very important in their daily existence, and 17 percent confessed to pray daily." (2011)



"Percentage of New England faculty (Fac) versus college students from public secular (Pub), private secular (Priv), and religious (Rel) institutions who consider one of the following statements to be consistent with intelligent design (ID): (A) ID is not scientific but has been proposed to counter evolution based on false claims; (B) ID is religious doctrine consistent with creationism; (C) no opinion; (D) ID is a scientific alternative to evolution and of equal scientific validity among scientists; (E) ID is a scientific theory about the origin and evolution of life on Earth." (2011)



"Percentage of New England faculty (Fac) versus college students from public secular (Pub), private secular (Priv), and religious (Rel) institutions who consider the following definitions of evolution to be either true (black bars) or false (color bars): (A) gradual process by which the universe changes, it includes the origin of life, its diversification and the synergistic phenomena resulting from the interaction between life and the environment; (B) directional process by which unicellular organisms, like bacteria, turn into multicellular organisms, like sponges, which later turn into fish, amphibians, reptiles, birds, mammals, and ultimately humans, the pinnacle of evolution; (C) gradual process by which monkeys such as chimpanzees, turn into humans; (D) random process by which life originates, changes, and ends accidentally in complex organisms such as humans; and (E) gradual process by which organisms acquire traits during their lifetimes, such as longer necks, larger brains, resistance to parasites, and then pass on these traits to their descendants." (2011)



"Percentage of New England faculty (Fac) versus college students from public secular (Pub), private secular (Priv), and religious (Rel) institutions who believe one of the following statements describes them best: (A) I accept evolution and express it openly regardless of others' opinions; (B) no opinion; and (C) I accept evolution but do not discuss it openly to avoid conflicts with friends and family." (2011)

Summary: Primarily focusing on professors from the New England area, this study reveals overall concern regarding the issue of evolution versus creationism versus intelligent design to be relatively high, with 91 percent of the faculty sample agreeing to be somehow or very concerned. Despite this growing attention to the issue, however, one in every four of the faculty did not know that humans are apes, or relatives of primates; furthermore, 30 percent of the faculty held Lamarckian notions of evolution(2011). Additionally, the study revealed that a significant portion of these professors (30 percent) considered religion to be an important part of their daily existence despite 94.4 percent of them agreeing to the statement: "I accept evolution and express it openly regardless of others' opinions" (2011). Therefore, acceptance surrounding evolution amongst professors across New England possesses conflicting factors. The importance of this data lies in its correlation to proper science education in the school system and the overall acceptance of naturalistic rationalism.

26) Nadelson, L., & Sinatra, G. (2009). "Educational professionals' knowledge and acceptance of evolution." *Evolutionary Psychology Journal, 7(4)*, 490-516. Retrieved from http://www.epjournal.net/filestore/ep07490516.pdf

UNITED STATES (educational professionals in psychology); n=337

Background: This study principally seeks to assess the merits of educational professionals in the emerging field of evolutionary educational psychology. This burgeoning area of study "seeks to understand learning as an evolved ability."To clarify, "Children acquire oral language, a biologically primary skill, with relative ease and therefore tend to require less formal instruction to learn to speak, whereas reading, a biologically secondary skill, tends to require systematic structured instruction and sustained effort on the part of the learner to acquire proficiency. The recognition of these domain differences and other aspects of learning that can be understood using an evolution-based perspective supports the possible utility of evolutionary educational psychology."
"The increasing reference to evolutionary psychology in cognition research and the associated theory refinement raises the question of whether there is a cadre of researchers or university instructors in *education domains* (what we call educational professionals) with sufficient comprehension and acceptance of biological evolution to adequately and objectively evaluate the merits and validity of this perspective."
"The purpose of our study was to determine the propensity for a sample of members of educational professional organizations in the USA to engage in the objective consideration of the merits or shortcomings of evolutionary educational psychology. Our research assessed participants' key personal characteristics, level of religious commitment, research and academic experience, knowledge of evolution (specifically understanding of the process of biological change through natural selection), and levels of acceptance of the theory of evolution."

"Study participants were 337 educational professionals recruited through their membership in Division 15 (Educational Psychology) of the American Psychological Association (APA), and Division C (Learning and Instruction) of the American Educational Research Association (AERA)." Approximately 60% of respondents were female, and 40% male. The sample was also very well educated, with 67% holding a Ph.D. or Ed.D. "About 40% of our respondents indicated that research was their primary institutional activity, 30% indicated teaching, with the remaining 30% indicating administration, service to patients, and other activities (such as graduate student or retired)." The average age of respondents was 45.37 years old. "All surveys were administered and data collected through Zoomerang, an internet based secure survey web site. Participation was anonymous."
After providing demographic information, participants were directed to complete the *Measure of Acceptance of the Theory of Evolution* (**MATE**). This questionnaire is scored from 20-100 possible points, with a five-point Likert scale that ranges from "Strongly Disagree" to "Strongly Agree."
"Following the completion of the MATE instrument, the participants were directed to the Conceptual Inventory of Natural Selection (**CINS**) (Anderson, Fisher, and Norman, 2002). The 20 item CINS instrument uses scenarios and corresponding selected response items to assess knowledge of natural selection…"
*** "In interpreting these findings, is important to note that our participants do not constitute a random or a representative sample of the populations of all educational psychologists, educational research, or education professionals."

Questions:

1) Level of religious commitment:
    - Not religious **OR** Minimally religious—**49%**
    - Somewhat religious—**21%**
    - Religious **OR** Very religious—**31%**
2) Personal importance of religion:
    - The average (2.95) placed our participants near "somewhat important"
    - The high level of correlation between this question and that of religious commitment "…provided justification for combining the two measures to form a single composite variable representing of our participants' levels of religiosity."
3) What are the levels of acceptance and knowledge of evolution held by this sample of educational professionals?
    - High to Very High—**75%**
4) Rate your compatibility between religious beliefs and evolution
    - Compatible or Very Compatible**—78%**
5) What is the relationship among participants' knowledge of evolution, acceptance of evolution, and levels of religiosity?
    - "The results revealed acceptance scores on the MATE to be significantly correlated with knowledge of evolution (as measured by the CINS), $r(337) = .38$, $p < .01$. The MATE scores were also found to be significantly correlated with perceived evolution familiarity, $r(337) = .28$, $p < .01$."
6) How do levels of acceptance and knowledge of evolution vary among the participants in relation to their academic rank, years of academic work, primary academic responsibility, and highest held degree?
    - "Post hoc analysis revealed that Instructors had significantly lower levels of acceptance than Lecturers ($p < .05$), Assistant Professors ($p < .05$), Associate Professors ($p < .05$), and Full Professors ($p < .01$). Further analysis of the pairwise comparisons revealed that Graduate Students had significantly lower levels of acceptance of evolution than Assistant Professors ($p < .05$) and, Full Professors ($p < .01$)."
    - Futher, "The results of this analysis revealed that levels of acceptance of evolution (MATE) varied with respect to the highest degree obtained, $F(5,331) = 7.35$, $p < .01$. The post hoc analysis of MATE scores revealed those holding a Ph.D. had significantly higher levels of acceptance than those holding a M.A. ($p < .01$) or an M.Ed. degree ($p < .01$)."
    - "Analysis of the CINS, our measure of evolution knowledge (inferred from knowledge of natural selection), revealed that approximately 65% answered correctly on 75% or more of the questions."
    - "The participants self-reported a perceived average level of familiarity with evolution of 3.62 ($SD = .91$) which fell between "somewhat familiar" and "familiar" on our Likert scale."
    - "Our results indicate that years of experience was significantly correlated with *acceptance* of evolution (MATE) $r(337) = .14$, $p < .05$."
    - Since there was no detectable correlation between years of experience and *understanding* evolution (as measured by CINS), one can conclude that "academic experience is not a predictor of evolution knowledge or religious commitment, but as years of experience increased there was an increase in the acceptance of evolution."

- "The number of college level biology courses was found to be significantly correlated with understanding of evolution (CINS), $r(337) = .16$, $p < .01$, and familiarity, $r(337) = .41$, $p < .01$. This indicates that as the number of biology courses increased evolution knowledge also increased."
- "We did not detect any relationships between primary institutional responsibility and religiosity or experience with research or teaching science."

7) Do academic experience, individual characteristics, evolution knowledge and acceptance relate to the willingness and ability to objectively consider the plausibility and coherence of evolution-based conjectures?
    - "The correlation of $r = .01$ between our academic experience and knowledge of evolution latent variables (see Table 8) indicates that these variables are measures of *different* constructs that are responded to with *different* consistencies. Yet, the considerably higher correlations between our experience variable and acceptance variable (hypothesized to be a predictor of the likelihood of engaging in the consideration of evolutionary developments) and our knowledge and acceptance variables ($r = .29$ and $r = .34$ respectively), provides justification for the use of knowledge and experience as predictors of acceptance in our proposed model."

Measure	***M***	***SD***
Level of religious commitment (Scale 1 - 5)	2.66	1.35
Importance of religion (Scale 1 - 5)	2.95	1.47
Familiarity with evolution (Scale 1 - 5)	3.63	.91
Knowledge of Evolution (CINS) (Scale 0 - 20)	15.41	4.26
Religious beliefs compatible with evolution (Scale 1 - 5)	3.97	1.15
Acceptance of Evolution (MATE) (Scale 20 – 100)	87.77	13.41

Academic Rank	***n***	**Sex**		**MATE * (Scale 20-100)**	**Evolution Compatible Beliefs (Scale 1-5)**	**CINS ** (Scale 0-20)**	**Familiarly with Evolution (Scale 1-5)**	**Religiosity (Scale 1-5)**	**Experience Researching or Teaching Science Education (Scale 0-1)**
		M/F	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	
Professor	71	43/28		91.83 (9.36)	4.23 (1.05)	16.00 (4.09)	3.63 (.96)	2.86 (1.27)	.58 (.50)
Associate. Professor	45	21/24		89.31 (11.47)	4.09 (.97)	16.58 (3.85)	3.78 (.90)	2.60 (1.43)	.58 (.50)
Assistant Professor	69	24/45		89.81 (11.24)	4.13 (1.08)	15.30 (4.47)	3.57 (.83)	2.76 (1.35)	.61 (.49)
Lecturer	37	11/26		89.94 (11.12)	3.97 (1.24)	15.35 (3.74)	3.70 (.88)	2.61 (1.45)	.51 (.51)
Instructor	22	8/14		79.13 (22.01)	3.36 (1.29)	14.09 (4.81)	3.77 (1.02)	3.11 (1.38)	.55 (.51)
Graduate. Student	93	22/71		83.59 (14.85)	3.73 (1.22)	14.80 (4.38)	3.55 (.94)	2.91 (1.42)	.44 (.50)

Institutional Responsibility	***n***	**Sex**		**MATE * (Scale 20-100)**	**Evolution Compatible Beliefs (Scale 1-5)**	**CINS ** (Scale 0-20)**	**Familiarly with Evolution (Scale 1-5)**	**Religiosity (Scale 1-5)**	**Experience Researching or Teaching Science Education (Scale 0-1)**
		M/F	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	
Administration	33	15/18		85.42(16.03)	4.00 (1.25)	15.12(4.01)	3.61 (.93)	3.09(1.35)	.48(.51)
Teaching	105	38/67		87.55(13.59)	4.00(1.10)	15.22(4.64)	3.60 (.93)	2.66(1.31)	.47(.50)
Research	134	49/85		89.56(12.33)	4.00(1.10)	16.07(3.92)	3.67 (.89)	2.57(1.35)	.63(48)
Services to clients	13	2/11		74.54(18.68)	3.38(1.29)	12.54(3.69)	3.54 (1.13)	3.08(1.44)	.46(.52)
Other	52	25/27		88.40(10.60)	3.94(1.29)	15.00(4.31)	3.63 (.91)	2.54(1.38)	.51(50)

Knowledge		**Acceptance**	**Experience**
Knowledge of Evolution	--		
Acceptanceof Evolution	.34*	--	
Experiencein Academics	.01	.29*	--

Summary: This study provides a complex attempt to solidify the importance of educational professionals who possess knowledge and experience in the field of evolutionary educational psychology. Specifically, the study examines the importance of religion to the participants, as well as their grasp on the theory of evolution. Factors assessed include level of education, years of experience, and institutional responsibility. Of these, the most telling data reveals that *acceptance* of evolution strongly correlated with years of experience and level of education, with full time professors and Ph.D. holders reporting higher rates of acceptance than graduate students and participants with M.A.'s or M.Ed.'s. Although these factors did not prove to have a strong correlation with *understanding* of evolution, the "results suggest that there is an informed, sizable subgroup (recall our sample size was well over 300 individuals) of educational professionals that exhibit preparedness to evaluate this new view of learning and cognition."

27) Paz-y-Miño C., G., & Espinosa, A. (2009, October 13). "Acceptance of evolution increases with student academic level: A comparison between secular and religious college." *Evolution Education Outreach, 2*, 655-675. Retrieved from http://faculty.rwu.edu/aespinosa/PazyMinoC-EspinosaVol2_4Dec2009.pdf

UNITED STATES (secular and religious Northeastern colleges); n=831

This study compares perspectives about evolution, intelligent design, and creationism between a secular college, Roger Williams University (RWU), and a religious college, the Catholic Providence College (PC). Both establishments are located in the Northeastern region of the United States. "Four hundred and seventy-six students at RWU (biology majors n=237, nonmajors n=239) and 355 students at PC (biology majors n=212, nonmajors n=143) responded to a six-question anonymous survey to assess their views about evolution, creationism, and intelligent design."The survey was conducted from September 17th to the 24th in 2007 for the participants at Roger Williams University; whereas the survey for participants at the Catholic Providence College responded to questions between February 4th and 15th in 2008.

Questions:

1) Evolution, creationism, and intelligent design in the science class. Which of the following explanations about the origin and development of life on Earth should be taught in science classes?
   - A = evolution
   - B = equal time to evolution, creationism, intelligent design
   - C = do not know enough to say
   - D = creationism
   - E = intelligent design
2) Intelligent Design (ID). Which of the following statements is consistent with ID?
   - A = no opinion
   - B = ID is religious doctrine consistent with creationism
   - C = ID is a scientific alternative to evolution and of equal scientific validity among scientists
   - D = ID is a scientific theory about the origin and evolution of life on Earth
   - E = ID is not scientific but has been proposed to counter evolution based on false scientific claims
3) Evolution and your reaction to it. Which of the following statements fits best your position concerning evolution?
   - A = hearing about evolution makes me appreciate the factual explanation about the origin of life on Earth and its place in the universe
   - B = hearing about evolution makes no difference to me because evolution and creationism are in harmony
   - C = do not know enough to say
   - D = hearing about evolution makes me uncomfortable because it is in conflict with my faith
   - E = hearing about evolution makes me realize how wrong scientists are concerning explanations about the origin of life on Earth and the universe

4) Your position about the teaching of human evolution. With which of the following statements do you agree?
    - A = I prefer science courses where evolution is discussed comprehensively and humans are part of it
    - B = I prefer science courses where plant and animal evolution is discussed but not human evolution
    - C = do not know enough to say
    - D = I prefer science courses where the topic evolution is never addressed
    - E = I avoid science courses with evolutionary content
5) Evolution in science exams. Which of the following statements fits best your position concerning science exams?
    - A = I have no problem answering questions concerning evolution
    - B = science exams should always include some questions concerning evolution
    - C = do not know enough to say
    - D = I prefer to not answer questions concerning evolution
    - E = I never answer questions concerning evolution
6) Your willingness to discuss evolution. Select the statement that describes you best:
    - A = I accept evolution and express it openly regardless of others' opinions
    - B = no opinion
    - C = I accept evolution but do not discuss it openly to avoid conflicts with friends and family
    - D = I believe in creationism and express it openly regardless of others' opinions
    - E = I believe in creationism but do not discuss it openly to avoid conflicts with friends and family

- Biology majors: "**64%** of the combined student responders (mean RWU + PC) considered that evolution should be taught in science classes as an explanation about the origin and development of life on Earth; **29%** favored equal time to evolution, creationism, and intelligent design, and **6%** did not know enough to say."
- However, non-majors differed in opinion between the two schools: "**42%** of RWU versus **62%** of PC responders thought that evolution should be taught in science classes (sign test two-tail pairwise comparison $P \leq 0.05$); **45%** of RWU versus **30%** of PC students favored equal time to evolution, creationism, and intelligent design, and **12%** of RWU versus **7%** of PC students did not know enough to say."
- In terms of academic level, the combined school responses reveal that, "**51%** of the combined freshman responders, **62%** sophomores, **72%** juniors, and **81%** seniors considered that evolution should be taught in science classes."
- In terms of intelligent design, the schools' biology majors differed: " **47%** of RWU versus **17%** of PC responders had no opinion about ID … **16%** of RWU versus **32%** of PC responders thought ID is a religious doctrine consistent with creationism … while **9%** of the combined student responders (mean RWU + PC) considered ID to be a scientific alternative to evolution and of equal scientific validity among scientists, **17%** thought ID is a scientific theory about the origin and evolution of life on Earth, and **17%** considered ID not scientific but proposed to counter evolution based on false scientific claims."
- The non-majors also disagreed on the topic of intelligent design: "**49%** of RWU versus **27%** of PC responders had no opinion about ID (sign test two-tail pairwise comparison $P \leq 0.05$), **18%** of the combined student responders (mean RWU + PC) thought ID is a religious doctrine, **10%**

considered ID to be a scientific alternative to evolution, **22%** thought ID is a scientific theory, and **11%** considered ID not scientific and proposed to counter evolution."

- Differentiation in terms of academic level: "…more RWU than PC freshmen (**57% vs. 25%**), sophomores (**39% vs. 8%**), juniors (**36% vs.17%**), or seniors (**48% vs. 12%**) had no opinion about ID; more PC than RWU sophomores (**44% vs. 20%**), juniors (**36% vs. 15%**), or seniors (**34% vs. 16%**) thought ID is a religious doctrine; and more PC than RWU freshmen (**20% vs. 3%**) considered ID a scientific alternative to evolution…"
- With regards to the value of learning evolution, the responses of bio majors at both schools coincided,: "…**76%** of the combined student responders (mean RWU + PC) thought that hearing about evolution makes them appreciate the factual explanation about the origin of life on Earth and its place in the universe, while **23%** considered that hearing about evolution makes no difference because evolution and creationism are in harmony."
- Non-majors between schools also agreed on evolution, with "…**76%** of the combined student responders expressed appreciation for the factual explanations about the origin of life on Earth, and **24%** considered that evolution and creationism are in harmony."
- Combined Biology majors according to academic level revealed that "…**68%** of the combined freshman responders, **75%** sophomores, **82%** juniors, and **86%** seniors favored the factual explanations about the origin of life on Earth."
- Both majors and non-majors agreed on the teaching of evolution between schools: **86%** of combined bio majors preferred science courses where evolution is discussed comprehensibly and humans are a part of it; similarly, **79%** of non-majors felt the same way.
- Additionally, amongst biology majors at both schools "…**88%** of the combined freshman responders, **90%** sophomores, **95%** juniors, and **97%** seniors favored the teaching of human evolution in science courses."
- A look at attitudes towards evolution on science exams reveals that, "…**76%** of the combined student responders (mean RWU + PC) had no problem with answering questions concerning evolution in exams; **19%** considered that exams should always include some questions concerning evolution, and **5%** did not know enough to say. The nonmajors' views were similar between both institutions… **79%** of the combined student responders welcomed questions concerning evolution in exams; **12%** thought that exams should always include some questions concerning evolution."
- More specifically, data from biology majors across academic levels reveals, "**83%** of the combined freshman responders, **76%** of sophomores, **78%** of juniors, and **80%** of seniors favored the inclusion of evolution in science exams."
- With regards to willingness to discuss evolution, both majors and non-majors at both institutions showed similar perspectives. With majors, "**52%** of the combined student responders (mean RWU + PC) indicated that they accept evolution and express it openly regardless of others' opinions; **26%** preferred not to comment on this issue, and **14%** admitted to accept evolution but not discuss it openly to avoid conflicts with friends and family…" Meanwhile, with non-majors, "**33%** of the combined student responders indicated that they accept evolution and express it openly; **42%** preferred not to comment on this issue, and **13%** admitted that they accept evolution but do not discuss it openly…"
- With academic level opinion on willingness, "**46%** of the combined freshman responders, **52%** sophomores, **60%** juniors, and **67%** seniors accept evolution and express it openly."

Summary: Broadly, this study aims to compare and contrast perspectives on evolution, intelligent, design, and creationism between a secular and a religious college in the Northeast. While doing so,

however, the study also addresses intrainstitutional differences between biology majors and non-majors, as well as academic level (freshman, sophomore, junior, senior). Important findings across both colleges (meaning both RWU and PC), between majors, include the fact that, "76% of biology majors or 76% of nonmajors… valued the factual explanation evolution provides about the origin of life and its place in the universe…; 86% of biology majors or 79% of nonmajors… preferred science courses where human evolution is discussed…, and 76% of biology majors or 79% of nonmajors… welcomed questions concerning evolution in exams." With respect to academic level, acceptance and support of evolution seems to increase with age due to the fact that percentages increased each year in response to the questions regarding exclusive teaching of evolution in science class; appreciation for the explanation that evolution provides; preference for science courses where human evolution is discussed; and willingness to accept evolution openly.

In terms of significant differences between the two colleges, there were similar and contrasting results. However, for the most part, the two schools revealed incredibly similar percentages in response to questions on the acceptance of evolution. For example, "60% of RWU biology majors versus 42% of RWU nonmajors or 65% of PC responders (mean biology majors + nonmajors) supported the exclusive teaching of evolution in science classes …; 71% of RWU biology majors versus 57% of RWU nonmajors or 74% of PC responders (mean biology majors + nonmajors) valued the factual explanation evolution provides about the origin of life and its place in the universe…; 78% of RWU or 87% of PC responders (means biology majors + nonmajors) preferred science courses where human evolution is discussed…" Therefore, the lack *inter*-institutional difference further proves how "public support of science correlates positively to level of schooling and income," which in turn demonstrates the importance of "Higher-education and outreach programs in biology for school teachers."

28) Cotner, S., Brooks, D., & Moore, R. (2009, November 26). "Is the age of the earth one of our 'sorest troubles?' Student's perceptions about deep time affect their acceptance of evolutionary theory." *Evolution: International Journal of Organic Revolution, 64*, 858-864. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1558-5646.2009.00911.x/abstract

UNITED STATES (secular college students); n=400

This study specifically examines how college students' self-described religious and political views influence their beliefs about Earth's age and how this may affect their knowledge and acceptance of evolution. Conducted in 2009, the optional survey was presented to 400 enrolled in several sections of a non-majors introductory biology course at the University of Minnesota. The survey "…consisted of the 20-item Measure of Acceptance of the Theory of Evolution (MATE) developed and validated by Rutledge and Sadler (2007), our own 10-item Knowledge of Evolution Exam (KEE; Moore et al. 2009a), and several items intended to gauge students' religious and political preferences." "Response rate varied by survey item, with as many as 195 students (almost 50% of the targeted group) completing the KEE, and as few as 124 responding to some of the MATE items."

Questions:

1) Religious Views: In general, I would describe my religious views as:
    - Conservative
    - Middle-of-the-road
    - Liberal/progressive
    - None of the above/I'm not religious
2) Political Views: In general, I would describe my political views as:
    - Conservative
    - Middle-of-the-road
    - Liberal
3) Young-Earth Variables: The age of the Earth is less than 20,000 years
    - Range goes from "Strongly Disagree" to "Strongly Agree"
4) Young-Earth Variables: The theory of evolution cannot be correct because it disagrees with the Biblical account of creation
    - Range goes from "Strongly Disagree" to "Strongly Agree"
5) Old-Earth Variables: Organisms existing today are the result of evolutionary processes that have occurred over millions of years
    - Range goes from "Strongly Disagree" to "Strongly Agree"
6) Old-Earth Variables: The age of the earth is at least 4 billion years
    - Range goes from "Strongly Disagree" to "Strongly Agree"
7) Identify whether or not evolution or creationism was taught in your high school biology courses
    - Included neither creationism nor evolution
    - Included creationism, but not evolution
    - Included both evolution and creationism

- Included evolution, but not creationism

8) "The variable measuring students' level of evolutionary biology knowledge (EVOGRADE) is a summative index of the number of questions answered correctly about various facets of evolutionary theory. EVOGRADE ranges in value from zero to 10 with each increment representing a correctly answered question."
9) "The 2008 presidential candidate supported by each student was collected via the self-reported, retrospective response to the statement, 'In the past presidential election, I voted/would have voted for John McCain or Barack Obama.'"

Variable	N	Mean	Std. Dev.	Min.	Max.
Myrelview	180	2.8111	0.9501	1	4
Mypolview	173	2.3468	0.7361	1	3
Youngearth	124	1.4839	0.6806	1	4
Oldearth	132	3.3674	0.6958	1	4
Hsbio	194	3.3402	1.0270	1	4
Evograde	195	5.3026	2.2328	0	10
Vote	174	0.7816	0.4143	0	1

- "…the more liberal one's political views, the more likely one is to be liberal, agnostic, or atheistic in their religious views and vice versa."
- "…the more conservative a student's religious views, the greater the likelihood of endorsing young-Earth beliefs ($P < 0.05$) and the less likely they are to endorse old-Earth evolutionist beliefs ($P < 0.01$)."
- "…more liberal, agnostic, or atheistic religious students were significantly more likely ($P < 0.05$) to correctly answer knowledge-based questions about theories and facts related to evolution."
- "…students holding less conservative religious views were considerably more likely to have voted for or supported Barack Obama in the 2008 presidential election ($P < 0.001$)."
- "…more liberal political views are negatively related to acceptance of young-Earth views and positively related to knowledge of evolutionary theory, political views fail to predict significantly either of those variables."

- Those "…who hold young-Earth views are significantly less likely to accept an old-Earth rooted in evolutionary theory and vice versa."
- "…students whose high school biology course included only evolutionary theory had approximately a 70% chance of answering half of the questions or more correctly whereas those with courses teaching only creationism had an approximately 50% chance of doing so (for discussion, see Moore et al. 2009b); those with neither evolution nor creationism had a 42% chance of scoring 50% or above…"

Summary: Moore's study encompasses numerous facets of college students' self-described religious and political views, which includes the influence these have on their beliefs about Earth's age and their knowledge/acceptance of evolution. While holding young-Earth views does not necessarily impede a student's ability to learn about the theory of evolution, the findings show that, "…students who are liberal, agnostic, or atheistic in their religious views, are politically liberal, were taught evolution in high school, and accept the science behind evolutionary theory are more likely to understand the theoretical concepts and empirical findings related to evolution than those who are more conservative politically and religiously, received either no evolution or a diluted form of evolution instruction in high school, and who do not accept an old Earth." Additionally, the study reveals that a student's political views (assessed by asking for their vote in the 2008 presidential campaign) also serve as a proxy for religious views. Therefore, the implementation of a "comprehensive conceptual-change instruction in Earth's age, the scientific method, and evolutionary theory could have practical, real-world implications that include nothing less than who we elect for political office."

29) Paz-y-Miño C., G., & Espinosa, A. (2008, November 19). "Assessment of biology majors' versus non-majors' views on evolution, creationism, and intelligent design." *Evolution Education Outreach, 2*, 75-83. Retrieved from http://faculty.rwu.edu/aespinosa/Paz-y-Mino_EspinosaEEOpub2009.pdf
*Referenced in #17

UNITED STATES (College Students: Bio majors and non-majors; n=476)

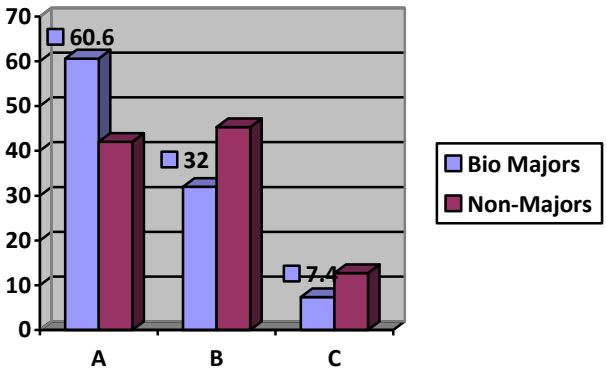
"Four hundred seventy-six students (biology majors n=237, non-majors n=239), native to 17 states in the USA, but mostly from the Northeastern region (Table 1), responded to a five-question anonymous survey to assess their views about evolution, creationism, and intelligent design."Students from Roger Williams University were asked to answer five separate questions, each with five choices that were presented randomly.

Questions:

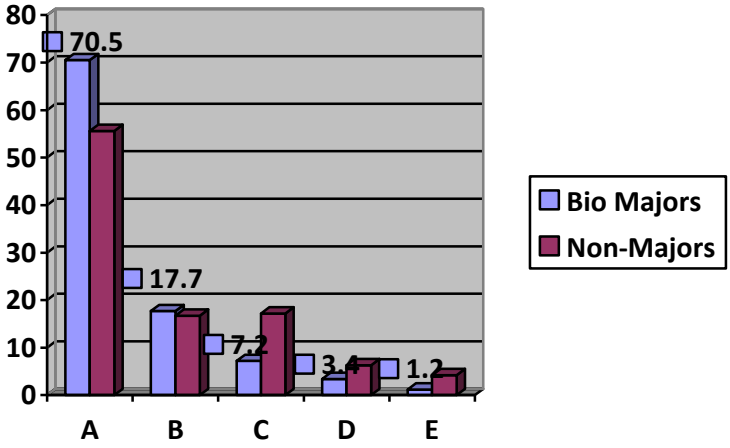
1) Evolution, creationism, and intelligent design in the science class: Which of the following explanations about the origin and development of life on Earth should be taught in science classes?
    - Evolution**—51%**
    - Equal time to evolution, creationism, and intelligent design**—39%**
    - Do not know enough to say**—10%**
    - Creationism
    - Intelligent design
2) Evolution and your reaction to it: Which of the following statements fits best your position concerning evolution?
    - Hearing about evolution makes me appreciate the factual explanation about the origin of life on Earth and its place in the universe**—63%**
    - Hearing about evolution makes no difference to me because evolution and creationism are in harmony **–17%**
    - Do not know enough to say **OR** Hearing about evolution makes me uncomfortable because it is in conflict with my faith**—20%**
    - Hearing about evolution makes me realize how wrong scientists are concerning explanations about the origin of life on Earth and the universe.
3) Your position about the teaching of human evolution: With which of the following statements do you agree?
    - I prefer science courses where evolution is discussed comprehensively and humans are part of it**—78%**
    - I prefer science courses where plant and animal evolution is discussed but not human evolution**—10%**
    - Do not know enough to say**—12%**
    - I prefer science courses where the topic evolution is never addressed
    - I avoid science courses with evolutionary content
4) Evolution in science exams: Which of the following statements bests fits your position concerning science exams?
    - I have no problem answering questions concerning evolution**—69%**
    - Science exams should always include some questions concerning evolution**—14%**
    - Do not know enough to say **OR** I prefer not to answer questions concerning evolution **OR** I never answer questions concerning evolution**—17%**

5) Your willingness to discuss evolution: Select the statement that describes you best.
   - I accept evolution and express it openly regardless of other's opinions—**37%**
   - No opinion—**38%**
   - I accept evolution but do not discuss it openly to avoid conflicts with friends and family—**16%**
   - I believe in creationism and express it openly regardless of others' opinions **OR** I believe in creationism but do not discuss it openly to avoid conflicts with friends and family—**9%**

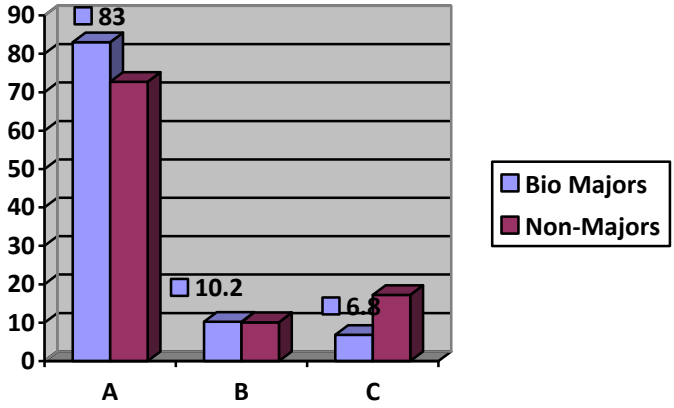
QUESTION 1
Percentage of biology majors (black bars, n=231) and nonmajors (white bars, n=236) who consider one of the following explanations about the origin and development of life on Earth should be taught in science classes: **A** = evolution, **B** = equal time to evolution, creationism, intelligent design, and **C** = do not know enough to say



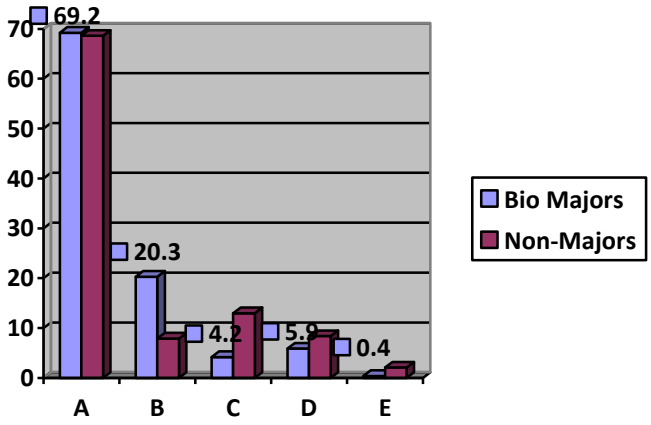
QUESTION 2
Percentage of biology majors (black bars, n=237) and nonmajors (white bars, n=239) who think one of the following statements fits best their position concerning evolution: A = hearing about evolution makes me appreciate the factual explanation about the origin of life on Earth and its place in the universe, B = hearing about
evolution makes no difference to me because evolution and
creationism are in harmony, C = do not know enough to say, D = hearing about evolution makes me uncomfortable because it is in conflict with my faith, and E = hearing about evolution makes me realize how wrong scientists are concerning explanations about the origin of life on Earth and the universe



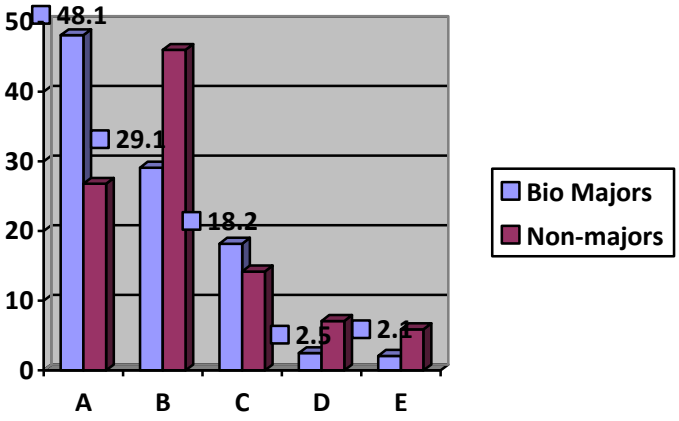
QUESTION 3
Percentage of biology majors (black bars, n=234) and nonmajors (white bars, n=227) who agree with one of the following statements concerning their own education: A = I prefer science courses where evolution is discussed comprehensively and humans are part of it, B = I prefer science courses where plant and animal evolution is discussed but not human evolution, and C = do not know enough to say.



QUESTION 4
Percentage of biology majors (black bars, n=237) and nonmajors (white bars, n=239) who agree with one of the following statements concerning evolution in science exams: A = I have no problem answering questions concerning evolution, B = science exams should always include some questions concerning evolution, C = do not know enough to say, D = I prefer not to answer questions concerning evolution, and E = I never answer questions concerning evolution



QUESTION 5
Percentage of biology majors (black bars, n=237) and nonmajors (white bars, n=239) who consider one of the following statements describes them best: A = I accept evolution and express it openly regardless of other's opinions, B = no opinion, C = I accept evolution but do not discuss it openly to avoid conflicts with friends and family, D = I believe in creationism and express it openly regardless of others' opinions, and E = I believe in creationism but do not discuss it openly to avoid conflicts with friends and family



Summary: This study of roughly four hundred students at a secular liberal arts private university reveals the discrepancies between students majoring in biology and those who are non-majors with respect to their beliefs regarding evolution. "The combined responses of students who accept evolution and express it openly plus those who accept evolution privately (Fig. 5a, choices A plus C) show that 66.3% of all biology majors versus 41% of all non-majors accept evolution."Also, age appears to be an indicator for those more willing to believe in evolution. "The combined responses of biology majors who accept

evolution and express it openly plus those who accept evolution privately (Fig. 5b, choices A plus C) show that 60.7% of freshman and 81% of seniors accept evolution."Between these two factors, a number of interesting patterns arise. For example, "It is intriguing that 32% of biology majors favored equal time in the science class to evolution, creationism, and intelligent design (Fig. 1a, choice B). Further analysis of this group reveals that 41.2% of freshman biology majors agreed with this view, an opinion that drops to only 13.1% by the senior year (Fig. 1b, choice B)." Therefore, the data here reveals that a concentration in biology, and also level of education thereby received, are strong indicators of one's willingness to accept evolution and wish its instruction in school.

30) Lombrozo, T., Thanukos, A., & Weisberg, M. (2008, June 20). "The importance of understanding the nature of science for accepting evolution." *Evolution Education and Outreach, 1-3*, 290-298. Retrieved from http://www.springerlink.com/content/f82518w0p8531512/

UNITED STATES (college students) n=96

This study examines "…the relationship between college undergraduates' understanding of the nature of science and their acceptance of evolution."96 undergraduates from a large public university on the West Coast completed an 18-page questionnaire for course credit. Among the participants were a range of majors, including psychology.
Scoring: "For the core science themes, a higher score indicates better understanding of the nature of science; for the limits of science, a higher score indicates a belief that the scientific method has limits; for attitudes toward science, a higher score indicates a greater personal interest in and positive attitude toward science; for acceptance of evolution, a higher score indicates a greater acceptance of evolution; and for the religion theme, a higher score indicates greater religiosity and a greater perceived conflict between science and religion."

Questions/Survey Statements:

1) The first part consisted of 60 statements about the nature of science to which participants recorded agreement or disagreement on a five-point Likert scale (1="strongly disagree," 2="disagree," 3="neither agree nor disagree," 4="agree," 5="strongly agree").
2) In parts two through five, participants were asked to evaluate Likert items clustered in sets of five around themes which concerned "the limits of scientific inquiry (limits), attitudes towards science (attitude), acceptance of evolution (evolution acceptance), and religious belief."
3) "In part 6 of the questionnaire, participants were asked to write a few sentences to complete a short story about science (the data from this task are not reported), and in the final part of the questionnaire, participants reported demographic information, including age, sex, and number of science courses taken at the university level (education)."

- "We found that among college undergraduates, acceptance of evolution was negatively correlated with religiosity, positively correlated with a positive attitude toward science, and positively correlated with understanding the nature of science."
- These findings then suggest that improving students' understanding of the nature of science could causally influence their acceptance of evolution.
- May be better to say that an understanding of the nature of science prevents the rejection of evolution rather than directly leading to its acceptance.
- Teaching the nature of science may have the greatest influence on students who are not committed to creationism but who are still unsure about evolution. "Second, instruction in the nature of science could be most beneficial at the earliest stages of science instruction."

Mean values for limits of science, attitude toward science, acceptance of evolution, and religiosity items

Theme and Items	**Mean (SD)**
Limits of Science	3.64

	(0.61)
Science cannot address the existence of supernatural entities or investigate supernatural mechanisms	3.27 (1.14)
Science can help inform decisions related to morality but cannot directly make moral judgments about what is good and bad	3.56 (0.92)
Science and technology cannot solve all human problems	4.16 (0.99)
Science could prove the existence of supernatural beings like God	2.35 (1.08)
Science could disprove the existence of supernatural beings like God	2.42 (1.02)
Attitude Toward Science	3.91 (0.64)
I am generally more interested in science than my peers are	3.41 (0.99)
I am interested in pursuing a career related to science, technology, engineering, or mathematics	3.66 (1.37)
I personally think that science is extremely valuable for society	4.32 (0.62)
I think that science often has more negative repercussions for society than positive repercussions	1.97 (0.80)
I personally think that science is boring	1.88 (0.85)
Acceptance of Evolution	3.93 (0.82)
I believe that animals have changed over time by a process of evolution	4.26 (0.87)
I accept evolution by natural selection as a well-supported scientific theory	4.10 (0.97)
I believe that all species, including humans, have a common evolutionary origin	3.86 (1.14)
I believe that species were created individually and do not change over time	1.68 (0.86)
I believe that the theory of evolution by natural selection has many gaps and problems	2.89 (1.09)
Religiosity	3.06 (0.89)
I believe in God	3.24 (1.41)
I believe in some kind of afterlife	3.48 (1.20)
I personally feel a conflict between science and religion	2.82 (1.22)
I do not think religion can or should make claims about the natural world	3.00 (1.19)
I do not consider myself a religious person	3.25 (1.31)

Nature of science themes with sample items and mean ratings for theme, followed by the standard deviation

Theme: Description and sample items	**Mean (SD)**
Theory support: scientific theories are not just guesses	3.91

To be accepted, scientific theories must be supported by much evidence New hypotheses are basically wild guesses; scientists just dream them up	(0.38)
Theory limits: theories can explain phenomena but cannot be definitively proven Accepted scientific theories are well-supported explanations for a broad set of natural phenomena Theories are basically hunches; they have not yet accumulated enough supporting evidence to be considered hypotheses	3.52 (0.34)
Testing: testing is central to science but can occur in many different ways The same hypothesis or theory is often tested in many different ways Scientific investigations could not proceed without laboratory experiments	3.68 (0.42)
Nonlinearity: the process of science is nonlinear, complex, and contingent The process of science is nonlinear; each step can lead to many possible next steps Scientists always follow the same step-by-step scientific method	4.05 (0.50)
Construction: theories are constructed, not "read off" from nature Scientific knowledge is built through a complex process that relies, in part, on observations of nature Scientific knowledge is deduced directly from observations of nature	3.86 (0.37)
Provisionality: hypotheses and theories can always be modified Scientific theories are subject to ongoing testing and revision Scientific theories based on accurate experimentation will not be changed	4.05 (0.53)
Continuity: science is an on-going process Scientific investigations usually lead to additional questions for further investigation Scientific investigations usually come to a definitive end, allowing the science to move on to a brand new question	4.19 (0.48)
Comparison: testing involves comparing multiple explanations with available evidence The aim of scientific testing is to figure out which explanation for a phenomenon is most likely to be correct Scientists usually investigate one hypothesis thoroughly before thinking about alternative explanations	3.54 (0.44)
Creativity: science relies on imagination and creativity Scientists use their imagination and creativity when they come up with new experiments, hypotheses, and theories Scientists do not use their imagination and creativity because these can interfere with objectivity	3.45 (0.71)
Community: the scientific community plays an important role in science The scientific community is essential to the process and progress of science Unlike many other professions, science is almost always a solitary endeavor	4.17 (0.49)
Applications: science and society are interrelated Everyday problems and observations frequently inspire scientific investigations Science is pure; scientists strive to do their work without considering its potential applications	4.23 (0.49)
Society and culture: science is influenced by social and cultural factors Individual scientists are influenced by their societies and cultures, and this, in turn, influences their scientific work Scientific research is not influenced by society and culture because scientists are trained to conduct "pure," unbiased studies	3.83 (0.68)

Summary: This study aims to explain the lack of acceptance of evolution by first looking at students' basic conception of and attitude towards the nature of science. Through a series of questions graded on the Likert scale, the results show that an understanding of the nature of science can in fact have a casual influence on their acceptance of evolution. For example, if a student is able to understand that a scientific theory is both reliable (not just a guess) and provisional (subject to ongoing revision), he or she may be more willing to accept the theory of evolution. Without a grasp on the basic tenets of science, a student may be less willing to accept evolution, thereby necessitating an increased emphasis on teaching the nature of science for both the sake of student and teacher.

31) Shtulman, A., & Calabi, P. (2008). "Learning, understanding, and acceptance: The case of evolution." *Cognitive Science Journal*. Retrieved from http://csjarchive.cogsci.rpi.edu/proceedings/2008/pdfs/p235.pdf

UNITED STATES (college students); n=45

The participants were 45 undergraduates enrolled in a one semester course on evolution and behavior at a public northeastern university with similar demographics to the United States as a whole. All had taken at least one high school or college-level biology course prior to the course in which they were currently enrolled, and some had taken as many as three. Their survey specifically "sought correlations between understanding and acceptance with an assessment tool designed in light of the history and philosophy of biology…to uncover naïve theories of evolution incompatible with natural selection." Second, they also sought correlations between learning and acceptance of evolution, measured by their acceptance of evolution "both before and after a teaching intervention designed to increase their understanding of evolution."

Comprehension Assessment (completed before other questions): 30-question survey covering six evolutionary phenomena: variation, inheritance, adaptation, domestication, speciation, and extinction.

Questions: Asked to rate agreement on a scale from 1 (strongly disagree) to 5 (strongly agree) regarding the following seven statements:

1) Species have changed over time
2) The species in existence today have not always existed
3) Natural selection is the best explanation for how species adapt to their environment
4) Natural selection is the best explanation for the origin of new species
5) The origin of human beings does not require a different explanation than the origin of other species

Following two analyzed separately:

6) I believe in the existence of God
7) I believe in the existence of souls

- In terms of the comprehension assessment, "Before instruction, nearly half of all participants scored below -10, resulting in a mean score of -4.0 (*SD* = 15.0). After instruction, only a quarter did so, resulting in a mean score of 1.1 (*SD* = 13.8). A paired-samples *t*-test confirmed that this difference was statistically significant ($t(45) = 4.39$, $p < 0.001$)." More specifically, "A full 71% of participants increased their score by one or more points, 47% increased their score by five or more points, and 27% increased their score by ten or more points."
- Agreement ratings for the five primary statements also increased: "Before instruction, participants' ratings averaged 4.2 across the five statements of belief (*SD* = 0.7); after instruction, they averaged 4.4 (*SD* = 0.6). A paired-samples *t*-test confirmed that this difference was statistically significant ($t(45) = 4.39$, $p < 0.001$)."
- By averaging a participant's agreement ratings and comparing them to the overall assessment score, the "analysis revealed that the higher a participant scored on the comprehension assessment, the more he or she tended to accept the occurrence of evolution, both before instruction ($r = 0.56$, $p < 0.001$) and after ($r = 0.50$, $p < 0.001$)."
- "…agreement ratings decreased from statement 1 (about species change) to statement 5 (about human evolution), as predicted by the controversiality of their content."
- However, agreement ratings also increased as a function of instruction.

- *"Before instruction, the percentage of participants who agreed with statements 1 through 5 were 93%, 76%, 76%, 62%, and 58%, respectively. After instruction, those percentages were 100%, 89%, 91%, 69%, and 76%, respectively."
- Statements 2, 3, and 5 revealed significant association between instruction and acceptance
- The effect on instruction on participant's agreement ratings was restricted mainly to those students that improved upon their assessment score (referred to as "the learners")
- The ratings in response to the questions regarding spiritual beliefs "did not change as a function of instruction and were negatively correlated with participants' assessment scores at both pretest and posttest."

Table 1: Frequency distributions of participants' pre- and post-instructional assessment scores (n = 45).

Range of scores	Pre-instruction	Post-instruction
-30 to -21	4	2
-20 to -11	18	10
-10 to 0	6	12
1to 10	7	10
11 to 20	6	7
21 to 30	4	4

Table 2: Mean differences between pre- and postinstructional agreement ratings (+ SE) for both learners and nonlearners.

Statement	Learners	Nonlearners
S1	+.28 (.11)	-.15 (.10)
S2	+.31 (.13)	+.08 (.18)
S3	+.44 (.11)	-.08 (.18)
S4	+.28 (.71)	-.23 (.17)
S5	+.34 (.13)	+.38 (.27)

Summary: This survey strives to provide sufficient evidence for a correlation between understanding evolution and accepting evolution for the first time. Not only did they uncover that a correlation does indeed exist between their acceptance of evolution and their understanding of evolution, but they also learned that participants' acceptance of evolution increased in strength as their understanding of evolution increased in accuracy. This is most strongly evidenced by the fact that "Before instruction, the percentage of participants who agreed with statements 1 through 5 were 93%, 76%, 76%, 62%, and 58%, respectively. After instruction, those percentages were 100%, 89%, 91%, 69%, and 76%, respectively."This data then suggests that a common misunderstanding amongst Americans of what evolution *is* fosters their low rates of acceptance for the theory.

32) Rutledge, M., & Sadler, K. (2007 August). "Reliability of the Measure of Acceptance of the Theory of Evolution (MATE) instrument with university students." *American Biology Teacher, 69(6)*, 332-335. Retrieved from http://www.bioone.org/doi/abs/10.1662/0002-7685(2007)69%5B332%3AROTMOA%5D2.0.CO%3B2

UNITED STATES (bio non-majors in college)

This survey uses the MATE instrument, which has respondents respond to statements on a scale of A to E (A=Strongly Agree; E= Strongly Disagree)."The instrument was administered to students enrolled in sections of a nonmajors biology course at Middle Tennessee State University, a mid-sized university in the South." "The class rank of the sample was: 57% freshmen, 31% sophomores, 8% juniors and 4% seniors. Demographically the sample was 51% male and 49% female, and ethnically, 85% of the respondents were Caucasian, 12% were African-American, and 3% were classified as "Other" (Hispanic, Asian, or Native American)."

Questions:

CONCEPT	ITEMS
Process of evolution	1, 9, 18, 19
Scientific validity of evolutionary theory	2, 10, 12, 13, 14, 20
Evolution of humans	3, 15
Evidence of evolution	4, 6, 8, 16
Scientific community's view of evolution	5, 17
Age of the Earth	7, 11

1) Organisms existing today are the result of evolutionary processes that have occurred over millions of years.
2) The theory of evolution is incapable of being scientifically tested.
3) Modern humans are the product of evolutionary processes that have occurred over millions of years.
4) The theory of evolution is based on speculation and not valid scientific observation and testing.
5) Most scientists accept evolutionary theory to be a scientifically valid theory.
6) The available data are ambiguous (unclear) as to whether evolution actually occurs.
7) The age of the earth is less than 20,000 years.
8) There is a significant body of data that supports evolutionary theory.
9) Organisms exist today in essentially the same form in which they always have.
10) Evolution in not a scientifically valid theory.
11) The age of the earth is at least 4 billion years.
12) Current evolutionary theory is the result of sound scientific research and methodology.
13) Evolutionary theory generates testable predictions with respect to the characteristics of life.
14) The theory of evolution cannot be correct since it disagrees with the Biblical account of creation.
15) Humans exist today in essentially the same form in which they always have.
16) Evolutionary theory is supported by factual historical and laboratory data.
17) Much of the scientific community doubts if evolution occurs.
18) The theory of evolution brings meaning to the diverse characteristics and behaviors observed in living forms.

19) With few exceptions, organisms on earth came into existence at about the same time.
20) Evolution is a scientifically valid theory.

Item	Scale Mean if Item is Deleted	Scale Variance if Item is Deleted	Correlated Item-Total Correlation	Alpha if Item is Deleted
1	53.62	270.139	.761	.936
2	53.02	291.068	.406	.942
3	53.22	268.647	.784	.935
4	53.08	279.501	.646	.938
5	54.10	305.956	.127	.944
6	53.05	284.930	.580	.939
7	53.43	283.945	.530	.940
8	53.57	274.114	.843	.935
9	53.28	290.003	.369	.943
10	52.93	276.979	.728	.936
11	53.55	281.065	.666	.938
12	53.43	275.199	.871	.934
13	53.50	281.407	.736	.937
14	53.23	276.894	.664	.938
15	53.10	275.142	.689	.937
16	53.35	277.113	.800	.935
17	53.20	295.959	.394	.941
18	53.70	273.603	.816	.935
19	53.05	282.150	.612	.938
20	53.43	273.301	.827	.935

Alpha = .941

An individual's score on the MATE is equal to the sum of the scaled responses to all 20 items. Possible scores for the MATE range from a high of 100 to a low of 20, indicating high and low levels of acceptance respectively:

1. Very High Acceptance: 89-100
2. High Acceptance: 77-88
3. Moderate Acceptance: 65-76
4. Low Acceptance: 53-64
5. Very Low Acceptance: 20-52

Summary: Although the focus of this research was to assess whether or not the MATE is a reliable measure of university student acceptance of evolution, it still sheds some light on students' acceptance of evolution. All the questions came back with low acceptance rates, except for Number 10, which barely averaged below a score of 53. This statement reads, "Evolution is not a scientifically valid theory." The very low acceptance rate of this statement bodes favorably for students of this university. The unvaried low acceptance rate for all the other questions, however, proves troublesome since they projected varying ideologies surrounding evolution. Thus, it is difficult to draw conclusions based off of the MATE test provided to these students. Nevertheless, in terms of the primary goal for this study, "The results of this study suggest that the MATE is a reliable instrument and may serve as a useful research tool in evolutionary biology education at the university level."

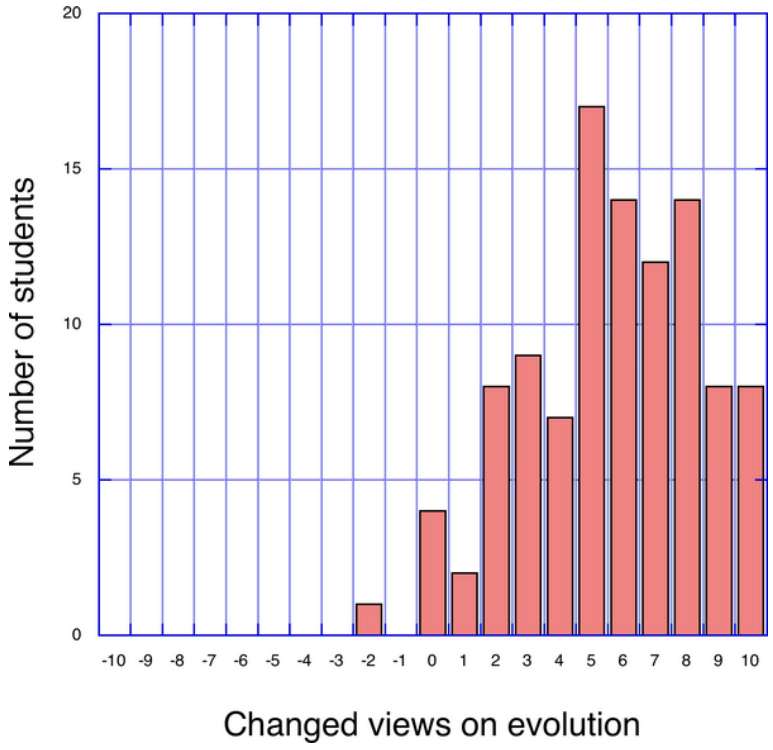
33) Wilson, D. (2005, December 13). "Evolution for everyone: How to increase acceptance of, interest in, and knowledge about evolution." *PLoS Biology*. Retrieved from http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0030364

UNITED STATES (college students)

This essay is reporting the success of a university-wide program at Binghampton University, "EvoS," which was first implemented in 2003.Students in the program enrolled in a course entitled "Evolution for Everyone," and students came from all majors and years. "Information gathered on each student at both the beginning and end of the course included religious and political orientation, prior exposure to evolution education, and an assessment of general thinking skills without reference to specific subject matter. In addition, students wrote short essays throughout the course that were submitted electronically and analyzed for words associated with cognitive operations using the software *Linguistic Inquiry and Word Count* [8,9]. Finally, students assessed the course anonymously in addition to providing information associated with their identity." The students were widely dispersed in terms of political orientation, though the average student was considered moderately religious.

Questions:

1) How much has this class changed your views on evolution and its relevance to human behavior, on a scale from −10 (negative change) to +10 (positive change)?



Student Quotes:

- "This course provides evidence that evolution is evident in everything. It revolutionized my way of viewing problems."
- I have always agreed with evolution but I did not know how much of everyday life was affected by it."

- I came into the class not knowing a lot about evolution. I now have an entirely new outlook on how evolution can be applied to many aspects of life."

Summary: The article mainly consists of details on how the program achieves its success. The class, "Evolution for Everyone," first seeks to provide students with a general framework of how evolution works, and then apply it to a number of specific topics. Students quickly become engrossed in the topic when they realize it is a "powerful way to understand and improve the world." The program also includes a seminar series, instructed by varying speakers of great merit who do not "water down" their presentations. Consequently, attending students have to learn from the presentations using only their conception of general frameworks. Both the class and these seminar series are regarded as huge successes by the author. Overall, the overwhelmingly positive response to the program from both students and faculties suggests that programs like EvoS should be available across more universities nationwide.

34) (2005, March 24). "Survey indicates science teachers feel pressure to teach nonscientific alternatives to evolution." *National Science Teachers Association.* Retrieved from http://science.nsta.org/nstaexpress/nstaexpress_2005_03_28_pressrelease.htm

UNITED STATES (science teachers, including professors); n=1,050

"The informal survey was conducted in March via NSTA Express, NSTA's weekly e-mail communiqué. More than 1,050 teachers participated in the survey. The majority, 51%, are high school teachers, while 26% are from middle level; 12%, college/graduate level; and 6%, elementary."

Questions:

1) Do you feel pressured to include creationism, intelligent design, or other nonscientific alternatives to evolution in your science classroom?
   - 31% agreed
2) From whom does this pressure come?
   - 22% said from students
   - 20% said from parents
3) Do you feel pushed to de-emphasize or omit evolution or evolution-related topics from your curriculum?
   - 30% agreed
   - Most pressure coming from parents and students, 18% each
   - Only 5% felt pressure was exerted by administrators
   - Only 3% felt pressure was exerted by principals
4) Do you feel well prepared to explain the reasons why it is important for students to understand evolution?
   - 85% said yes
   - 11% said no
5) How successful have you been at helping parents and others understand the reasons why it's important for students to understand evolution?
   - 62% said they were successful
   - 5% said they were not
6) Do you think you must de-emphasize or omit from their lessons the term "evolution" so as not to draw attention to it?
   - 74% disagreed
   - 19% agreed

Summary: This survey asks teachers from varying institutions and academic levels to answer questions regarding the teaching of evolution, and any pressure they may receive in regards to that topic. Some trends did arise, with 31% of teachers saying they felt pressured to include nonscientific alternatives and 30% saying they felt pushed to de-emphasize evolution in their curriculum. Interestingly, however, more reported feeling the pressure to include creationism or intelligent design slightly more from students (22%) than from parents (20%). With regards to pressure to de-emphasize evolution itself, only 5 and 3 percent came from administrators and principals respectively. Therefore, the pressure that teachers feel on the topic of evolution, primarily come from students and parents. More broadly, this may suggest the efficacy of the National Academy of Sciences in demonstrating their positions on the teaching of evolution to educational professionals.

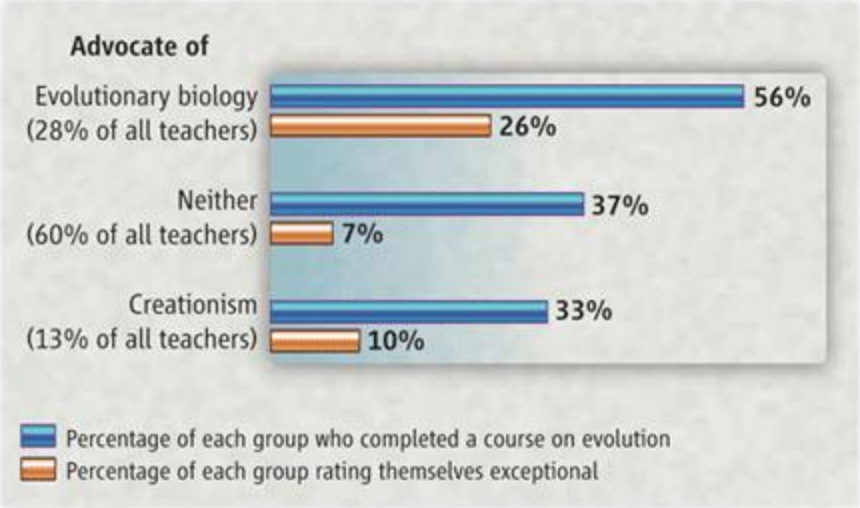
Pre-College Samples

35) Berkman, M., & Plutzer, E. (2011, January 28). "Defeating creationism in the courtroom, but not in the classroom." *American Association for the Advancement of Science, 331*, 404-405. Retrieved from http://www.sciencemag.org/content/331/6016/404.full

UNITED STATES (public high school teachers); n=926

Research is primarily based on the National Survey of High School Biology teachers, which utilizes a "nationally representative probability sample of 926 public high school biology instructors."

- "…in the 15% most socially conservative school districts, nearly **4 in 10** teachers personally do not accept human evolution…"
- In the least conservative districts, **11%** do not accept human evolution
- They estimate that **28%** of all biology teachers effectively use and implement the major recommendations and conclusions of the National Resource Council (this entails that they introduce evidence that evolution has occurred and craft lessons that unify evolution with other topics in biology)
- There "… are **13%** of the teachers surveyed who explicitly advocate creationism or intelligent design by spending at least 1 hour of class time presenting it in a positive light (an additional **5%** of teachers report that they endorse creationism in passing or when answering student questions)."
    - Of which, only **19%** report "having been 'nervous at an open house event or meeting with parents'."
- There is a cautious **60%** of teachers who want to avoid controversy and do so in three primary ways:
    - By teaching evolutionary biology as though it only applies to molecular biology
    - By treat the teaching of evolutionary biology as a necessary evil, using state exams as excuses
    - By choosing to expose their students to all positions, scientific or not, and allow them to make up their own minds
- "…teachers in the ambivalent middle 60% also resemble those who endorse creationism in that few believe that they have an exceptional understanding of evolutionary biology."



Self-reports of qualifications of teachers, classified by approach to teaching evolution.

Based on responses from 926 U.S. public high school biology teachers. See SOM for survey details.

Summary: Despite the fact that more high school students take a general biology than any other science course, many are not afforded a sound science education from their teachers. In fact, 13% of the surveyed teachers not only rejected the notion of teaching evolutionary biology, but also explicitly advocated creationism or intelligent design in the classroom. This incites yet another cycle of adults who will be predisposed to antievolutionary theories. Therefore, in order to address the situation, participation in federal law suits must continue so as to improve state standards. Additionally, improving the instruction of pre-service teachers is essential. A better understanding of the field would provide them with more confidence and familiarity in teaching an evolutionary course or lecture of their own. This would result in better-trained teachers who "…will be able to more effectively take advantage of details in their textbooks and supplementary material published by the National Academy of Sciences and to put aside fear of reactions and pressures from members of their communities."

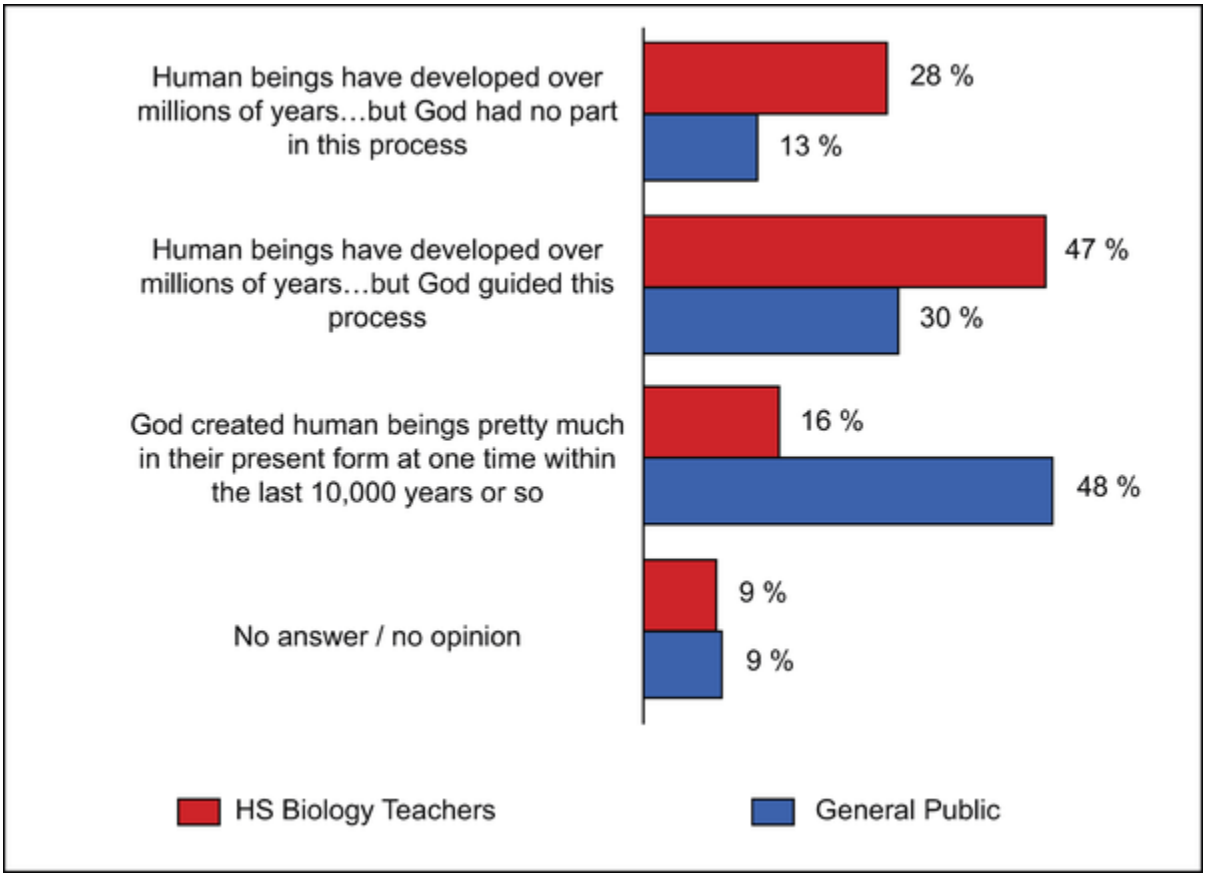
36) Berkman, M., Pacheco, J., & Plutzer, E. (2008, May 20). "Evolution and creationism in America's classrooms: A national portrait." *PLoS Biology, 6(5)*. Retrieved from http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0060124

UNITED STATES (high school biology teachers); n=939

"Between March 5 and May 1, 2007, 939 teachers participated in the study, either by mail or by completing an identical questionnaire online. Our overall response rate of 48% yielded a sample that may be generalized to the population of all public school teachers who taught a high school–level biology course in the 2006–2007 academic year, with all percentage estimates reported in this essay's tables and figures having a margin of error of no more than 3.2% at the 95% confidence level."

- "Of teachers surveyed, 17% did not cover human evolution at all in their biology class, while a majority of teachers (60%) spent between one and five hours of class time on it."
- "Overall, only 23% strongly agreed that evolution served as the unifying theme for their biology or life sciences courses (Table S2); these teachers devoted 18.5 hours to evolution, 50% more class time than other teachers."
- 13% of teachers agreed or strongly agreed that a biology course could exist without mentioning Darwin or the evolutionary theory at all
- 25% of teachers indicated spending at least one or two hours teaching creationism or intelligent design (*this can include broaching creationism in order to criticize it or in response to student questions)
    - "Of the 25% of teachers who devoted time to creationism or intelligent design, nearly half agreed or strongly agreed that they teach creationism as a 'valid scientific alternative to Darwinian explanations for the origin of species.'"
    - However, "Of those who spent time on the subject, 32% agreed or strongly agreed that when they teach creationism they emphasize that almost all scientists reject it as a valid account of the origin of species, and 40% agreed or strongly agreed that when they teach creationism they acknowledge it as a valid religious perspective, but one that is inappropriate for a science class."
- State standards are not the primary reason for differences amongst science teachers' perspectives, instead:
    - Personal beliefs about evolution
    - Number of college-level science classes
- "Among the biology teachers, 16% believed that human beings were created by God in their present form at one time within the last 10,000 years…"
- The data shows that there is substantial sympathy for the "young earth" creationist position amongst the teachers, with nearly one in six showing support; these people then devote 35% fewer class hours to evolution that an all other high school teachers
- The best prepared teachers devote 60% more time to evolution than the least prepared (best prepared defined as those with the largest number of college-level credits in biology and life sciences)

Hours	Human Evolution	General Evolutionary Processes	Creationism or Intelligent Design
Not covered	17%	2%	75%
1–2 hours	35%	9%	18%
3–5 hours	25%	25%	5%
6–10 hours	12%	26%	1%
11–15 hours	5%	18%	1%
16–20 hours	3%	11%	1%
20 hours or more	2%	9%	0%
Total	100%	100%	100%



Summary: This survey reveals that despite the majority of high school biology teachers viewing evolution as central and essential to their course, the amount of time each devotes to the topic varies widely. Although 60% reported spending between one and five hours of class time on the subject, 17% reported not covering evolution at all. Reasons for such discrepancies include the personal belief of the teacher with regards to human origins, and also their level of science education while in college. This inconsistent level of teaching evolution suggests that although science teachers are winning in the court rooms, they are losing in the classrooms. As a suggestion, "…requiring all teachers to complete a course in evolutionary biology would have a substantial impact on the emphasis on evolution and its centrality in high school biology courses."

Museum Samples

37) Evans, E., Frazier, B., Hazel, A., Kiss, A., Lane, J., Spiegel, A., & Diamond, J. (2010 August). "Tree-thinking: do pictorial representations of phylogenetic relationships help or hinder museum visitors' understanding of evolution?" *Carnegie Museum of Natural History*. Retrieved from http://evolution.berkeley.edu/UToL/evans2010.pdf

UNITED STATES (Carnegie museum visitors and experts, children included); n=66

This qualitative study seeks to assess the role of the representation of a simplified tree of life to abstract modern cladograms in terms of its ability to convey core ideas of evolution and common descent. They "…assessed natural history museum visitors' (Novices: 21 children, 11-13 yrs; 12 youth, 14-18 yrs; 30 adults) and evolutionary biologists (15 Experts) interpretation of pictorial representations of four evolutionary trees: whale, human, HIV, and fruit fly."
" Visitors completed pre- and post-visit interviews, including closed- and open-ended questions for non-pictorial and pictorial scenarios, around a typical gallery visit to *Explore Evolution*, where the graphics were displayed." "Participants' open-ended verbal and spatial descriptions of the graphics, and their evolutionary explanations for species portrayed in the pictorial and non-pictorial scenarios were transcribed and coded." Only experts were asked to a complete a post-visit interview.

- 90% of the adults were college graduates
- 89% of the children's and youth's parents were also college graduates
- Only one adult had a biology background
- Compared to non-pictorial scenarios, "…most participants—novice and expert—included discussion of common ancestry, time, and the relationships between species in their responses to the pictorial scenarios, even for complex trees."
- "However, novice participants were more likely to report that one organism 'changes into' another (anagenesis), focusing on individual need-based (purposeful) change rather than population."
- "… Novices used intuitive reasoning along with evolutionary reasoning, particularly for the simplified "tree-like" representations, frequently describing evolutionary change as a developmental process."

Summary: The authors of the study concluded that a tree-like representation of phylogenetic relationships and evolutionary change "…may impede an understanding of evolutionary mechanisms, particularly of natural selection." Despite fostering an acceptance of common descent and creating recognition for the importance of time, the use of a tree tends to show only a single member of a taxon. Consequently, this suggests to a novice visitor that the individual is the unit of change. Such representation of a taxon also fails to portray variation, a key concept for understanding natural selection. Also, "In comparison with cladograms simplified tree-graphics easily convey a clear message about relationships between species and common descent; however, they are also more likely to elicit the everyday intuition that evolutionary change is like developmental change especially to younger and/or less expert museum visitors." Thus, factors such as the age and expertise of an audience should be considered when creating a new exhibit, as well as how to portray certain aspects of evolutionary theory in ways other than a cladogram.

38) Evans, E., Spiegel, A., Gram, W., Frazier, B., Tare, M., Thompson, S., & Diamond, J. (2009, July 27). "A conceptual guide to natural history museum visitors' understanding of evolution." *Journal of Research in Science Teaching*. Retrieved from http://www-personal.umich.edu/~evansem/JRST-Evans-2009.pdf
*Referenced in #46

UNITED STATES (museum visitors); n=32

"Thirty-two systematically selected museum visitors (38% male, 62% female; 97% non-Hispanic white, 3%multi-racial) from three Midwest universities' natural history museums were asked to take part in a 25–30-minute audio-taped interview with trained interviewers."However, respondents had not yet been exposed to the exhibition content and were not aware that it was about evolution. "Visitors were asked to explain seven problems (see Table 1), each of which focused on one of the organisms central to the work of each of the scientists featured in the exhibition." "In line with the above theoretical perspective, visitors' explanations were coded into three reasoning patterns: *novice naturalistic, informed naturalistic* and *creationist*."

Seven Evolutionary problems presented to the museum visitors:
Interviewer: ''I would like to ask you a few questions about current research on how living things have changed over time. I want to know what you think about some new scientific discoveries about a variety of living things."

1) VIRUS: I'm going to tell you about a person who has the virus called HIV. You may know that this virus causes the disease called AIDS. Here is a picture of the HIV virus greatly enlarged (give illustration to subject). This virus is in a child called George. Now scientists can read the genetic material of a virus to tell what kind it is. When the scientists first looked at George's virus, he had three varieties of HIV, each slightly different. Later, when the scientists went back to check on George's viruses again, there were now 5 types of HIV. Describe how you think George came to have the new kinds of HIV viruses
2) DIATOM: Yellowstone Lake is in the middle of Yellowstone National Park (show map). There are many types of algae in this lake. However, scientists have found a kind of algae in this lake that is not found anywhere else (show diatom photo). These algae first appeared about 14,000 years ago. At that time, the climate was warming. Describe how you think this new kind of algae came to be in Yellowstone Lake
3) ANT/FUNGUS: Scientists have learned about a kind of ant that looks after a special type of fungus in ''ant farms'' (show picture). The ants eat the fungus and this type of ant and the fungus have had this relationship for millions of years. However, there is another type of fungus that attacks the farms. But, the ant carries around bacteria that protect the farms from the attacking fungus. These four organisms have been living together for many millions of years. Describe how you think this partnership came about
4) FRUIT FLIES: There were once no fruit flies on Hawaii (show map). Then, about 8 million years ago, a few fruit flies landed on one of the islands. Now there are 800 different kinds of fruit flies in Hawaii (show photos of flies). How would you explain this?
5) FINCHES: The Galapagos Islands are located off the coast of South America (show map of chain). On one of these islands, scientists have been studying one kind of finch. Here is a picture of this finch (photo has more than one ground finch). The scientists measure the size of the finch's beak (show picture). On their first trip to the island, the scientists found that most of the beaks of this finch were on the small side. Then a severe drought occurred on the island, and it wiped out most of the plants that make the small seeds that the finches feed on. The only seeds that

were common were really tough seeds that require a large beak to open. Then the scientists came back a few years later and measured the beaks again. This time, they found that most of the beaks were on the large side. How would you explain that on their return trip to the island, larger beaks were found on more of the finches?

6) HUMAN/CHIMP: Here is a picture of a human being and a picture of a chimpanzee (show photographs). Scientists think that humans and chimps shared a common ancestor as recently as 5 million years ago. Describe how you think that both a chimp and a human could arise from the same kind of ancestor.
7) WHALE/HIPPO: Here is a picture of a new kind of whale that was found in the desert in the Middle East (show cover of Science). Scientists believe that this whale shares a common ancestor with hippos (Show photo of hippo). Describe how you think that both a whale and a hippo could arise from the same kind of ancestor.

Coding:

Informed naturalistic reasoning (INR) pattern: themes, definitions, and examples

Theme	Operational Definition	Examples
Evolution Term	Mention of main evolution term	''Evolution,'' ''Darwin(ian),'' ''Survival of the fittest''
Variation	Differences among individuals in a population	''There were finches with larger beaks and some with smaller beaks''
Inheritance	Traits (genes) are inherited and passed on to the next generation	''The big-beaked finches had babies that looked the same''
Common Descent	Reference to a common ancestor or a descendent (implication that these were different ''species'')	''They could have been derived from the same early ancestor''
(Natural) Selection	Organisms with adaptive traits are more likely to survive	''The large-beaked finches were better able to eat the large seeds and they survived''
Time	Implication that there had to be enough time for natural selection to occur	''I supposed they just changed over time''
Chance	Any reference to happenstance, chance, or Accident	''. . . then this relationship accidentally happened''
Sexual Selection	Any reference to sexual selection	No Examples
Ecological Pressure	Mention of ecological pressures as a causal agent in diversification or change	''. . . adapt to the different ecological niches on the islands''

Novice naturalistic reasoning (NNR) pattern: themes, definitions, and examples

Theme	Operational Definition	Examples
Intentional	Use of mental states, skills or conscious effort to explain change	''. . . had to try and work harder, probably, to develop their beaks''
Essentialist	Category-based induction (referencing species stability)	''Humans and chimps are the same kind''
Static Adaptation	References the organism-environment fit as the reason why a particular organism might be found in a particular location	''Well, this area is generally colder and you find this type of algae in this type of location''
Adaptive Feature List	Simply lists adaptive features of one or more organisms	''. . . toes and webbed feet for the land, instead of fins, most whales have fins . . .''
Goal-directed "need based adaptation"	The organism changes to meet a need or purpose, a functional or adaptive goal-directed behavior	''The first fungus needed to be protected from the second fungus so it developed a natural defense mechanism in the ant to stave it off''
Goal-directed "develops"	The organism develops towards an inbuilt goal [no mention of need]	''As they grow they develop into other types of HIV''
Proximate cause-	An agent brought the organism in from	''Obviously, people brought the fruit flies in . . .''

agent	some place else	
Proximate cause-other	The organism was always there, but was not detected	''The new strains of HIV were there, scientists hadn't seen them''
Reproduction	Reference to reproduction or an increase in numbers, no clear reference to inherited features	''Then they multiplied when they got to Hawaii''
Hybridization	Two unrelated animals interbred	''Then the different kinds of flies bred and they had different offspring''

Creationist reasoning (CR) pattern: themes, definitions, examples

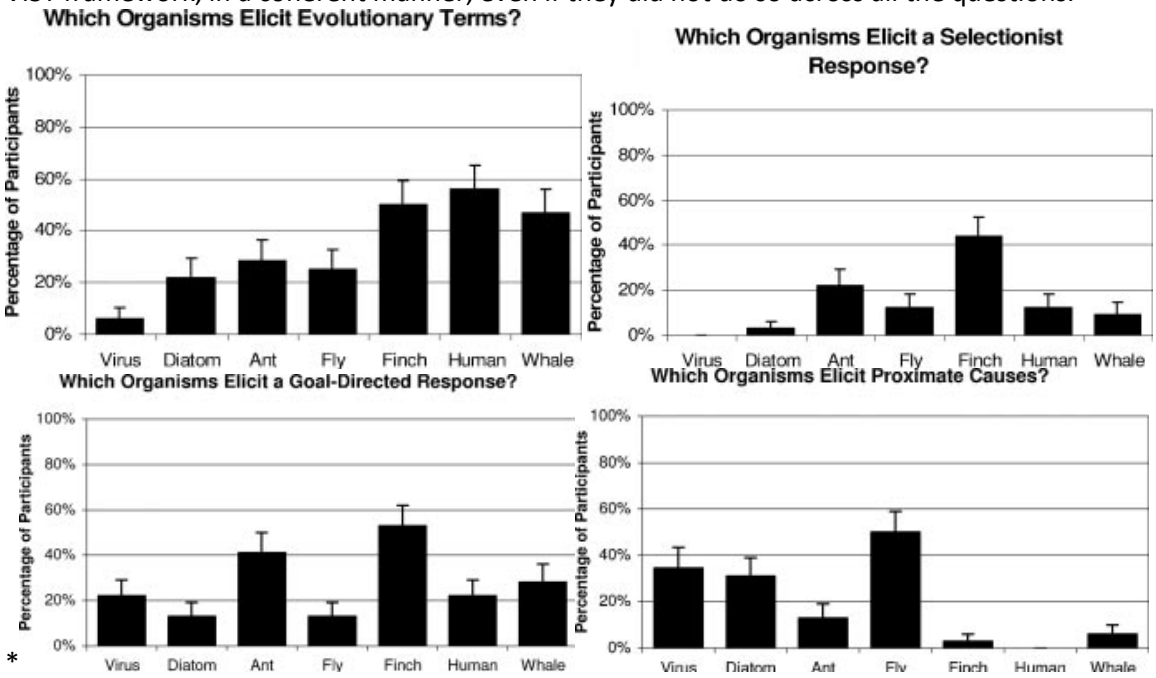
Theme	Operational Definition	Examples
God's creation	God created each organism	''. . . God was the creator and he designed and created every organism''
God's variation	God created the diversity seen in organisms	''God created the algae with the DNA to expand into different kinds''
God's adaptation	God made organisms so that they are adapted to fit in with their environment	''He created this almost symbiotic relationship between the ant and the fungus''
God's essence	God created each organism with a specific ''essence'' and it does not change	''I think they were created as they are with their own unique set of chromosomes''
Young earth creationists	Specifically rejects geological time and the age of the earth	''I don't think the world is more than 1,000 years old''
Rejects common descent	Rejects the idea of common ancestry or common descent	''Well, I wouldn't believe the ancestor theory''
Intelligent design	Refers to the design of organisms by a sentient entity, but no reference to God	No examples
Vague belief	Declaration of religious or biblical belief—not explicit	''I believe in a catastrophic flood'' ''I'm religious'' ''I am a Christian''

Response patterns for the seven organisms: percentage of participants endorsing a particular pattern

Organism	INR (Only %)	NNR (Only %)	CR (Only %)	INR NNR (Only %)	INR NNR CR (%)	INR CR (%)	NNR CR (%)	Don't Know (%)
Virus	16	34	0	44	0	0	0	6
Diatom	19	38	0	28	3	0	3	9
Ant	9	34	3	44	0	6	0	3
Fly	9	47	6	38	0	0	0	0
Finch	19	13	0	66	0	3	0	0
Whale	22	19	0	47	0	6	0	6
Human	25	6	3	41	9	9	6	0
Average	17	27	2	44	2	3	1	3

- **"**Overall, the most common pattern for individual museum visitors was informed naturalistic/novice naturalistic reasoning (72%)."
- "A less common pattern was informed naturalistic/novice naturalistic/creationist reasoning (28%)."
- "…34% could be classified as consistent informed naturalistic reasoners, 53% as consistent novice naturalistic reasoners and 6% as creationist reasoners (6% were equally novice and informed naturalistic reasoners)."
- Overall, mixed reasoning patterns prevail
- "Summing across all seven organisms, the mean and standard deviation for the number of themes (recall that each theme was coded as present or absent for each question/organism) mentioned by each visitor, for each reasoning pattern was: INR (M¼9.4, SD¼6.1, Range 2–25), NNR (M¼8.1, SD¼4.3, Range 1–19), and CR (M¼1.3, SD¼3.5, Range 0–16)."

- The question regarding human ancestors invoked the most elicit evolutionary terms, seconded by the finch.
- The most commonly used VIST concepts were variation, time and selection.
- "…The virus, diatom, ant, and fly were more likely to invoke an NNR pattern."
- "A creationist theme was mentioned by 28% of the visitors."
- "The significant positive relationship between selection, variation, and time (Table 7), and selection and inheritance (r¼0.36; p<0.05) indicates that participants often accessed the full VIST framework, in a coherent manner, even if they did not do so across all the questions."



* "The classic misconstrual of Darwinian evolution is the adaptationist response in which the individual organism adapts itself to environmental conditions, which we have called need-based adaptation. For ease of presentation, we combined responses for this more prevalent theme with the less prevalent development theme (see Table 3) and called them goal-directed responses, as they both imply progression toward a goal."

Summary: This study chose museum visitors as its target based on the idea that if they were unable to understand basic evolutionary principles, the population at large would stand even less of chance. Compared to others, they are less likely to reject evolutionary theory (only 28% express discomfort with its principles) and they tend to be very well educated (60% had completed a 4-year college or higher levels of education). However, "while the majority accepted evolutionary ideas, only a third could be said to have a reasonable grasp of Darwinian evolutionary mechanisms." Additionally, not a single respondent used evolutionary reasoning as a basis for explaining all seven presented problems. Although, "the more frequently they visited natural history museums, the more likely they were to spontaneously mention evolution terms." In terms of creationist reasoning, it became most prominent when answering the question on human evolution, though frequently in combination with novice and/or informed naturalistic reasoning. Overall, "These results indicate that about two-thirds of these museum visitors were unlikely to spontaneously invoke a Darwinian evolutionary explanation to solve a biological change problem. Of this group, a minority were creationists, while the majority invoked novice modes of reasoning." This reveals the tendency of museum visitors to not realize the term evolution applies to both microevolutionary and macroevoultionary processes. Thus, "These findings highlight the need to help the public understand that microevolutionary and macroevolutionary processes occur in all living kinds."

39) MacFadden, B., Dunckel, B., Ellis, S., Dierking, L., Abraham-Silver, L., Kisiel, J., & Koke, J. (2007 November). "Natural history museum visitors' understanding of evolution." *American Institute of Biological Science, 57*, 875-882. Retrieved from http://www.jstor.org/stable/4539733

UNITED STATES (natural history museum visitors; *INCLUDED INTERNATIONAL VISITORS*); n=380

This project consists of interviews conducted at six natural history museums across the country: the Smithsonian National Museum of Natural History, the Denver Museum of Nature and Science, the Florida Museum of Natural History, the Natural History Museum of Los Angeles County, the George C. Page Museum at the LaBrea Tar Pits, and the University of Kansas Natural History. 380 interviews were conducted using a stratified space sampling method. Of their participants, there were four age groups: high school (15 to 18 years), young adults (19 to 34 years), middle-aged adults (35 to 54 years), and older adults (55 years and older). Numbers of male and female participants are roughly equal. Other demographics: "The study participants were from 39 US states, Canada, and five other areas of the world (Latin America, Europe, Middle East, Australia and New Zealand, and Asia). The racial and ethnic composition of the sample was white or non-Hispanic, 75 percent; Hispanic, 8 percent; Asian, 5 percent; African-American, 4 percent; and multiple or other, 8 percent. The educational level of the participants who were not high-school students (> 18years old) included people with a master's, doctoral, or professional degree (41 percent); with a college degree (22 percent); with some college or post high-school technical courses (28 percent); and with a high school degree or less (9 percent)."

Questions:

1) **Fossils and rock strata:** Participants were shown a variety of fossils (ammonite, coral, ancient and modern shark teeth, tortoise shell, etc.). The goal of this component was to evaluate knowledge of relative geological time, ancient environments, extinction, and the nature of science. After examining the fossils, participants were asked questions that required them to draw inferences based on the fossil evidence, and to generate explanations for the pattern of evidence.
    - 95% of participants understood the concept of superposition
    - The understanding, however, varied with age and education: 99% of middle-aged adults, compared with 90% of older adults understood that the oldest fossils are at the bottom of the rock column; as did 97% of those with a college degree, compared to 86% of those with a high school degree or less
    - When asked what it means to find fossils in upper layers but now lower ones, 74% said that it was "newer" or that it had evolved
        - 89% of high school students inferred this, while only 76% of middle-aged adults, 66% of young adults, and 67% of older adults did
    - With regard to the nature of science, 94% of participants were able to draw a reasonable inference
2) **Cheetah microevolution:** To assess visitors' understanding of intraspecies evolution, we asked participants this question: "According to many scientists, long ago that cheetah had an ancestor that was not able to run as fast as the modern cheetah. How would these experts explain the cheetah's running ability? Please explain this development as precisely as you can using the principles of biological evolution, regardless of whether you personally believe this explanation."

*****For an answer to be coded as natural selection, they had to include the following key microevolutionary concepts: intraspecies variation, survival advantage, genetic determination, reproductive advantage, and accumulated change.

- Explanations varied by age: high school students were significantly less likely to offer natural selection explanations than young, middle-aged, or older adults (though older adults were less likely than other two adult age groups)
- However, high school students were more likely than other participants to offer an amechanistic account for the cheetah's increase in ability (they said the cheetah evolved, but did not specify a process or mechanism)
- Middle-aged adults were less likely to offer teleological explanations than participants of other ages
- Participants with a college degree were more likely than participants with less education to explain the cheetah's running ability in terms of natural selection
- Participants with a high school degree or less were more likely to offer an amechanistic explanation than those with a college degree
- Across all museums, 30% of respondents used natural selection as a framework to explain the faster running ability of the cheetah relative to its ancestors

3) **Personal beliefs and geological time line:** After explaining microevolution in the cheetah activity, they asked respondents if they personally believed the explanation and, if not, how their beliefs differed. Also, they asked visitors to place seven major geological and biological events on a time line from 15 billion years ago to the present using cards labeled: "Origin of the Universe," "Origin of Earth," "Life on Earth," "Fish," "Land Plants," "Dinosaurs," and "Humans."
    - 89% of participants who were asked, or who could be reliably coded (n=365), accepted evolution
    - The remaining 11% either completely rejected evolution, or expressed some skepticism
    - When participants responded by saying that, "Evolution is correct for some situations, but no others," they may have accepted microevolution but not macroevolution, or he/she may have rejected the possibility that humans evolved from nonhuman primates
    - Only 2% of participants placed all the events at the same time on the timeline
    - Although approximately 80% of respondents placed the cards in logical order, far fewer understand the magnitude of geological time corresponding to when these events actually occurred
    - Varied with age: 96% of high school students and 95% of young adults accepted evolution, while 84% of middle-aged adults and 83% of older adults accepted it
    - Rejection of evolution did not vary with level of education
    - However, rejection of evolution was inversely associated with understanding of evolution: 32% of those who accept evolution were able to provide a scientifically accurate account of the cheetah's running ability, compared to only 14% of those who reject evolution
    - Only 17% of those who accept evolution offered a teleological account, compared with 29% of those who reject evolution

- The lowest rates of acceptance were at KU (80%), FLMNH (83%), and NMNH (83%)
- NHMLAC and Page were 94% and 88% respectively
- The rate at DMNS are not strictly comparable, because 14% of visitors approached for the survey declined due to their negative attitudes towards evolution; the rate was 95% among those who did participate
- "When compared with respondents to recent general survey polls, high-school students and adults who visit natural history museums and other informal learning settings have a better understanding of evolution and are less likely to reject it."
- "Whereas the great majority of respondents understand the concept of relative geological time, fewer understand natural selection as a mechanism for microevolutionary change between successive generations."
- Only 8% of high-school aged participants gave accurate explanations for the change in running ability of the cheetah
- Yet 40% of young adults provided an accurate explanation of natural selection

Summary: While the study shows that natural history museum-goers have a better understanding and higher acceptance rate of evolution than the general public, there are still certain concepts that are not generally as well understood. For example, these participants demonstrated greater understanding for the concept of relative geological time than they did for the concept of natural selection. As such, there should be an increased focus on how to present evolutionary concepts in natural history exhibits so that information becomes more comprehensible to visitors. Additionally, although different acceptance rates of evolution varied across the chosen museums, no significance was given to the findings due to the fact that visitors' prior exposure to evolution may have occurred outside of where the museum is located.

40) Spiegel, A., Evans, E., Gram, W., & Diamond, J. (2006, Spring). "Museum visitors' understanding of evolution." *Museums & Social Issues, 1*, 69-86. Retrieved from http://www-personal.umich.edu/~evansem/SpiegelEvansGramDiamond.pdf

UNITED STATES (museum visitors); n=60

The first half of the survey at *Explore Evolution* asked questions regarding their understanding of and interest in the seven organisms featured in the exhibit and in the VIST concepts. They interviewed 60 visitors from three Midwestern natural history museums.

Questions:

1) What would you expect to see when I say [variation, inheritance, selection, time, evolution]?]
   - Variation—**72%**
   - Inheritance—**60%**
   - Selection—**58%**
   - Evolution—**82%**
2) Responses to other un-cited questions about interest in evolution:
   - "Visitors indicated a greater interest in learning more about whales, humans, viruses, and diatoms than the other organisms."
   - "About two-thirds of visitors (60%) indicated they would be somewhat or very likely to go to a museum exhibit entitled, *Explore Evolution."*
3) Visitors were asked to explain the evolution of seven organisms, such as: *"During one year, scientists measured the beaks of one kind of finch on a remote island. They found that most of these finch beaks were small. In the following year, a drought wiped out almost all the plants that produce small seeds. Only the plants that make large tough seeds remained. A few years later, the scientists returned to the island and measured finch beaks again. This time they found that more of the finches had bigger beaks. How would you explain why more of the finches had bigger beaks?"*
   * Responses fell into the following reasoning patterns: (1) *Informed naturalistic reasoning (INR)*, in which one or more core Darwinian evolutionary concepts or VIST terms was referenced, though the visitors were not "experts." (2) *Novice naturalistic reasoning (NNR)*, in which the intuitive modes of reasoning, described earlier, were used to explain evolutionary change. (3) C*reationist reasoning*, in which supernatural rather than natural explanations were invoked, in particular, God's direct role in the origin of species (CR). (4) *Mixed Reasoning*, using more than one of the above reasoning patterns.
   - "The majority of responses (72%) used a combination of informed naturalistic reasoning (INR) and novice naturalistic reasoning (NNR) to explain these evolutionary events."
   - "Some visitors (28%) used a combination of creationist reasoning with one or both of the naturalistic reasoning patterns."
   - "Overall, the most frequently used reasoning pattern, used by 53% of the respondents, was novice naturalistic reasoning (NNR), followed by 34% using informed naturalistic reasoning (INR), and 6% using predominately creationist reasoning (CR)."

Type of Reasoning Used	**Example of Visitor Responses**
Informed Naturalistic Reasoning (INR)	Well, the large-beaked birds were the only ones that survived because they could eat the seeds, and therefore they were the only ones that reproduced, and the ones with the small beaks lost out.

Novice Naturalistic Reasoning (NNR)	Evolution for survival. . . .Well, in order to survive, their body parts had to adjust to certain things, similar to the way giraffes' necks probably grew long as they reached for the plants at the top of the trees, so the beak grew longer in order to deal with the tougher seeds..
Creationist Reasoner (CR)	I would just explain it as God being the creator with infinite wisdom, and he designed and created every organism, down to most minute detail.
CR/INR Mixed Reasoning	But like I said, I don't believe in evolution. So I don't believe that they evolved because it takes too long. There are too many failures before they evolve into something that finally works, so I just reject that view. Um, my guess would be that there probably were larger beaked finches but there weren't as many of them and the small beaked ones would have died out because they couldn't get the food.

- "Of the seven organisms, the finch question was the most likely to invoke an evolutionary term and least likely to invoke a novice reasoning pattern. The fly, ant, diatom, and virus were more likely than the finch, human, and whale to invoke novice reasoning. The finch, human, and whale questions were more likely to elicit evolutionary reasoning than the other organisms, and the human was also more likely to elicit creationist reasoning."
- "Creationist reasoners fell into two groups. One rejected most references to evolution and explained variation as part of God's plan ("built into the DNA"). The other group, which comprised the majority of the creationist reasoners in this sample, applied creationist reasoning primarily to one organism: Humans were created by God, even though the other organisms change over time."

Summary: The first half of the essay focuses on broad generalizations, supported by various outside studies, regarding visitors to natural history museums across the country. However, the second half focuses on qualitative research collected from visitors to the *Explore Evolution* exhibit. This exhibit is very large, and on display at six Midwestern museums that each have their own organism of focus (virus, diatom, ant/fungus, fly, finch, human, and whale). After asking a series of questions regarding knowledge of and interest in evolution, patterns revealed that the museum visitors tended to have some knowledge about evolution, but they often combine it with more intuitive reasoning, or in some fewer cases, creationist reasoning. Also, museum visitors are more willing to endorse creationist origins for humans than they are for non-humans. Therefore, despite the increased likelihood for museum visitor to accept evolution, they still possess some misconceptions surrounding fundamental evolutionary mechanisms.

International

Samples including United States

41) (2010, July 15). "Americans are creationists; Britons and Canadians side with evolution." *Angus Reid Public Opinion*. Retrieved from http://www.visioncritical.com/wp-content/uploads/2010/07/2010.07.15_Origin.pdf

INTERNATIONAL SAMPLES; (1,002<n<2,011)

Conducted between July 1st and July 9th in 2010, this is an online survey that asked representative samples of 1,002 Americans (all Springboard America panelists), 1,009 Canadians (all Angus Reid Forum panelists) and 2,011 Britons (all Springboard UK panelists) "…whether their own point of view is closest to the notion that human beings evolved from less advanced life forms over millions of years, or the idea that God created human beings in their present form within the last 10,000 years." The margin of error for the Canada and United States results is +/- 3.1%, and the margin of error for the Great Britain results is 2.2%.

- **Britain:** " In Britain, two-thirds of respondents (**68%**) side with evolution while less than one-in-five (**16%**) choose creationism. At least seven-in-ten respondents in the South of England (**70%**) and Scotland (**75%**) believe human beings evolved from less advanced life forms over millions of years."
- **Canada:** " In Canada, three-in-five respondents (**61%)** select evolution from the two options provided, while one-in-four (**24%**) pick creationism. Quebec (**66%**) and British Columbia (**64%**) hold the highest proportion of respondents who believe human beings evolved, while three-in-ten Albertans (**31%**) think God created human beings in their present form."

- **United States:** "In the United States, almost half of respondents (**47%**) believe that God created human beings in their present form within the last 10,000 years, while one-third (**35%**) think human beings evolved from less advanced life forms over millions of years. Half of people in the Midwest (**49%**) and the South (**51%**) agree with creationism, while those in the Northeast are more likely to side with evolution (**43%**)."

Origin of Humans

Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

	CANADA	UNITED STATES	GREAT BRITAIN
Human beings evolved from less advanced life forms over millions of years	**61%**	**35%**	**68%**
God created human beings in their present form within the last 10,000 years	**24%**	**47%**	**16%**
Not sure	**15%**	**18%**	**15%**

Origin of Humans
CANADA (by region)
Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

	Region						
Canada		**BC**	**AB**	**MB/SK**	**ON**	**PQ**	**ATL**
Human beings evolved from less advanced life forms over millions of years	**61%**	**64%**	**51%**	**50%**	**60%**	**66%**	**64%**
God created human beings in their present form within the last 10,000 years	**24%**	**21%**	**31%**	**39%**	**25%**	**17%**	**28%**
Not sure	**15%**	**16%**	**18%**	**11%**	**15%**	**17%**	**8%**

Origin of Humans
CANADA (by sex and age)
Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

Canada		**Male**	**Female**	**Age 18-34**	**Age 35-54**	**Age 55+**
Human beings evolved from less advanced life forms over millions of years	**61%**	**69%**	**54%**	**68%**	**61%**	**54%**
God created human beings in their present form within the last 10,000 years	**24%**	**19%**	**29%**	**18%**	**23%**	**32%**
Not sure	**15%**	**12%**	**17%**	**14%**	**16%**	**14%**

Origin of Humans
UNITED STATES (by region)
Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

	Region				
U.S.		**Northeast**	**Midwest**	**South**	**West**
Human beings evolved from less advanced life forms over millions of years	**35%**	**43%**	**37%**	**27%**	**38%**
God created human beings in their present form within the last 10,000 years	**47%**	**38%**	**49%**	**51%**	**45%**
Not sure	**18%**	**19%**	**13%**	**21%**	**16%**

Origin of Humans
UNITED STATES (by sex and age)
Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

U.S.		Male	Female	Age 18-34	Age 35-54	Age 55+
Human beings evolved from less advanced life forms over millions of years	35%	43%	28%	41%	33%	32%
God created human beings in their present form within the last 10,000 years	47%	42%	52%	41%	49%	51%
Not sure	18%	15%	20%	18%	18%	17%

Origin of Humans
GREAT BRITAIN (by region)
Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

		Region				
Great Britain		London	South of England	Midlands and Wales	North	Scotland
Human beings evolved from less advanced life forms over millions of years	68%	58%	70%	68%	69%	75%
God created human beings in their present form within the last 10,000 years	16%	25%	15%	15%	16%	12%
Not sure	15%	17%	15%	17%	15%	13%

Origin of Humans
GREAT BRITAIN (by sex and age)
Which of these statements comes closest to your own point of view regarding the origin and development of human beings on earth?

Great Britain		Male	Female	Age 18-34	Age 35-54	Age 55+
Human beings evolved from less advanced life forms over millions of years	68%	72%	65%	65%	71%	68%
God created human beings in their present form within the last 10,000 years	16%	16%	16%	18%	15%	16%
Not sure	15%	12%	19%	18%	14%	15%

Summary: This online survey reveals the percentage of respondents from Canada, the United States, or Great Britain that agrees with one of the following statements: 1) Human beings evolved from less advanced life forms over millions of years, or 2) God created human beings in their present form within the last 10,000 years. Results showed that both Canada and Great Britain possess larger populations that agree with the theory of evolution, with percentages of 61% and 68% respectively. Meanwhile, the United States only had 35% of its respondents side with evolution, and 47% chose to side with creationism. The study also evaluates these percentage distributions according to region, sex, and age. In terms of these factors, one observable trend across all three nations reveals consistently higher percentages of men tending to agree with evolutionary theory.

42) Williams, J. (2009, September 30). "Belief versus acceptance: Why do people not believe in evolution?" *BioEssays, 31*, 1255-1262. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/bies.200900082/full

INTERNATIONAL (primarily UK)

This essay examines the reasons for which people do not accept evolution, particular blaming its poor representation in some science textbooks and the reinforcement of misconceptions that take hold in early childhood.

- In a review of belief in evolution conducted across 34 countries, USA was number 33, as the country with the second greatest percentage of its population who believe evolution to be false
- "America has conducted polls over a 30-year period and the percentage of adults that reject evolution has remained relatively stable, between 43 and 47%."
- A recent UK poll conducted by Theos, a religious think tank that undertakes research and provides commentary on social and political issues, resulted in a major report into attitudes and belief about evolution,10 it revealed that:
    - Only 54% of people know that Charles Darwin wrote *The Origin of Species*.
    - Forty-two per cent of people believe that evolution presents some challenges to Christianity but that it is possible to believe in both.
    - Fourteen per cent of people think that human beings are just another species of animal and have no unique value or significance.
    - Forty-three per cent believe that human beings are like other animals but are particularly complex and this complexity gives humans value and significance.
    - Forty per cent believe that human beings are uniquely different from other living things and so have a unique value and significance.
    - 37% of respondents agreed that Darwinian evolution is a theory so well established it is beyond reasonable doubt, with nearly a fifth (19%) believing it has little or no supporting evidence.
    - Also 36% stated that the theory is still waiting to be proved or disproved.
- Reasons for the misconceptions, as proposed by Novak:
    - "Concepts (scientific and social) are acquired (very) early in life.
    - Misconceptions are acquired early and are resistant to modification.
    - Prior knowledge influences new learning.
    - Information processing capacity is inevitably limited.
    - Most (scientific) knowledge is stored hierarchically.
    - Learners are seldom conscious of their cognitive processes.
    - Epistemological commitments (or cognitive styles) of student thinking influence learning.
    - Thinking, feeling and acting are integrated."
- Wiliams asserts that children develop their own notion of the origin of species in primary school, often without the guidance of a teacher, guardian, or religious influence, and it tends to be "creationist"
- "Since evolution as a concept is not formally taught in primary schools in the UK, it makes such challenges to creationist misconceptions harder to mount."
- Also blames the depiction and treatment of science in text books as being misguiding
    - Ex: Poster of "Godzilla" with caption: Dinosaurs once ruled the planet

    - Of course, dinosaurs were not able to breathe fire and Godzilla was not even a real dinosaur
- Blames scientists for being imprecise with their terminology (distinctions between law, theory, hypothesis, fact), which leads to "apparent lack of understanding that science graduates have of the nature of science"

Summary: With this essay, Williams aims to qualify the idea of creationism (which he defines as "the notion that something has been 'created' by someone/something") as a misconception, and detailing the ways in which it becomes one. Principally, he faults primary school education and the overall treatment of science in learning materials such as textbooks. Additionally, he even faults scientists for using the language of design in their papers, which only serves to perpetuate the ideas associated with creationism. To conclude, he gives the following list of recommendations:

1) Policy-makers and curriculum developers must begin to provide for evolution education in primary schools. Creationist misconceptions implanted or naturally occurring in primary age children will be very difficult, if not impossible, to correct at a later date.
2) School science textbook and resource writers must provide better, more up-to-date examples of evolution – from the wealth of evidence that exists in the scientific literature and museum collections.
3) Pre-service and practising teachers must be given the tools to combat creationist arguments as well as a way of dealing with creationist interventions by pupils in science classrooms (*i.e*. discuss acceptance not belief)
4) The community of science educators must come to an agreement on the definitions of key terminology associated with the nature of science and scientific enquiry as used in our school-based science education
5) Scientists must avoid inappropriate and imprecise language, such as design-related terminology, in the communication of their findings to their peers and the public.

43) Miller, J., Scott, E., & Okamoto, S. (2006, August 11). "Public acceptance of evolution." *Science Magazine, 313*, 765-766. Retrieved from http://rifters.com/real/articles/Science_Public_Acceptance_of_Evolution.pdf
Referenced in #32

Miller, J., Scott, E., & Okamoto, S. (2006, August 18). Supporting online material for public acceptance of evolution. *Science Magazine*. Retrieved from http://cdn.cloudfiles.mosso.com/c148221/Science_evolution_2006_SOM.pdf
* To differentiate the sources, they will be referenced as 1 and 2 since dates and authors do not differ.

INTERNATIONAL SAMPLES; 1,557<n<31,390

United States: "The data for the United States for the years 1988, 1990, 1992, 1995, 1997, and 1999 were collected in national random-digit telephone surveys of approximately 2,000 respondents conducted through grants from the National Science Foundation." (2)
"The U.S. data for 1993 were collected by telephone interviews with 1,557 adults as a part of the International Social Science Program, a cross-national program sponsored in part by the National Science Foundation. The U. S. data for 2003 were collected online using a sample of 2,066 adults from a probability-based national panel maintained by Knowledge Networks, Inc." (2)
"The U.S. data for the years 2004 and 2005 were collected online using samples of approximately 2,000 adults from a probability-based national panel maintained by Knowledge Networks, Inc."
Europe: "The 2002 data from 13,587 adults in Britain, Germany, France, Italy, Spain, the Netherlands, Denmark, Austria, and Poland were collected by personal interview by T.N.S. (Taylor Nelson Sofres) in the fall of 2002."(2)
"The 2005 data from 32 European countries was collected by the European Commission in its Eurobarometer Survey 63.1, conducted through personal interviews during the first quarter of 2005." "A total of 31,390 adults were interviewed in the Eurobarometer 63.1 study." (2)
Japan: "The 2001 data from Japan was collected by personal interview in February and March of 2001 and was sponsored by the Japanese National Institute of Science and Technology Policy (NISTEP). A total of 2,146 adults were interviewed for this study." (2)

Questions:

1) **Genetic Literacy:** 10-country study that consisted of 10 statements that measure genetic understanding. The following statements are to be evaluated on scale from "Absolutely True" to "Absolutely False."
   - Ordinary tomatoes do not have genes, whereas genetically modified tomatoes do. (F)
   - Genetically modified animals are always larger than ordinary animals. (F)
   - Cloning is a form of reproduction in which offspring result from the union of sperm and egg. (F)
   - Today it is not possible to transfer genes from humans to animals. (F)
   - If someone eats a genetically modified fruit, there is a risk that a person's genes might be modified too. (F)
   - All plants and animals have DNA. (T)
   - Today it is not possible to transfer genes from animals to plants. (F)
   - Humans have somewhat less than half of the DNA in common with chimpanzees. (F)
   - It is possible to extract stem cells from human embryos without destroying the embryos. (F)

- All humans share exactly the same DNA. (F)
    - "Genetic literacy has a moderate positive relationship to the acceptance of evolution in both the United States and the nine European countries. This result indicates that those adults who have acquired some understanding of modern genetics are more likely to hold positive attitudes toward evolution." (1)
    - Mean score in the US was slightly higher than in the nine European countries combined. (1)

2) **Religious belief:** A four-category ordinal variable was constructed to reflect a typology of current religious belief.
    - No religious belief
    - Some religious belief but a strong belief in human control
    - Belief in substantial divine control but infrequent prayer
    - Belief in substantial divine control and frequent prayer.
        - "Adults in Poland, the United States, and Italy were most likely to believe in substantial divine control and to pray frequently." (2)
        - "Adults in Britain, France, and Demark were the least likely to believe in divine control and to pray frequently." (2)
        - "The total effect of fundamentalist religious beliefs on attitude toward evolution (using a standardized metric) was nearly twice as much in the United States as in the nine European countries (path coefficients of –0.42 and –0.24, respectively), which indicates that individuals who hold a strong belief in a personal God and who pray frequently were significantly less likely to view evolution as probably or definitely true than adults with less conservative religious views." (1)
3) **Attitude towards life:** The Index of Pro-life Attitudes is a simple count of the number of pro-life attitudes expressed in response to the three questions and ranges from zero to three:
    - When does life begin?
    - Asked their agreement with four statements regarding the status of an embryo that is a few days old
    - Should all stages of life—embryo, fetus, child, or adult—have the same legal protection and should later stages of life have greater protection than the earliest stage?
        - "Approximately 30% of American adults hold strong pro-life attitudes compared to 23% of adults in the nine European countries." (2)
        - "The total effect of pro-life attitudes on the acceptance of evolution was much greater in the United States than in the nine European countries (–0.31 and –0.09, respectively)." (1)
4) **Attitude towards science and technology:** Evaluated through two constructs:
    - "One dimension reflects a belief in the promise of science and technology to improve human life and conditions." (2)
    - "The other dimension reflects reservations about actual or potential negative consequences from science and technology." (2)
        - "In the United States, these two dimensions are negatively correlated at the -0.3 level and in the E.U. the same two dimensions are nearly uncorrelated (*S1*)." (2)
5) **Political ideology:** Each respondent in the 10-country study was asked to place himself or herself on a zero-to-10 scale, with zero meaning "very liberal" and 10 meaning "very conservative."
    - "A slightly higher proportion of U.S. adults classified themselves as conservative than did European adults." (2)

- "In the second half of the 20th century, the conservative wing of the Republican Party has adopted creationism as a part of a platform designed to consolidate their support in southern and Midwestern states—the "red" states. In the 1990s, the state Republican platforms in seven states included explicit demands for the teaching of "creation science" (*1*). There is no major political party in Europe or Japan that uses opposition to evolution as a part of its political platform." (1)

6) **Structural Equation Model:** A structural equation model (SEM) allows an examination of the relationship between several variables simultaneously on one or more outcome variables. They chose the independent variables: Age, Gender, Education, Genetic Literacy, Religious Belief, Attitude towards Life, Attitude towards Science and Technology, and Political Ideology.
*By multiplying each of the coefficients in a series of paths and summing all possible paths from any independent variable to the dependent variable, it is possible to compute the total effect of each of the independent variables in the model on the outcome variable—attitude toward evolution.

Total effects of ….	**United States**	**European Nine**
Age	–0.10	–0.13
Gender (F)	–0.03	–0.10
Educational attainment	0.00	0.17
Genetic literacy	0.20	0.19
Religious beliefs	–0.42	–0.24
Pro-life beliefs	–0.31	–0.09
Belief in the promise of science & technology	0.00	0.14
Reservation about science & technology	0.00	–0.07
Political ideology	–0.15	0.00

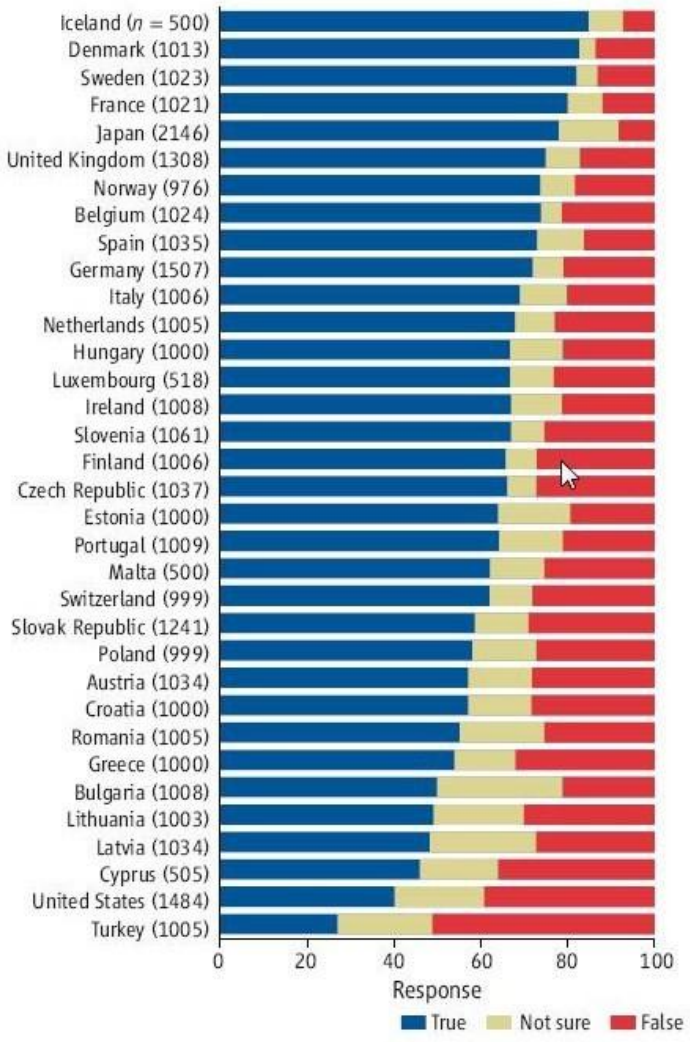
***R*2 = 0.46 0.18**

7) Human beings, as we know them, developed from earlier species of animals. True or False? (or Not Sure/I don't know)
* We compared the results of these surveys with survey data from nine European countries in 32 European countries in 2005, and a national survey in Japan in 2001 (1)

Acceptance of selected scientific constructs, United States, 2005. N = 1484.

	True	**Not sure**	**False**
Over periods of millions of years, some species of plants and animals adjust and survive while other species die and become extinct. (T)	78%	16%	6%
More than half of human genes are identical to those of mice. (T)	32	47	21
Human beings have somewhat less than half of the DNA in common with chimpanzees. (F)	15	48	38
The earliest humans lived at the same time as the dinosaurs. (F)	28	22	51
Human beings were created by God as whole persons and did not evolve from earlier forms of life. (F)	62	2	36

Human beings, as we know them today, developed from earlier species of animals. (T)	40	21	39



Summary: This study involves a number of polls conducted both domestically (within the US) and internationally to provide information on acceptance of evolution and various independent variables associated with these viewpoints. In terms of international comparison, the US ranked 33rd of 34 countries with approximately 40% believing evolution to be true. The stark contrast between beliefs in the US and the European countries can be attributed to the fact that the foundation of American fundamentalism historically differs from that of mainstream Protestantism (Genesis seen as literal instead of metaphorical). Regarding independent variables, one of the most important emerged as genetic literacy. Although the US scored higher on this test than the European countries, substantial numbers of American adults still hold numerous misconceptions regarding core ideas of biology from the 20th and 21st century. As such, the proper teaching of these concepts not only in junior high and high school, but also in college and beyond, becomes increasingly important.

Samples excluding United States

44) (2009 April). *Ipsus Mori*. Retrieved from http://www.ipsos-mori.com/Assets/Docs/Polls/poll-darwin-survey-shows-international-consensus-on-acceptance-of-evolution.pdf

INTERNATIONAL (Great Britain adults); 950<n<975

This survey, conducted in April of 2009, asks eight different questions regarding evolution and one's belief in the theory. Each question received its own base of respondents, numbering between 950 and 973. All participants are citizens of Great Britain and above the age of 18.

Questions:

1) Which, if any, of the following statements best describes how well you understand the term 'evolution?'
    - I have a very good understanding of the term evolution—**23%**
    - I have a fairly good understanding of the term evolution—**34%**
    - I have some understanding of the term evolution—**24%**
    - I have heard of the term evolution but have no understanding about what it means—**11%**
    - I have never heard of the term evolution—**5%**
2) Views regarding the development of life on earth: Which of these comes closest to your own view?
    - Life on earth, including human life, evolved over time as a result of natural selection, in which God played no part—**38%**
    - Life on earth, including human life, evolved over time in a process guided by God—**25%**
    - Life on earth, including human life, was created by a God and has always existed in its current form—**16%**
    - I have another view on the origins of species and development of life on earth, which is not included in this list—**11%**
    - Don't know/no view—**11%**
3) To what extent do you agree or disagree that it is possible to believe in a God and still hold the view that life on earth, including human life, evolved over time as a result of natural selection?
    - Agree Strongly—**19%**
    - Tend to Agree—**35%**
    - Neither Agree nor Disagree—**20%**
    - Tend to Disagree—**11%**
    - Disagree Strongly—**8%**
    - Don't Know—**7%**
4) Which, if any, of the following statements best describes your understanding of Charles Darwin and his Theory of Evolution?
    - I have heard of Charles Darwin and know a lot about his theory of evolution—**15%**

- I have heard of Charles Darwin and know a fair amount about his theory of evolution—**30%**
- I have heard of Charles Darwin and know a little amount about his theory of evolution—**26%**
- I have heard of Charles Darwin but don't know very much about his theory of evolution—**13%**
- I have heard of Charles Darwin but I know nothing about his theory of evolution—**7%**
- I have never heard of Charles Darwin or his theory of evolution—**9%**

REGION	ENOUGH EVIDENCE TO SUPPORT EVOLUTIONARY THEORY			POSSIBLE TO BELIEVE IN GOD AND STIL HOLD POSITIVE VIEWS ON NATURAL SELECTION			TEACHING OF EVOLUTION THEORIES IN SCHOOLS			
	Agree	Disagree	Neither A or D	Agree	Disagree	Neither A or D	Evo' alone	Evo' and other theories	Other only	No theories
Scotland	47%	7%	33%	51%	23%	26%	19%	57%	4%	1%
North	42%	8%	26%	53%	18%	30%	18%	51%	5%	4%
Midlands	49%	9%	23%	51%	18%	31%	17%	53%	10%	5%
South	66%	9%	23%	51%	18%	31%	17%	53%	10%	5%
London	48%	6%	20%	48%	16%	37%	22%	44%	9%	3%
Wales	28%	2%	46%	44%	21%	35%	21%	62%	6%	3%

Summary: This quantitative study of adults in Great Britain principally examines its respondents' knowledge and awareness of Charles Darwin and his theory of evolution and/or natural selection, but it also forays into the issue of creationism. While 81% of respondents reported to have any *understanding* of the term "evolution," 51% agreed that there is enough evidence to support an evolutionary theory. Yet only 38% report believing that life on earth, including human life, results from natural selection without the guidance of God. Additionally, only 54% of the sampled population agreed (either strongly or with a tendency) that it is possible to believe in a God and still hold the view that life developed as a result of natural selection. Therefore, this study demonstrates that there is a fairly broad recognition of Charles Darwin and his theory across Great Britain, yet the acceptance of his work is much less ubiquitous.

Samples from Islamic World

45) (2009). "Study of acceptance of evolution among Muslim physicians." *Hampshire College*. Retrieved from http://www.hampshire.edu/news/16095.htm

Chang, K. (2009, November 2). Creationism, minus a young earth, emerges in the Islamic world. *The New York Times*. Retrieved from http://www.nytimes.com/2009/11/03/science/03islam.html?_r=2&scp=1&sq=salman%20hameed&st=cse

INTERNATIONAL (US and Muslim countries, mainly Turkey and Pakistan); n=500 and 2,527

This is a three-year study funded by the National Science Foundation and executed by researchers at Hampshire college and the Evolution Education Research Center at McGill University. Hampshire's researchers interview 500 doctors and medical students in 5 Muslim countries (Egypt, Iran, Pakistan, Turkey, and Malaysia) and three diasporas (Germany, Great Britain, and the US)(2009). The study at McGill mainly focused on 2,527 Pakistani high school students (Chang).

Questions:

1) Do you agree with the statement: "Evolution is not a well-accepted scientific fact?" (Chang)
   - Of 2,527 Pakistani high school students…
   - 28% agreed
   - 60% disagreed
2) Do you agree with this statement: "Millions of fossils show that life has existed for billions of years and changed over time?" (Chang)
   - Of 2,527 Pakistani high school students…
   - 86% agreed
3) Do you agree with this statement: "Millions of fossils show that life has existed for billions of years and changed over time?" (Chang)
   - Of students at Islamic schools outside of Toronto…
   - 50% agreed
   - This is much less than the 85% who agreed in Pakistan

- "In Turkey, officially a secular government but now ruled by an Islamic party, the teaching of evolution has largely disappeared, at least below the university level, and the science curriculum in public schools is written in deference to religious beliefs, Dr. Edis said." (Chang)
- "There is some indication that in the West, where non-Islamic influences are strongest, Islamic creationism may be stronger in reaction to the outside pressure." (Chang)
  - "'We actually expect, especially in Europe, where they have a harder time merging in the culture,' Dr. Hameed said, 'harsher rejection of evolution in England and Germany' than in Muslim countries." (Chang)
- "In the McGill research, fewer students in Indonesia than in Pakistan thought evolution a well-accepted scientific fact, yet 85 percent agreed that fossils showed that life had existed for billions of years and changed over time." (Chang)

Summary: Although the survey itself is not available, this article explores the emerging tension between the Islamic world and evolution. While the Muslim religion actually has very few issues with cosmological history in general, they greatly oppose the idea that humans evolved from primitive primates since they believe life is the creation of God. However, pertaining to the age of the Earth, they are actually in accordance. The degree of acceptance of evolution varies among Islamic countries since science education also varies so greatly. For example, since ruled by an Islamic party, Turkey barely addresses evolution in its schools; one can even find books on creationism in the science section (written by a creationist of old-Earth variety). Even in Pakistan, where they do address the theory evolution, the biology textbooks have quotes from the Koran. Interestingly, data suggests that countries with the largest Western influence show the strongest opposition to evolution, as if the outside pressure increases their likelihood to believe in creationism, as is the case with the students at Islamic schools in Toronto. Overall, this article suggests the growing need to target Islamic communities for evolution education. Since opposition to the theory mainly stems from lack of knowledge or information, simply introducing the tenets behind evolution through books or museums could have a huge impact.

46) Hameed, S. (2008, December 12). "Bracing for Islamic creationism." *Science Magazine, 322*, 1637-1368. Retrieved from http://helios.hampshire.edu/~sahCS/Hameed-Science-Creationism.pdf
*References #38

MUSLIM COUNTRIES; 527<n<1472

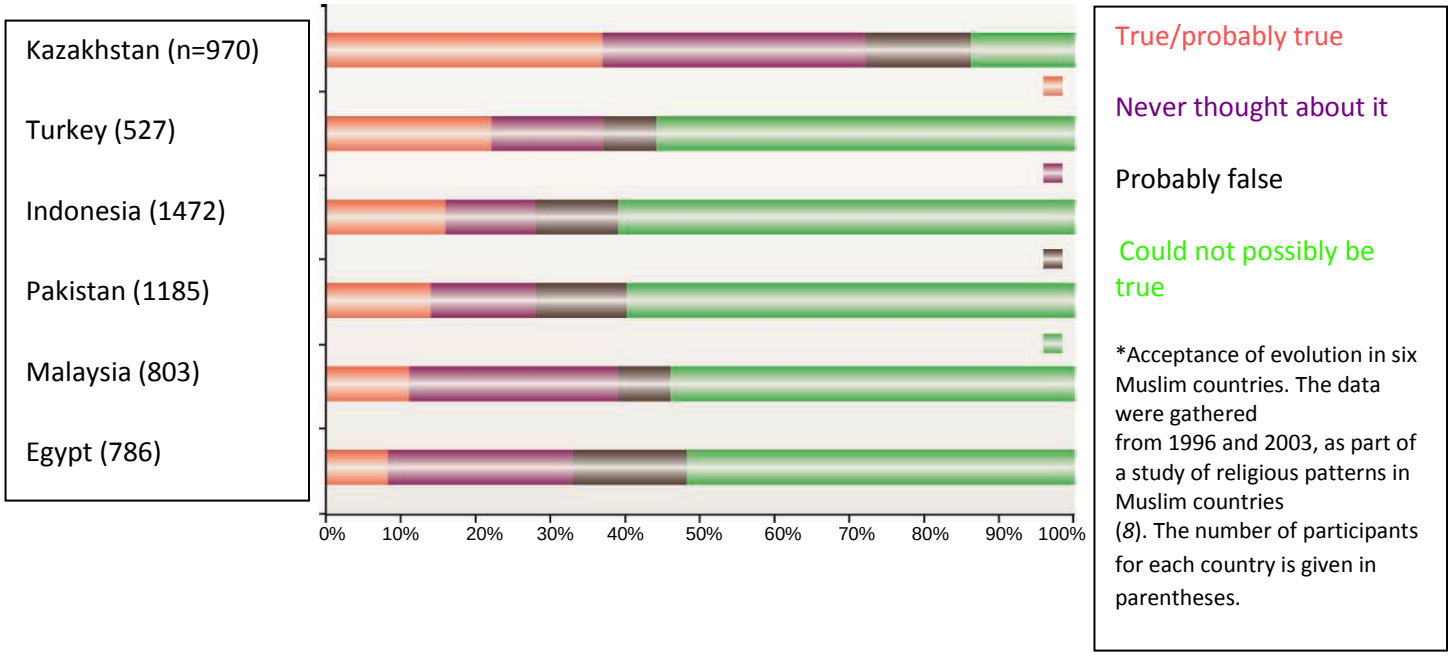
This essay focuses on the growing role of Muslim populations in the creationist movement, and the consequent opposition these groups are creating for the theory of evolution. "Relatively poor education standards, in combination with frequent misinformation about evolutionary ideas, make the Muslim world a fertile ground for rejection of the theory." The essay includes several references to other studies/polls, which will be identified and referenced with a (*).

- The study (7)* found that about 25% of adults in Turkey agree with the statement, "Human beings, as we know them, developed from earlier species of animals," well below the United States (at 40%). The result is all the more worrisome, because Turkey is one of the most educated and secular of Muslim countries.
- Various Muslim countries participated in a sociological study (8)*and revealed that when asked: "Do you agree or disagree with Darwin's theory of evolution?" Only 16% of Indonesians, 14% of Pakistanis, 8% of Egyptians, 11% of Malaysians, and 22% of Turks agree that Darwin's theory is probably or most certainly true. The former Soviet republic of Kazakhstan reported the highest percentage of acceptance, with only 28% reporting evolution as *false*.
- In terms of school policy, "Science foundations of 14 Muslim countries, including Pakistan, Iran, Turkey, Indonesia, and Egypt, recently signed a statement by the Interacademy Panel (IAP, a global network of science academies), in support of the teaching of evolution, including human evolution (*9*)*." However, evolution still manages to be taught in highly religious environments since there is no separation between church and state in countries such as Pakistan.
- "Asghar and Alters recently interviewed 18 science schoolteachers in Pakistani schools located in Karachi and Lahore and found that all favored using religious explanations about the creation of life, but most presented both scientific and religious perspectives while teaching biological evolution (*10**). Most (14 out of 18) accepted, or at least held as possible, the evolution of organisms; but at the same time, 15 out of 18 rejected human evolution. All agreed that there is no contradiction between Islam and science."
- "…a recent study of 25 Muslim university students from Turkey and Morocco studying in various disciplines in Holland (*12*)*. Although most accepted microevolution, almost all rejected macroevolution and connected the idea to atheistic aspirations and to the impossibility of chance and mutations leading to complex species. However, none expressed antiscience attitudes or foresaw any significant tension between Islam and science (*12*)."

*

7: J. D. Miller, E. C. Scott, S. Okamoto, *Science* 313, 765 (2006). (#38)
8: R. Hassan, *Muslim World* 97, 437 (2007).
9: IAP statement on the teaching of evolution (2006), www.interacademies.net/?id=6159.
10: A. Asghar, B. Alters, *Proceedings, National Association for Research in Science Teaching (NARST) Conference*, New Orleans, LA, 15 to 18 April 2007.
12: D. Koning, *ISIM Rev.* 18, 48 (2006).

ACCEPTANCE OF EVOLUTION



*Acceptance of evolution in six Muslim countries. The data were gathered from 1996 and 2003, as part of a study of religious patterns in Muslim countries (*8*). The number of participants for each country is given in parentheses.

Summary: The growing opposition of Muslim communities towards the theory of evolution, though possessing contradictory attitudes, consequently suggests a growing need to address science education in such countries as Pakistan, Turkey, and Egypt. Despite the Koran suggesting an old world view as opposed to the new world creationist view, very low percentages of these survey respondents agreed to Darwin's theory of evolution. In fact, Turkey, one of the most educated and secular of the Muslim countries, only had 25% of its adults agreeing with the evolutionary theory. In order to increase awareness, "The message about evolution in the Islamic world needs to be framed in a way that emphasizes practical applications and show that it is the bedrock of modern biology…"Since religion plays such a large role in social and cultural landscape of the Muslim world, the importance of research scientists specifically targeting this audience in order to increase awareness becomes doubly important.

Miscellaneous

47) Reiss, M. (2009, April 13). *Evolution: International Journal of Organic Revolution*. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1558-5646.2009.00714.x/abstract

Summary: There is no official poll here, but rather an assessment of how teachers approach the topic of evolution. Reiss cites a study in South Africa that demonstrates the lack of absorption by creationists regarding evolution. "…in their assessment of a first-year evolution course taken by undergraduates at the University of Cape Town, South Africa, Chinsamy and Plag´anyi (2007) found no statistically significant changes in the views of students as a result of the course for questions that challenged religious views about creation, biodiversity, and intelligent design and concluded 'Our study confirms the results of previous studies that adults' views on evolution are remarkably impervious to instruction' (p. 252)." Reiss explains that creationism becomes a world view, not just a simple misconception that can be corrected through a science class. As such, instead of ridiculing those with creationist beliefs, he believes that educators should just focus on giving them a better understanding of general biological knowledge, thereby hoping to also give them an appreciation for evolutionary biology.

48) (2009, February 4). "Overview: The conflict between religion and evolution." *The Pew Forum*. Retrieved from http://pewforum.org/Science-and-Bioethics/Overview-The-Conflict-Between-Religion-and-Evolution.aspx
*References #16, 18

Summary: While this essay itself is not a primary source for statistics on evolution, it does incorporate other polls in order to make its argument that evolution should not be viewed as less true because of its label as a "scientific theory." Citing an August 2006 survey from Pew Research Center (#40), they say that 63% of Americans believe that humans and other living things either always existed in their present form or have evolved over time under the guidance of a supreme being. Additionally, a poll from Pew in 2005 (#44) found that 64% of Americans support teaching creationism alongside evolution in the classroom. Contrastingly however, America's scientists view evolution as more of a fact. Comparing the theory of evolution to the theory of gravity, they say that a scientific theory is not a mere guess or hunch, but an established explanation for natural phenomena. The contention of evolution's validity then lies in its theological and political implications. Firstly, evolution contradicts the biblical creation story and the Judeo-Christian notion of a supreme and loving God. Secondly, evolution has sometimes been used in the past to justify heinous crimes such as mass genocide. Regardless, the importance of teaching evolution in public schools becomes the primary issue at hand and will remain among some of the nation's most heated and important debates for years to come.

49) Moore, R. (2002, May-June). “Racism and public’s perception of evolution.” *National Center for Science Education*, *22(3)*, 16-18 & 23-25. Retrieved from http://ncse.com/rncse/22/3/racism-publics-perception-evolution

Summary: Although this essay contains no quantitative data, it does present a thoughtful argument regarding the use of evolution to qualify racism. These arguments, by antiquated scientists such as Alexander Winchell, center on the idea that whites descended from non-whites, degenerating from and thereby improving upon their ancestors. Ironically, groups such as the Ku Klux Klan who oppose the teaching of evolution, embrace Social Darwinism in order to explain its own racist ideology by claiming biological differences between races are biological determinants of human actions and destiny. Not surprisingly, the Klan became the first national organization to urge that creationism and evolution be given equal time in schools in 1925. More recently, the Bob Jones University has emerged as the largest fundamentalist university in America, which sells satellite-delivered, anti-evolution academic courses. Groups such as these often employ the tactic of vilifying evolution, blaming it for racism, Nazism, adultery, infanticide, murder, homosexuality, and even drunkenness. “There is a great irony here: creationists originally misused evolution to promote racism, but later vilified evolution as racist. The simple fact remains: there is no "inferior" race; the genetic differences between races are trivial.” These accusations persist both out of ignorance and political motivations. In terms of both, the proper education of evolution becomes even more imperative to society today in order to prove such ideas as empirically wrong.

Unavailable

50) Broken link, but #27 is by Nadelson and Sinatra—repeat? The Researcher, 2010 http://nrmera.org/files/Nadelson_Sinatra2010.pdf

51) Have to pay: Miller, J. , Kimmel, L. & Pardo, R. (2009, May 25). "The Public Acceptance of Evolution and the Big Bang." *American Association For Public Opinion Association.* Retrieved from from http://www.allacademic.com/meta/p17022_index.html

52) Have to pay: Donnelly, L., Kazempour, M., & Amirshokoohi, A. (2008). "High school students' perceptions of evolution instruction: Acceptance and evolution learning experiences." *Research in Science Education, 39 (5)*, 643-660. Retrieved from http://www.springerlink.com/content/r7410k51534n6011/