



The **BEACON**

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PRESIDENT'S MESSAGE

The Same Old Creationism Knocking at Our Door A Summary of Recent Events

During the genesis of CESE, a number of the founders expressed the opinion that a significant reason for the creationism movement was inextricably linked to the overall lack of science literacy in the nation. Creationism could not be completely placed back into the realm of religious belief until people understood the difference between ideological creationism and scientific based learning. That was one factor that we, CESE, could possibly help with. However, it is not the only factor. Clearly, there are many people who simply will never be able to imagine how life could have evolved without the direct intervention of God. We cannot impart credulity to the incredulous. But, we can try to address science illiteracy.

We set out to do what we could, and actually made some real progress in New Mexico—at least in terms of being instrumental in getting an excellent set of science standards in place for the state. We have done many other things too, and I would rather be talking about them right now. But, we keep getting sucked back into the old creationism versus science fight. Yes, they call it intelligent design now, but it is

still the same old thing with slightly evolved erroneous “scientific” sounding arguments.

We cannot ignore them. They can do too much damage to a United States that already has a significant loss of blood in the body of science education and in the number of scientists being trained through advanced college degrees. We must keep fighting. There are a few things we all should remember.

Creationists can be defeated—but only if someone stands up to them. The creationist activists are dedicated religious fundamentalists (with very few exceptions) who really believe what they are doing. They want to proselytize the whole nation, but they have a serious problem because of the First Amendment to our Constitution. “*Congress shall make no law respecting an establishment of religion, . . .*”—the Establishment Clause. To get around that, they have to break the Bible’s ninth commandment. They have to lie about what their purpose really is—to get creationism into our public schools.

We must keep track of what is going on in the rest of the country, both good and bad, because it can help to prepare us for what we may face here in New Mexico. We can certainly cheer the recent victory in Dover PA in which all of the pro ID school board members were defeated for reelection by a pro-science slate. Hopefully,

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we will be able to celebrate the Dover case when the judge rules on whether or not ID is really creationism. (We know it is, but most people do not!) The Dover case was well presented by the pro-science side. But, no one can really predict the outcome of a trial. The ruling is due out in late December or early January.

In Kansas the school board voted 6 to 4 in favor of changing the science standards' definition of science to allow for the supernatural. Kathleen Sebelius, the governor of Kansas, made a strong statement against the board for doing this, noting that the Kansas reputation in science would be harmed. Governor Sebelius said in a statement e-mailed to reporters: "[T]his is just the latest in a series of troubling decisions by the Board of Education. . . . If we're going to continue to bring high-tech jobs to Kansas and move our state forward, we need to strengthen science standards, not weaken them." A brave governor, there.

Please realize that New Mexico is still being misrepresented in national and international press stories as one of the few states that have accepted "intelligent design" into their science standards. This is, of course, totally wrong. We have put the corrections out, but that doesn't seem to do much good. However, there is a kernel of truth in what the world press says. We have Rio Rancho, whose school board passed a very cleverly worded policy that does not mention intelligent design creationism, but allows for its presentation - yes - even its inclusion in the Rio Rancho science curriculum in the form of "evidence against evolution." You know—present all the alternate interpretations of the "data" concerning "origins" so that the students (children equipped with a really good technical background in the subject?) can make up their own minds. Of course, the only evidence against evolution is straight from the ID creationist literature that has been examined multiple times by expert, mainstream scientists and found to be without any scientific merit whatsoever.

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Guess who claims responsibility for this policy? Correct again--two pastors on the Rio Rancho school board. And, no, these pastors don't admit that intelligent design is their purpose. They say they simply want to teach good science. I wonder why at least one of them sponsored an intelligent design type curriculum seminar for students in a church and handed out questions straight from a creationist web site? Say it's for good science, but teach it for religious ideological reasons. In my opinion, this is purposefully misleading to get around the First Amendment. It would also seem that this is breaking the spirit, if not the letter, of both God's law and Caesar's law.

CESE can help with Rio Rancho. Mostly though, Rio Rancho must lead this. But I would ask that

all who read this be ready to respond when it is time to help. The nature of the help will depend on the circumstances. The Rio Rancho policy is a pox on the face of good science in New Mexico. Someday this may be an issue relegated to the funny quirks of history files. But - like a duck in a shooting gallery, it seems to just keep popping up again. (Thanks for that statement, David A. Thomas.)

So, please be ready to help when called upon. Keep your eyes open. Other school districts in New Mexico may be tempted to follow Rio Rancho's example. Pay attention to what is happening around you and in the nation. Be ever vigilant!

Kim Johnson
CESE President

Scientific Answers to Some ID Creationist Questions

Jonathan Wells, William Dembski and other Intelligent Design advocates have encouraged students to ask certain questions in biology classes. Some of these questions come directly from earlier "creation science" literature and have already been answered; others are disingenuous, misleading, or are topics of current evolutionary research. In no case is the simple statement "Some supernatural designer did it" an appropriate **scientific** answer:

We will illustrate four of these questions along with answers provided by Prof. Kenneth Brown, Dr. Alan Gishlick, and a few updates by us. We hope that these questions and answers will prove useful for teachers, students, and others interested in responses to ID's deceptive tactics.

Q: *ORIGIN OF LIFE. Why do textbooks claim that the 1953 Miller-Urey experiment shows how life's building blocks may have formed on the early Earth — when conditions on the early Earth were probably nothing like those used in the experiment, and the origin of life remains a mystery?*

A: Miller's experiments have been repeated many times using different initial conditions.

Remarkably, these experiments have still produced organic compounds. In fact, one of Miller's most recent experiments (in 1995) produced cytosine and uracil, two of the bases found in DNA and RNA." [Robertson & Miller "An Efficient Prebiotic Synthesis of Cytosine and Uracil," *Nature* 375: 772-774 (1995).]

Indeed, it is not unusual that the deceptive and misleading questions raised by ID advocates are often out-of-date and sometimes quickly refuted by ongoing scientific work. Research published just this year suggests that Miller & Urey may have been essentially correct about the nature of the earth's early atmosphere [see "Rethinking earth's early atmosphere" by C. F. Chyba, *Science* 308: 962-963 (2005)].

Of course, the origin of life still remains a mystery. Because evolution works with any model of the origin of life on Earth, how life originated is not a weakness of evolutionary theory.

Q: *DARWIN'S TREE OF LIFE. Why don't textbooks discuss the "Cambrian explosion," in which all major animal groups appear together*

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in the fossil record fully formed instead of branching from a common ancestor— thus contradicting the evolutionary tree of life?

A: Recent textbooks **do** discuss the Cambrian explosion. Furthermore, the claim that all major animal groups appear “fully-formed” in the Cambrian is **false**. In reality, major groups of animals including amphibians, birds, reptiles, mammals, and insects do not appear in the Cambrian, but much later. The question’s claim that “all major animal groups appear together” in the Cambrian is false. The Cambrian actually lasted 50 million years, and some of these groups appeared in the lower Cambrian, tens of millions of years before the others. It is now also known that many complex animals actually appeared well before the Cambrian. Examples include the Precambrian echinoderm *Arkarua* [Chen *et al*, 2000, PNAS 97: 4457-4462], the extensive collection of fossil animals in the Doushantou formation in China [Lou, 2005, J. Paleontology 79: 1040-1042], and the newly-discovered small bilateral animals that predate the Cambrian by as much as 50 million years [Chen *et al*, 2004, Science 305: 218-222]. The discovery of animal embryos in the Precambrian [Xiao *et al*, 1998, Nature 391: 553-558] further contradicts this false question.

Q: *ARCHAEOPTERYX. Why do textbooks portray this fossil as the missing link between dinosaurs and modern birds—even though modern birds are probably not descended from it, and its supposed ancestors do not appear until millions of years after it?*

A: The notion of a “missing link” is an out-of-date misconception about how evolution works. Archaeopteryx (and other feathered fossils) shows how a branch of dinosaurs gradually appeared to acquire both the unique anatomy and flying adaptations found in all modern birds. It is a transitional fossil that shows both dinosaur ancestry and bird specializations. Paleontologists have now accumulated an abundance of fossil evidence that birds evolved from dinosaurs.

Wells’ claim that “supposed ancestors” are younger than Archaeopteryx is false. These fossils are not ancestors but relatives of Archaeopteryx and, as everyone knows, your uncle can be younger than you! Many new fossilized dinosaurs with bird features, including various forms of feathers, have been found over the last few years, especially in China.

Q: *EVOLUTION A FACT? Why are we told that Darwin’s theory of evolution is a scientific fact—even though many of its claims are based on misrepresentations of the facts?*

A: The ID advocates know that a scientific theory is an explanation of a very large number of validated facts. Their artificial distinction between fact and theory is a deliberate attempt to confuse the public. It is a fact that living organisms have changed over time and evolution is a theory as to how these changes occurred, and continue to occur today. Similarities and differences among living things on Earth over time and space display a pattern that is best explained by evolutionary theory. Speciation events have been observed, both in the wild and in the lab:

<http://www.talkorigins.org/faqs/comesc/section5.html#speciations>

Although not all mechanisms are fully understood, every new discovery has confirmed the underlying basis of the theory of evolution. ID advocates misrepresent the facts in order to advance a political and religious agenda.

Note: More **Q & As** on ID and evolution will be available on the CESE website in the near future: www.cesame-nm.org .

**Kim Johnson
and
Marshall Berman**

Intelligent Design?

Dr. Marshall Berman

*Published by the Santa Fe New Mexican
October 16, 2005, Section Opinions; Page F3*

Theodosius Dobzhansky, renowned evolutionary biologist, said: "Nothing in biology makes sense except in the light of evolution."

Ernst Mayer, evolutionary biologist and major contributor to the Neo-Darwinian synthesis, said: "I am taking a new look at the Darwinian revolution of 1859, perhaps the most fundamental of all intellectual revolutions in the history of mankind."

Nobel laureate James D. Watson, co-discoverer of the molecular structure of DNA, said: "...the most impressive data supporting the laws of evolution come from the studies of the past 40 years in molecular genetics. The clearest evidence for the common ancestry of all living organisms comes from the universality of the genetic code.... With some variations, this code is the same for viruses, bacteria, worms, human beings, beetles, mice and slugs. The most extreme example is that bacteria can be given a human gene and they will make a human protein. What an extraordinary vindication of Darwin's ideas!"

A survey showed that over 99% of earth and life scientists reject "creation science."

Almost every major national science organization in almost every branch of science, from physics to chemistry to biology to astronomy to geology, has stated their support of evolutionary theory and their opposition to intelligent design or the disingenuous claim of "only" wanting to "teach the controversy." Ten U.S. civil liberties, fifteen religious, and 29 educational organizations have voiced their support of teaching evolution in public schools (www.ncse.org).

Yet a few politically savvy people, generally motivated by religious beliefs, still claim an unearned, unjustified place in public school science classes. Although a handful of so-called "intelligent design" (ID) authors publish speculative books contain-

ing no empirical data, there are nearly zero ID articles in mainstream peer-reviewed scientific journals. This ID movement claims to be non-religious, and *doesn't identify* the designer, or the method and timing of converting design into creation. Its most recent deceptive slogan is "teach the controversy." But the controversy is political; there is no scientific controversy. And ID's "questions" concerning the fossil record, geological strata, radioactive dating, or other supposed "gaps" have already been resolved and rejected, or are currently being researched. No supernatural causes can be considered part of science - by definition of the scientific method, and not because of any philosophical or religious bias. Science seeks natural explanations for natural phenomena, and is silent about religion.

How can such unbridled scientific ignorance gain a hearing in the face of overwhelming scientific opposition? To accomplish that feat requires political acumen, deception, an extremely well-crafted marketing campaign, and a large number of religious people who do not understand the issues, but have been indoctrinated to believe that "evolution equals atheism." This latter claim is absurd, since a huge number of scientists *are* religious and accept the enormous evidence for evolutionary theory.

Despite internal contradictions, false claims, and the complete lack of scientific evidence, this unfalsifiable "Intelligent Design" notion has made inroads across the country, and is now attempting to infiltrate local districts in New Mexico.

In Rio Rancho, three school board members who admit to no scientific expertise whatsoever, claim that they *know* there are data indicating weaknesses and gaps in the "field" of "origins science." That unscientific expression has its "origin" in the contradictions between Biblical inerrancy and scientific understandings of cosmology and the origin of species.

New Mexicans, please stand up against propaganda and indoctrination in the science classrooms!

Making Sense of Those Test Results

Schools live and die by the results on the New Mexico Standards-Based Assessment (NMSBA.) Making “Adequate Yearly Progress” has deep and terrible meaning for staff and students alike. How do we make sense of the scores? Let’s look at APS elementary school mean fractions proficient or better on the NMSBA for the last three years. These exclude charter schools, a few newly opened schools, and are calculated a little differently from the way the state does it, so they might not exactly agree with the “official” numbers. I think these are realistic, though.

Subject	2002-2003	2003-2004	2004-2005
Math	55%	58.3%	41.7%
Reading	49.1%	50.9%	57.6%

Does this mean that reading teachers were getting steadily better and math teachers were on vacation all of the last school year? Not at all. These averages don’t address changes in test content, demographics, different students tested, or a whole host of external nuisance variables. Although schools have to live with the official measures, the fact is that they don’t always mean much. Did a school’s score change because the school was doing better, or just because of a systemic change in the whole district, or because this year’s test was easier or was it pure chance?

We can get a better picture by reducing scores to a quasi “Z” score. Z scores for the whole district have a mean of zero and a standard deviation of 1.0. $Z = (\text{school score} - \text{district mean score}) / (\text{district standard deviation})$. We use the population-weighted mean and the population-weighted standard deviation of school fractions proficient. Then we can truly judge school progress, because changes at the district level are zeroed out. We can better compare schools and groups of students against each other. A Z score of +2.0 is far above the district average. A Z score of -2.0 is far below the district average. The district as a whole has a score of exactly 0.0 every year, so if a school has a positive change in Z score, it really is advancing faster than the rest of the district.

now we know that the demographics of the school are every bit as important as the demographics of individual students. Students in every ethnic and economic group do better in schools with favorable overall demographics. We can calculate a “Demographic Index” for each school in each year. It is the combination of fractions of minorities, English language learners, economically disadvantaged students, and students with disabilities at every school that best correlates with a combination of reading and math scores at every school. We use an index of the school’s cluster as a proxy for the neighborhood in which the school is located. Figure 1 shows how the outcome index—the combined score variable—varies with the demographic index for the most recent school year. There are bunches at the high and low ends because schools can’t have more than 100% of minority or poor students or less than 0%. Between these end points there is a very good correlation. A similar correlation holds for the cluster index.

Figure 2 shows the most recent reading results for Anglo and Hispanic students. There are too few Black, Asian, and Native American students for good statistics. The plot shows the actual scores against the scores one would predict, based on each school’s demographic and cluster indexes and the specific ethnic group. Each symbol shows the quasi Z score for one ethnic group at one school. Although Hispanic students do not do as well as Anglo students on average, there are some surprises. Hispanic students at some schools surpass Anglo students at many other schools, and those are not necessarily the schools with the most favorable demographics. We also note that Anglo students at several schools do considerably worse than expected, in some cases worse than most Hispanic students. The solid line indicates equal predicted and actual scores. If scores were normally distributed (they aren’t) we would expect 90% between the upper and lower dashed lines. Even if a school has a fairly

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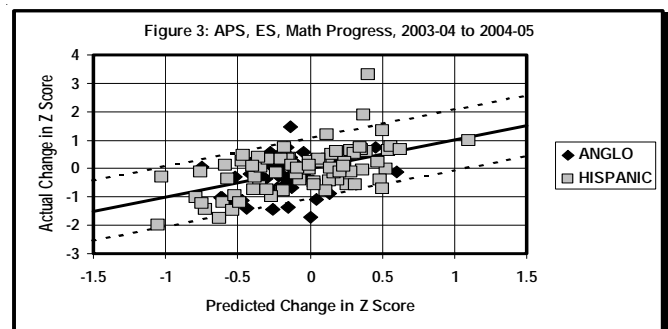
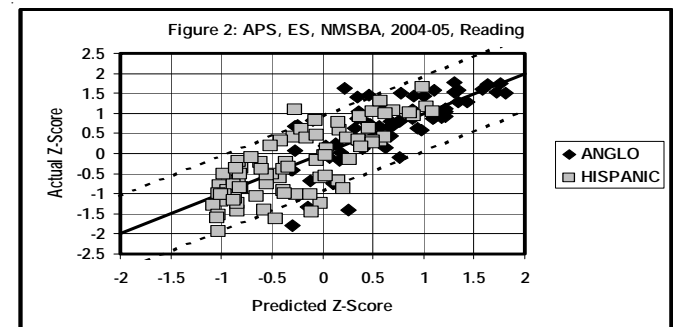
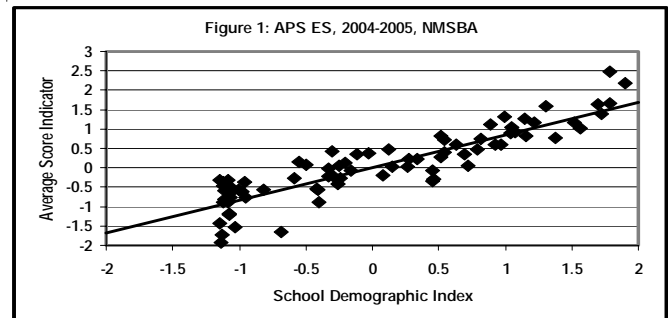
low fraction proficient, if it falls above or near the upper dashed lines, it is doing very well. Even if a school has a respectable fraction proficient, if it falls below or near the lower dashed line, it is in trouble.

There are similar results for economically disadvantaged students. On average, poor students don't do as well as more affluent students. However, at a few schools poor students do better than affluent students at some other schools. The same is true for English deficient vs. English proficient students. Although there are exceptions, in schools where minority students do much better than expected, economically disadvantaged students and English learners also tend to do better than expected. Now we have a rational way to rate schools. Of course, it might not get used. We can also use the method to pinpoint problems. We might find, for example, that most groups in a school do as well as expected but that Anglo students in that school perform much worse than expected. We can also point out where a specific subject might be a major problem.

We can also look at progress. I don't mean the less than useful progress that is measured against an arbitrary AYP criterion. Progress depends on school demographics, the school's neighborhood, student ethnicity, English competence, economic status, and the previous year's showing. Real progress is gain that exceeds expectations. Figure 3 shows real progress over the last two years. Hispanic students made about as much progress as Anglo students - in some cases, more progress. The "wild card" school that shows a gain of over 3 standard deviations had a similar large gain for reading and for poor students. This is possible, but might bear investigation. Perhaps there was a major change in the student body. If the gain holds up in the following year, the teaching methods would be well worth copying at other schools. Schools that fall near or above the upper dashed line did very well, whether or not they happened to meet the ar-

bitrary AYP requirement. Schools that fall near or below the lower dashed line are falling badly behind, whether or not they meet the AYP standard.

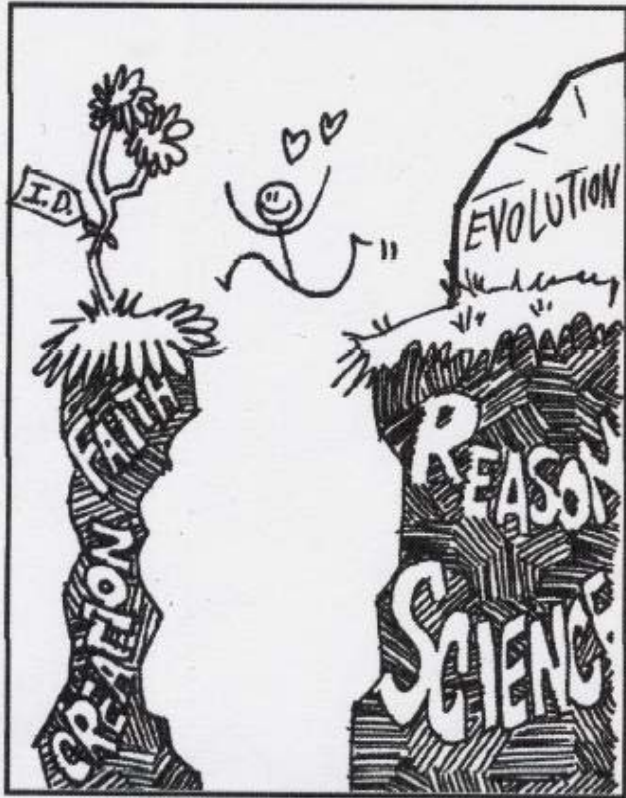
This is a more rational way to look at status and progress. It is an unfortunate fact of life that schools will have to abide by the rigid and less useful AYP standard. However, every school could use an analysis like this to find whether it is really doing comfortably well and where special attention is needed. The district could study the methods used by schools that show real progress and try to apply those methods in schools in need of improvement.



Walt Murfin
CESE Statistician

The LEAP of FAITH

written by Ariel Thomann
illustrated by Keith McCaffety



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Tuesday, January 31st, 2006, 12:00 noon

Ballroom C, UNM Student Union Building

"The Evolution Wars: Who's fighting Whom about What?"

"A controversy rages in our public schools and in our churches over the teaching of the Darwinian model of evolution

"The team of Martinez Hewlett, a molecular biologist, and Ted Peters, a systematic theologian, will present just what Darwin actually said and show why acceptance of Darwinian theory need not conflict with Christian faith. They will make a case for a healthy relationship between faith and science."

Peters is affiliated with Pacific Lutheran Theological Seminary in Berkeley, CA and is editor of *Dialog: A Journal of Theology* and co-editor of *Theology and Science*. Hewlett is professor emeritus at Arizona State University.

Advanced reading recommended for this event is *Evolution from Creation to New Creation* (Abingdon 2003), by Ted Peters and Martinez Hewlett.



"Nexus Religion in the Public University" is a year-long, Louisville Foundation grant-funded program of public events and clergy-faculty dialogues on topics of mutual interest.



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