



# The **BEACON**

News from

*The Coalition for Excellence in Science and Math Education*

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*In this issue:* President's Message—Dave Thomas, Toon by Trever Copyright Albuquerque Journal, 11-14-07—John Trever, used with permission, A Better Metric—Walt Murfin, Flock of Dodos (film) coming in February—see page 8.

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## **PRESIDENT'S MESSAGE**

Things are once again heating up in the never-ending assault on science education. And this week (I'm writing this mid-November) included several events that bring the issue into sharp focus. The most significant of these was the long-awaited airing of the PBS/NOVA special on the Kitzmiller vs. Dover Area School District court case of 2005, titled "Judgment Day: Intelligent Design on Trial" (aired November 13, 2007).

The two-hour production was splendid. At times it was like a biology class most of us would have been delighted to attend. When the alleged lack of transitional fossils came up, the program shifted gears, taking us directly to a barren Canadian outcrop bearing incredible fossils of a genuine fish with legs—Tiktaalik—found in strata of just the right age (375 million years old) for the predicted transition from fish to tetrapods.

Intelligent Design (ID) proponent Michael Behe's actual court testimony was presented, regarding whether or not bacterial flagella (tiny hair-like appendages which propel bacteria through liquids) are "Irreducibly Complex" (so complex that the absence of even one component would render it useless, precluding its evolution from simpler precursors). On the witness stand, Behe quoted Brandeis University biology professor David DeRosier directly: "*More so than other motors, the flagellum resembles a machine designed by a human.*" But NOVA didn't stop there. They found and interviewed DeRosier himself, and he clearly and convinc-

ingly explained how Behe was misrepresenting his actual position: "*What I wrote was that this is a machine that looks like it was designed by a human. But that doesn't mean that it was designed, that is, the product of Intelligent Design. Indeed, this, more, has all the earmarks of something that arose by evolution.*" And then, DeRosier showed real microphotographs of an assembly containing a subset of the same proteins forming the base of the flagellum: "*This is a structure found, for example, in Yersinia Pestis, the bacterium that causes the Bubonic Plague. Look at the similarities. ... It's like—sort of like a syringe... So, indeed, the [flagellum] structure is not, in that sense, irreducibly complex.*"

Another splendid example of riveting science was provided in a discussion on why gorillas and chimps and other great apes have 24 chromosomes, while humans have only 23. The trial testimony of Ken Miller was presented, in which the Brown biologist and textbook author said "*Well, evolution makes a testable prediction, and that is, somewhere in the human genome we ought to be able to find a piece of Scotch tape holding together two chromosomes so that (of) our 24 pairs -two of them [were] pasted together to form just 23. And if we can't find that, then the hypothesis of common ancestry is wrong and evolution is mistaken. ...*" Then, vivid graphics were employed to show recent research which solved this enigma—in humans, two of the 24 original chromosomes are indeed fused, resulting in a single chromosome (Number 2)

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with more than just the two normal ends (telomeres) and single center (centromere) of ordinary chromosomes. Just as predicted, Chromosome Number 2 has three telomeres, separated by two centromeres, as would be expected if two chromosomes had been fused into one.

More than great science, though, the NOVA special got the politics and religion right too. The original creationist motivations for the ill-fated policy, the perjury and misrepresentations of the Dover school board members who started the process, and much more were clearly and accurately presented. One of the most vivid segments showed the startling evolution of the ID text at the heart of the Dover trial, *Of Pandas and People*, from an overtly creationist book (just before the 1987 Supreme Court ruling against "creation science") into the first "Intelligent Design" book. Professor Barbara Forrest was interviewed, saying *"In cleansing this (early) manuscript, they failed to replace every word properly. I found the word 'creationists.' And instead of replacing the entire word, they just kind of did this and got 'design proponents' with the 'c' in front and the 'ists' in the back from the original word..." (cdesign proponentsists)*

An interview with the judge who ended up ruling that ID is religion, and not science, focused on the main charge ID supporters levy against teaching mainstream biology in public schools. Judge John E. Jones III said in a (later) interview that *"Both Defendants and many of the leading proponents of Intelligent Design make a bedrock assumption which is utterly false. Their presupposition is that evolutionary theory is antithetical to a belief in the existence of a supreme being and to religion in general. ..."*

The official ID "Think" Tank, the Discovery Institute, immediately published its own guide to counter the effective PBS production. In the guide, called *"The Theory of Intelligent Design: A briefing packet for educators, to help teachers understand the debate between Darwinian evolution and intelligent design,"* the Institute's John West and Casey Luskin pompously declared that the NOVA program was *"clearly unconstitutional": "The question of whether evolution is compatible with religion is essentially a theological question, and public schools are forbidden from endorsing any particular theological position regarding evolution."*

This is the crux of the whole controversy. The Discovery Institute certainly doesn't want students to learn that many religious faiths are not at all

opposed to evolution science. Rather than simply presenting the facts of modern biology, and allowing students to decide for themselves whether or not these facts are compatible with their personal religious views, the Institute continues to equate “Darwinism” with outright atheism. That is, the only ones espousing a “*particular theological position regarding evolution*” are the Intelligent Design leaders themselves.

The founder of the ID Movement, lawyer Phillip Johnson, declared in *Creator or Blind Watchmaker? (First Things, January 1993)* that “...*the attempt to reconcile Darwinism and theism collapses. Either God rules creation—which means that He somehow directed evolution to produce humans—or He doesn’t. The former isn’t Darwinism, and the latter isn’t theism.*” And top ID theorist William Dembski pontificated in *What Every Theologian Should Know about Creation, Evolution, and Design (1996)* that “*Design theorists are no friends of theistic evolution. ... When boiled down to its scientific content, theistic evolution is no different from atheistic evolution, accepting as it does only purposeless, naturalistic, material processes for the origin and development of life.*”

Two days after the NOVA program was aired, Father George Coyne, former director of the Vatican Observatory, spoke at UNM’s Northrop Hall. He talked eloquently about his views on the marvelous dance in the Universe between Chance and Necessity, and of the

apparent fertility of the Universe itself. He asked “*Why did it take 12 billion years just to make an amoeba?*” His answer was that that was about how long it takes stars to go through three generations of formation and immolation, finally producing the heavier elements required for life.

As for Intelligent Design, Coyne described it as a “disease that is spreading,” and as something that is not science, but simply poor religion. Much of the subsequent discussion centered on the basic fraudulence of the ID movement. The new Discovery Institute briefing packet displays much of this fraudulence, once again repeating the falsehood that New Mexico is one of several states that “*have science standards that require learning about some of the scientific controversies relating to evolution.*”

In closing, the Rio Rancho School Board is set to consider repealing Science Policy 401, widely perceived as ID-friendly, at its upcoming December 3rd meeting. While supporters of the policy contend that it’s innocuous and innocent, the head of the local ID group, Joe Renick, revealed otherwise in an interview on religious station KNKT earlier this year: “*If we had a dozen school districts in New Mexico that came up with a policy on science education similar to that one that was passed by the Rio Rancho school board, that would shake the ground. ... That would be the start of a revolution.*”

As they say, we are cursed with living in interesting times. Stay tuned!





**William Dembski,  
Discovery Institute  
Senior Fellow**

*"When boiled down to its scientific content, theistic evolution is no different from atheistic evolution ..."*

*"...many of the leading proponents of Intelligent Design make a bedrock assumption which is utterly false. Their presupposition is that evolutionary theory is antithetical to a belief in the existence of a supreme being and to religion in general. ..."*



**Judge  
John E. Jones III**



**Casey Luskin,  
Discovery Institute  
Spokesman**

*"The question of whether evolution is compatible with religion is essentially a theological question, and public schools are forbidden from endorsing any particular theological position regarding evolution. ..."*

**Comments from the Discovery Institute and Judge John E. Jones III re the Dover area School District court case of 2005.**

## A Better Metric

There is general agreement that the requirements of NCLB are becoming impossible to meet. Because there is wide variation in student ability, the only possible way that 100% proficiency can be met is by setting the level for “proficiency” within the reach of the slowest students. This would pervert the meaning of proficiency and the intent of NCLB. NCLB as originally written takes no account of a school’s progress. A school could make heroic progress and still fail to meet the Annual Measurable Objectives (AMOs.) The act makes no provision for the well-known fact that school demographics have a strong effect on performance. A school that has unfavorable demographics, but does well in spite of its demographics should be applauded. A school that does poorly in spite of very favorable demographics clearly needs help. The act has the laudable intent of raising the performance of struggling groups. It is a matter of reality that poor and minority students typically do less well than affluent Caucasians. A school in which normally disadvantaged groups do much better than might be expected given the school demographics is obviously doing very well, whatever the actual level of proficiency.

Of course, school excellence has many facets, and a single number cannot capture the complexity. However, a measure that combines both status and growth, and accounts for the effects of school demographics and the variability of subgroups is possible. We already know that the school demographics – the fractions of minorities, economically disadvantaged (Newspeak for FRPL), Special Ed. students, and the like – has different effects on the various demographic groups. As an example, Figure 1 shows that economically disadvantaged and not disadvantaged students are both affected by the school demographics, but the effect is stronger for more affluent students. The school demographics also differentially affect ethnic subgroups.

Growth from one year to the next is associated with the previous year’s score, and is weakly associated with school demographics.

Last year’s low scoring schools tended to gain more than last year’s high scoring schools. For example, in seventh grade reading, the lowest scoring schools in 2006 gained about nine points between 2006 and 2007 on average and the highest scoring schools actually lost about five points. The reason is obvious. Schools at the 5th percentile can easily gain several points. Schools at the 95th percentile are already near the ceiling, and any change is more likely to be a loss.

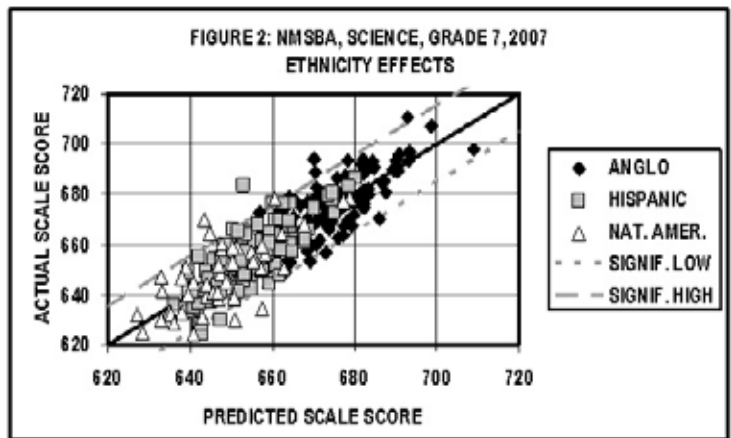
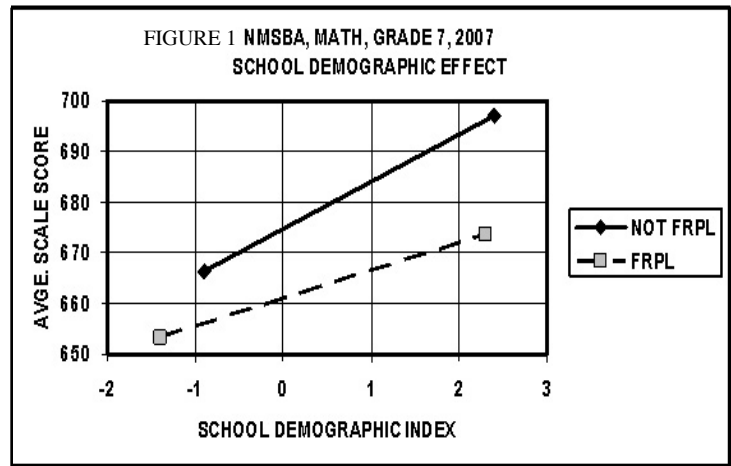
Three important factors are strongly associated with scores: the school demographics, the student ethnic and economic subgroups, and the previous year’s score. The school demographics differentially affect the performance of student subgroups and can slightly alter the effects of the previous year’s score. These three factors together account for 60% to over 70% of the variance in mean scores. The current year score predicted by these factors is compared to the actual current score for each subgroup. If the actual score is greater than the predicted score, the school is performing well for that subgroup. This is true even if the proficiency is below the AMO level. Conversely, a school in which the actual score is lower than the predicted score is performing below average, even if the fraction proficient exceeds the AMO. Because the previous year’s score is one of the variables in calculation of the current year’s score, growth is implicitly included as well as current status. The difference between the actual and predicted score (the residual) is a more complete and fair measure of a school’s standing and progress than the fraction proficient. Figure 2 shows an example of the calculation for one grade and subject. Each symbol represents the average score for one ethnic subgroup in one school. Symbols above the upper dashed line indicate schools that perform significantly better than predicted. Those below the lower dashed line indicate schools that perform significantly worse than predicted. Symbols farther to the right for each ethnic group indicate schools with more favorable demographics and higher scores in 2006.

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We can find demographically similar schools with higher performance to compare to each school that performs significantly worse than predicted. For example, (as shown in the table below) non-FRPL students at school “A” performed significantly lower than predicted in math in 2007. This is a relatively small school with only 47 students tested in fourth grade. Schools “B” and “C” are demographically similar high performing schools about twice as large as school “A”. School “D” is a demographically similar school about the same size as school “A”. The staff at the low performing school could visit any of these three schools to see how they get superior results with about the same demographics. The table shows the demographic index and math residual for non-FRPL students in each school.

This metric accounts for many of the factors that are known to be associated with performance, but that are not usually thought to be within the school’s control. Schools cannot choose the student demographics or student subgroups. The previous year’s score cannot be erased or changed. This metric allows schools to focus on the part than can be changed—the factors that are within a school’s control. It will not replace the requirements of NCLB. It is only realistic to suppose that few if any in Congress could fully understand how this method works. However, a school that finds difficulty in meeting its AYP requirements for any subgroup can



use this measure to see if they are actually doing as well as could be expected, and if not, whether they can find a higher performing school that might be an appropriate model. On the down side, status and growth cannot each be seen separately.

**Walt Murfin**  
CESE Statistician

**TABLE**

SCHOOL	NUMBER 4TH GRADE TESTED	DEMOGRAPHIC INDEX	MATH RESIDUAL, NON-FRPL
“A”	47	0.64	-16.89
“B”	93	0.66	+17.41
“C”	91	0.64	+14.41
“D”	42	0.66	+7.34

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CESE has received \$1250 in donations in memory of Professor Tim Moy, a founding member of CESE, who tragically drowned last summer. This is not enough to start a permanent fund, as had been hoped for. In speaking with the other recipient of memorial donations, the UNM History Department, the CESE board determined that the money might best be used by combining it with the UNM fund being set aside for the education of Tim’s son, Luke. We believe that this is something that Tim would have been very grateful for.

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**Return Service Requested**

Join CESE for a special Darwin Day showing of Randy Olson's film "Flock Of Dodos," which examines creationist attacks on science education in Kansas. The free showing will be at 2 PM on Saturday, February 16th, 2008 at UNM's Maxwell Museum of Anthropology Lecture Hall (Room 163). More info: 869-9250. Film website: [www.flockofdodos.com](http://www.flockofdodos.com)