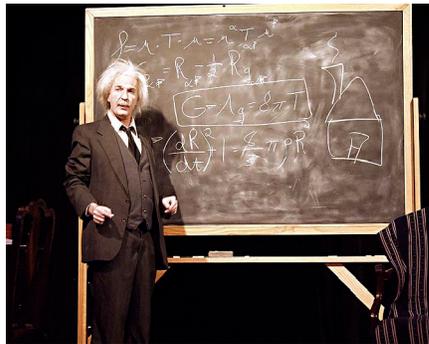




New Mexico Academy
of Science

Celebrating the World Year of Physics

The New Mexico Academy of Science, is pleased to present ...



Tom Schuch
in

Einstein: A Stage Portrait
Saturday, November 19, 2005
1:00 PM to 4:00 PM
Albuquerque Academy
Simms Auditorium

THIS EVENT IS FREE FOR ALL
There is no admission fee
Bring your whole family

THE SETTING: The year is 1946, the Bomb has been dropped, the world has forever changed, and Albert Einstein has invited the audience over to his home to set the record straight about his life. Join Dr. Einstein for an evening of humor, introspection, science and a little violin. You'll walk away with an understanding of the man who solved many of the world's most difficult puzzles with astounding creativity - and a sense of humor.

This award-winning show (Dramalogue, Best Playwright) brings to life a brilliant, dedicated and sometimes controversial theoretical physicist who TIME magazine called their Person of the Century.

This presentation of Einstein: A Stage Portrait is jointly sponsored by the New Mexico Academy of Science and the University of New Mexico Physics Department, with additional funding from Sandia National Laboratories

Celebrating the Centennial of Einstein's "Miracle Year"

In celebration of this 100th anniversary, please join us during the afternoon of:

November 19, 2005....

for Einstein: A Stage Portrait

THEN...please join us during the evening of November 19 for the...

*NMAS 2005 Banquet
and Distinguished Lecture*

Dr. Tim Moy, UNM Department of History will speak on Einstein's role as "the scientist," how and why a research scientist became a known and recognized symbol of science and genius around the world.

Dinner will be at 6pm with the NM Outstanding Science Teacher awards following. Dr. Moy's invited lecture will be at 7:30pm.

The evening will be held at the New Mexico Museum of Natural History and Science. See the fall NMAS newsletter for more details on cost and registration for the evening events.

DID YOU KNOW?

In 1905, the 26 year-old and obscure physicist working in the Swiss Patent Office, published five scientific papers that shook the world of science. In that year, Einstein challenged Isaac Newton and 19th century physics by proposing the theory of relativity, proposing that the speed of light is constant, postulating the equivalence of mass and energy, supplying a convincing proof for the existence of atoms, and arguing that light behaved as both a particle and a wave. All of these ideas were questionable in 1905, but they are bedrock scientific concepts today.

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NMAAS Member News.....

Recent gifts to the NMAAS

In the category "Under \$100"

Herbert Hammond
Leonard Sugarman

THANK YOU!

We Need YOU to Nominate Outstanding Science Teachers for 2005

The NMAAS honors New Mexico elementary and secondary teachers who teach science using innovative and effective methods. Each year, the NMAAS names one elementary and one secondary teacher from throughout New Mexico as Outstanding Science Teachers and honors them with awards at the annual NMAAS banquet.

Please help us by nominating an outstanding teacher from YOUR community.

**Deadline for nominations is
October 7, 2005.**

For more information, check out the NMAAS web site at www.nmas.org or contact Harry Pomeroy at 505-762-0878 or francis@plateautel.net

DID YOU KNOW?

The Second International Conference on Women in Physics was held in Rio de Janeiro in May, 2005. Participants from 42 countries unanimously passed a resolution promoting the recruitment, retention, and advancement of women in physics.

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NEW MEXICO ACADEMY OF SCIENCE

Founded in 1902 to foster scientific research and scientific cooperation, increase public awareness of the role of science in human progress and human welfare, and promote science education in New Mexico.

The Academy has been in continuous existence since 1915, and became formally associated with the New Mexico Museum of Natural History and Science in 1995.

Affiliated with the American Association for the Advancement of Science (AAAS)

Member of the National Association of the Academies of Science (NAAS)

President's Message - August 2005

Jayne Aubele

Albert Einstein set the science world on its collective ear and has become the image and symbol of "the scientist" to almost all non-scientists. Children who are asked to draw a picture of a scientist invariably depict an Einstein-type figure. His name and photograph are instantly recognized and known worldwide. Very few days go by when we fail to hear some popular reference to Einstein. His passion was deciphering nature's puzzle and he spent his entire life "trying to fit the pieces together" and working on ideas that would fundamentally change our view of the physical world around us.

Yet, he didn't begin speaking until the age of three, and he was considered to be a slow learner by his teachers. He abhorred all forms of authority, which made his school years difficult and finding work as an adult even more difficult. His fundamental scientific research papers, published in 1905, were written without the support of grant-funding and without a position at a college, university, government laboratory or private research facility that would confer "legitimacy" upon him and his work. It is interesting to wonder what would have happened if Einstein had been born a hundred years later, in our own time. He would have been suffering through elementary school, middle school, and high school in the late 1980s and early 1990s. Would he have been diagnosed with an attention deficit disorder or considered developmentally disabled because he did not act and learn like everyone else in a school setting? Would his behavior and learning have been altered by prescription pharmaceuticals in an attempt to make him act like all of the other students? He would be attempting to publish his fundamental work this year. Would his research papers, written by someone without an academic position or professional association of any kind and unknown to the physics community, have been accepted for publication in one of the major scientific journals?

I don't know the answers to these questions, but I am somewhat pessimistic. I am particularly concerned about our "modern Einstein's" early school years. As a scientist, I know that new ideas in science require creativity, and that creativity requires a thinking "out-of-the-box" that is a delicate blend of knowing what is already known about a subject and at the same time thinking about it in a totally new way. Scientific creativity comes from those who think a little differently, who don't always easily fit into a stereotype, who may be considered "difficult." Although we have come to realize the importance of diversity in our society, and K-12 teachers have long recognized the need for teaching to a variety of learning styles, we seem to have decided as a society to prefer a homogeneity of learning behavior in our children, frequently enforced with pharmaceuticals. As a scientist and educator, I am very concerned about the prescription drugs that are now a part of childhood. I know that no studies have been published on the long-term effects of some of these drugs on a growing brain. Perhaps there are no effects, perhaps they are all good, but we need to be certain that we are not fundamentally changing those potential Einsteins among us.

Lately, I have been remembering a science fiction story that I read many years ago. The story was set in a future society where all students are tested at a specific age. During testing, their perfect career is decided by an examination of their brain and all of the knowledge needed for that career is instantly downloaded into their brain - all students, that is, except for a small percentage of students who upon examination are told that their brains are not suitable for any career. This, of course, is a terrible stigma, families are ashamed, the students are considered "mentally disabled." Their only future is to be sent away to an institution to live out their lives. The surprise ending (which you may already have seen coming) is that these students are the creative ones, the ones that create the new knowledge and the new disciplines that are downloaded into the others....they are the different ones....

2005 New Mexico Junior Academy of Science Paper Competition Winners

Lynn Brandvold

Director, New Mexico Junior Academy of Science

NMAA State Winners

Senior Division

First Place

Keely Goodgame

The Effect of 670 nm LED Photobiomodulation on the Growth of Mitochondrial Mutant Saccharomyces Cerevisiae

San Jon High School

San Jon, NM

Second Place

Robert Cordwell

Some Results of Inclusive and Exclusive Partitions of Complete Graphs

Manzano High School

Albuquerque, NM

Third Place

Kevin Claytor

Acoustic and Ultrasonic Resonances Induced by Laser Irradiation

Los Alamos School

Los Alamos, NM

Honorable Mention

Ahmad Manshad

Braille Accessible Learning System

Las Cruces High School

Las Cruces, NM

Junior Division

First Place

Emily TenCate

SIM Desert-Coyotes and Rabbits: The Predator Prey Problem

Pinon Elementary School

Los Alamos, NM

Second Place

Marietta Young

Mother Earth's Brew: Ethanol as an Alternate Fuel

Hermosa Middle School

Farmington, NM

Third Place

Ashley Phillips

Itsy Bitsy Spider

Hermosa Middle School

Farmington, NM

Honorable Mention

Nathaniel Pfeifer

Simple Solar Spectrometer

Pfeifer Home School

Los Lunas, NM

**Cash awards were provided by a grant from
Intel Foundation.**

AVS Science & Technology Society Winners

The AVS Science & Technology Society, formerly the New Mexico Chapter of the American Vacuum Society, sends judges and selects its own winners in the paper competition and awards prizes to these winners as well as to their teachers/sponsors. The New Mexico Academy of Science is very grateful for their support.

Senior Division

First Place

Ahmad Manshad, Las Cruces High School

Sponsor: Muhanad Manshad

Second Place

Kevin Claytor, Los Alamos High School

Sponsor: Thomas Claytor

Junior Division

First Place

Emily TenCate, Pinon Elementary School

Sponsor: Deborah Summa

Second Place

Nathaniel Pfeifer, Pfeifer Home School

Sponsor: Kent Pfeifer

DID YOU KNOW?

To increase public awareness of physics and its place in U.S. history, the American Physical Society is placing plaques around the country to mark the sites of important discoveries in physics and to honor those scientists making the discoveries. Five sites have been selected so far and the number of historic sites will be increased each year. The initial sites selected, and the scientists honored, are the following:

- Case Western Reserve University, Cleveland Ohio
Albert Michelson and Edward Morley - the speed of light as a constant
- Johns Hopkins University, Baltimore Maryland
Henry Rowland - diffraction gratings
- Franklin Institute, Philadelphia
Benjamin Franklin - lightning and electricity
- Washington University, St. Louis Missouri
Arthur Compton - x-ray scattering
- Yale University
Josiah Willard Gibbs - thermodynamics

The APS wants to honor local and recent discoveries, too. To nominate sites for inclusion in future years, send an email to historicsites@aps.org

Keely Goodgame, a sophomore at San Jon High School, was the first place winner in state competition in the recent New Mexico Junior Academy of Science scientific paper writing and oral presentation competition. The competition is held annually in conjunction with New Mexico regional and state Science and Engineering Fairs to promote a crucial part of scientific research; communicating your results to others. Keely was the first place winner in her regional competition and competed against regional winners from around the state to take top honors.

Her winning abstract is printed below:

**The Effect of 670 nm LED
Photobiomodulation on the Growth of
Mitochondrial Mutant
Saccharomyces Cerevisiae
Keely Goodgame
San Jon High School, San Jon, NM**

Abstract

Therapeutic light-emitting diodes (LED) are a recent form of light therapy. This so called "photobiomodulation" has been shown to accelerate wound healing and to increase cell growth in tissue cultures. Both cell division and growth require energy produced through the cellular respiration occurring in mitochondria. Cytochrome-c oxidase, the terminal enzyme complex of the mitochondrial electron transport chain, creates the electrochemical gradient which provides the force to produce ATP (Capaldi, 1990). The theorized energizing of cytochrome complexes in the electron transport systems by the photobiomodulation have not been documented (Eells, et al., 2002). The purpose of this experiment is to test the effects of a 670nm LED light on a *S. cerevisiae* strain deficient in mitochondrial DNA and a strain deficient in cytochrome-c oxidase subunit IV, to elucidate the theorized mode of action. *S. cerevisiae* is a well documented eukaryotic model with available mutant and wild-types to test specific cytochrome-c oxidase complexes. It was hypothesized that the 670nm LED light would improve the growth and longevity of both mutant strains. The wild-type and mutant yeast were photoirradiated with a 670nm LED light at 80seconds/4joules per cm², 2X and 3X a day, using a Quantum© warp 10 light for a period of 86 hours. Colonies were counted at 12 hours, 24 hours, and 86 hours. The photobiomodulation **significantly increased the growth and longevity of cytochrome-c oxidase subunit IV *S. cerevisiae* at both levels of irradiation, supporting the hypothesis. Further research should include a suitable model for a mitochondrial respiration deficient disease.**

Instructional Material Adoption Process Complete for Science Textbooks in New Mexico

by
*Malva Knoll,
Del Norte High School, Albuquerque
Past-President, NMAAS*

On July 7, 2005 Secretary of Education, Veronica Garcia greeted 70 New Mexico teachers who met to review Science, Health, and Physical Education materials prior to adoption by elementary and secondary schools in 2006-2007. This review was the first implementation of Senate Bill 128. The Public Education Department received funds from the publishers to cover the stipends for teachers who participated in the Materials Review Institute.

According to new state law level two or level three-A teachers must review instructional materials submitted by publishers. The materials are scored for alignment with New Mexico Content standards and pedagogy after publishers are given the opportunity to document specific sites in their materials, which meet the standards. Materials which achieved a final score of greater than 80% were recommended for adoption, a second panel of reviewers assessed all materials scored below 80%. Low scoring materials were eliminated from consideration.

Teachers made recommendations on over 256 texts. The categories submitted to Secretary Garcia were:

- a) recommended for adoption as a core-basal text
- b) recommended for adoption as a core-basal text requiring specific supplementation
- c) recommended for adoption as supplementary material only
- d) recommended for adoption as an elective course text
- e) recommended for adoption as an Advanced Placement (AP) course text
- f) not recommended for adoption

DID YOU KNOW?

The U.S. Postal Service has issued a set of stamps honoring *American Scientists*. The stamps were issued in May, 2005 are now available at your local post office. The four American scientists selected for recognition are:

Josiah Willard Gibbs (1839-1903) - formulated the modern system of thermodynamics.

Barbara McClintock (1902-1999) - geneticist; discovered genetic transposition within and between chromosomes; awarded Nobel Prize in Physiology/Medicine in 1983.

John von Neumann (1903-1957) - mathematician; significant contributions to quantum mechanics and computer theory.

Richard Feynman (1918-1988) - physicist; developed a new formulation of quantum theory; awarded Nobel Prize in Physics in 1965.

Special Report on Science Standards in New Mexico

by

*Malva Knoll, Del Norte High School, Albuquerque
Past-President, NMAAS*

First High School Standards Based Science Test for Ninth Grade

Teachers from across New Mexico met April 5-9, 2005 to help the Public Education Department (PED) and Harcourt Testing Company set the proficiency scores (using Modified-Angoff) for the standardized ninth grade Science test. This was the final step in implementing the requirements of annual testing at all grade levels in the federal No Child Left Behind (NCLB) legislation. In 2007, the composite scores of Science, Math, Reading, Writing sections on this ninth grade test will be used to determine each New Mexico School's Annual Yearly Progress (AYP).

The ninth grade test is a criterion referenced test including Math, Reading, Writing, and Science sections. It is based on the New Mexico State Standards. The Science portion of the test was created immediately after the revision of the State Science Standards in August 2003.

The PED provided a blue print of instructions for the criterion-referenced test with its initial request for proposals from testing companies. For validity and reliability, the test is constructed at each grade level with an equal balance among all of the areas in the NM Standards including: 1) Scientific Thinking and Practice, 2) Physical Science, 3) Life Science, 4) Earth and Space Science, and 5) Science and Society. Each test is also balanced with multiple choice, short answer, and longer essay questions.

Harcourt was selected by PED as the testing company for grades 3 through 9. Harcourt immediately utilized teams of New Mexico teachers at each grade level to select appropriate test questions. Teachers chose questions, which were based on the Performance Objectives in the State Science Standards. Harcourt edited the final questions based on teacher recommendations and PED approval.

The first administration of the ninth grade Science test in February 2004 was a pilot to determine the validity of the test questions. Data analysis was used to eliminate invalid questions and to replace 30% of questions as is normal in such standardized tests. February 2005 was the first regular administration of the exam. Teachers were involved in creating the rubric for the short answer and essay question which compose approximately 1/3 of the test and then in setting proficiency scores (cut-scores) for performance evaluation of each school.

New Mexico teachers are using the State Standards to develop curriculum in classes from K-12. This year (2005) will provide data on criterion referenced tests to set a baseline for improvements which are expected in the coming years.

Albuquerque Public Schools Implements New Science Requirements

The New Mexico Public Education Department (PED) recently passed a requirement for 3 years of Science for all high school students. The requirement becomes effective for incoming freshmen in August 2005. The added year of Science will bring the requirement in line with other core classes. High School students are required to complete 4 years of English, 4 years of Social Studies, 3 years of Math to include Algebra and Geometry, and 3 years of Science. New Mexico State law also requires that students master the State Science Standards within their high school career. The State Science Standards are within the areas of Biology, Chemistry, Physics, and Earth-Space Science.

Albuquerque Public Schools (APS) will implement a new course-taking pattern for high school students, which combines the 3-year requirement with proficiency in standards. APS is following the lead of the National Science and Education Standards (NSES) by enforcing the concept that every student should have a minimum base of knowledge including concepts in Biology, Chemistry, Physics, and Earth-Space Sciences. Science educators realize that these changes are a quantum leap toward improving the science literacy for all high school students

Individual schools in APS have the prerogative to teach courses, which meet the needs of their student population. Most plans include a single course in Biology, one in Chemistry, and one in Physics. The Earth-Space standards have been embedded in the three other courses as appropriate. Each school has also made an attempt to offer Chemistry and Physics courses, which are analytical in nature as well as Chemistry and Physics courses, which are conceptual in nature. Teachers can accommodate different learning styles and mathematical levels of students by choosing between the analytical and conceptual categories.

DID YOU KNOW?

The number of physics degrees granted by U.S. colleges and universities have increased, according to a new report by the American Institute of Physics. Although physics bachelor's degrees accounted for slightly less than 0.4% of the 1.3 million bachelor's degrees awarded in the U.S. in 2003, this number represents an increase of 25% from 1999. At the Ph.D. level, 1106 physics degrees were awarded nationally in 2003. This number represents the first slight increase (1%) after 8 years of steady decline in numbers of physics Ph.Ds awarded in the U.S.

Membership Form New Mexico Academy of Science

New Membership [] Renewal [] Membership Year 2005 [] other [] Additional Donation []

Date _____ Name _____

Employer/Firm/Affiliation _____ Title _____

Primary Interest (geology, biology, chemistry, physics, science education, etc.) _____

Mailing Address: _____

Phone _____ FAX _____ email _____

Check if your address is different from that on the mailing label of this newsletter []

NMAS PUBLICATIONS

<i>New Mexico Journal of Science</i> Set of all available pre-1992 back issues	\$10 _____
<i>From Sundaggers to Space Exploration</i> (NMAS/Sigma Xi, 1986)	\$4 _____
<i>Dinosaurs of New Mexico</i> (NMAS Journal v. 32, 1992)	\$10 _____
<i>The Importance of Agricultural Science in New Mexico's Economy</i> (NMAS Journal v. 34, 1994)	\$10 _____
<i>Astronomy in New Mexico: Past, Present and Future</i> (NMAS Journal v. 35, 1995)	\$10 _____
<i>New Mexico's Natural Heritage: Biological Diversity in the Land of Enchantment</i> (NMAS Journal v. 36, 1996)	\$10 _____
<i>Environmental Management: Current and Future Needs</i> (NMAS Journal v. 37, 1997)	\$10 _____
<i>Water Resource Issues in New Mexico</i> (NMAS Journal v. 38, 1998)	\$10 _____
<i>Ensuring Sustainable Development of Arid Lands Through Time</i> (NMAS Journal v. 39, 1999)	\$10 _____
<i>NMAS Journal v. 40, 2000</i>	\$10 _____
<i>NMAS Journal v. 41, 2001</i>	\$10 _____
<i>NMAS Journal v. 42, 2002 (Centennial CD)</i>	\$10 _____
<i>NMAS Journal v. 43, 2003</i>	\$10 _____
Subtotal:	\$ _____
+ Handling:	\$ 2.00
TOTAL:	\$ _____

Membership Class (check one)

- [] Member \$20/year
- [] Student \$15/year
- [] Subscription \$30/year
(Libraries only)

Publication subtotal: \$ _____

Total: \$ _____

Membership includes 3 newsletters.

Send check for membership and/or additional publications, payable to NMAS, to:

New Mexico Academy of Science
NM Museum of Natural History and Science
1801 Mountain Rd. NW
Albuquerque, NM 87104

Or use the enclosed addressed envelope!

ALSO...consider making a donation to the NMAS to help further its science education programs!

NMAS Newsletter
Volume 91 no. 2
August, 2005

Don't Forget your NMAS Membership Renewal for 2005

If your mailing label says 2004 on it, your membership renewal is past due....Please fill in the membership form on page 7 and send it in with your membership dues.

If your mailing label says 2003 on it, we ask you to please support the work of the Academy by renewing for 2005. If we do not receive your renewal by the next newsletter, we will unfortunately have to drop you from our membership.

If you have already sent your 2005 dues,
THANK YOU.



**NEW MEXICO
ACADEMY
OF SCIENCE**

Newsletter

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