



The
BEACON

The Coalition for Excellence in Science and Math Education

Volume IV No. 1

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May 2000

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Y'all come!!!

4th Annual Meeting of
Coalition for Excellence in
Science and Math Education

Speaker: **Michael J. Davis**
State School Superintendent

First Unitarian Church
3701 Carlisle Blvd. NE

Southwest corner of Carlisle & Comanche

Saturday, June 17th, 2000
From 1 to 4 pm.

Light refreshments

RSVP 296-1467

CroSSlinks

With the instigation of CESE members Jonathan Weiss and Mark Boslough, Sandia National Laboratories and Albuquerque Public Schools are partnering to create **CroSSlinks**. This program strives to establish links between the scientific and engineering community and the Albuquerque educational community. By establishing more "links," we hope to improve science education for Albuquerque students. Beginning in the 1999-2000 school year, Albuquerque Public Schools will use hands-on kits as the primary method of science instruction. The CroSSlinks Program continues Sandia's commitment to the effective utilization of inquiry-based science instruction.

The two volunteer options are:

School Links will involve people who prefer to work with one school (volunteer may choose school, or Sandia Community Involvement will assist with school selection based on location, etc.). The volunteer and school will decide what level of support would be mutually productive (email interaction, answering teacher questions, visiting the classroom, etc.). **Kit Links** will involve people who prefer to work with one or two kits. The volunteer will be available to answer teacher questions and may visit classrooms to assist, but will not be assigned to a school.

Sandia welcomes volunteers from the community. If you are interested, please contact Amy Tapia at 284-5207 or astapia@sandia.gov.

NOTE

If you're not getting Email from CESE at least once a month and want it, please email det@rt66.com.

NEW SPEAKERS' COORDINATOR

Timothy Moy is the new Speakers' Coordinator for CESE, and he is very eager to hear from any CESE members who (1) have suggestions for local organizations that might be interested in hearing a CESE presentation on the importance of high-quality science education, or (2) might be interested in joining the surging ranks of CESE speakers. If you have suggestions or are interested, please contact Tim Moy at 277-7851, or at tdmoy@unm.edu.

The Beacon is published quarterly (almost) by the Coalition for Excellence in Science and Math Education (CESE). A non-profit corporation, CESE is incorporated in the State of New Mexico. See www.CESAME-NM.org, for the new CESE web address.

The Coalition for Excellence in Science and Math Education (CESE) is composed of interested citizens throughout New Mexico and the nation, including scientists, engineers, educators, university faculty, members of the clergy, and parents. CESE is non-partisan and non-sectarian, and welcomes members of all religions and political philosophies. This coalition works to improve science education and science literacy for all citizens. The organization also provides support to teachers, students, the public, and state officials who deal with education issues. We want to ensure that the Beacon of Enlightenment is not extinguished in 21st century America.

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Membership Information: please contact any of the above officers. The only requirement for CESE membership is the acceptance of our mission, above, as a statement of the organization's purpose. The CESE annual dues are currently \$25 for an individual, \$35 for a family membership, and \$10 for students. This is to help defray costs of postage, insignia, envelopes, etc. No members will be asked to do anything more than they wish to do on behalf of the common cause. Please make checks payable to CESE and mail to 11617 Snowheights NE, Albuquerque, NM 87112.

MR. BRUGGE GOES TO DALLAS

by Steve Brugge

Before marriage, children, and a full-time job teaching 160 students per day, I used to have time to listen to talk shows on the radio. One of my favorites was Bruce Williams, the Dear Abby of the financial world. People used to call and ask Mr. Williams about the value of going to real estate seminars and investment lectures. His standard reply was that if a person got just one good idea, then the seminar or lecture was worth the time and money.

The Southwest Educational Development Laboratory (SEDL) recently paid my way to Dallas for a two-day strategic planning meeting. SEDL has provided the very generous support for the Hotspots project at Inez Science and Technology Magnet Elementary School. The meeting was to look back on the last ten years of reform in science and math education and look toward the next millennium for future challenges. About forty people from New Mexico, Texas, Oklahoma, Arkansas, and Louisiana attended, including representatives from state departments of education, universities, the business community, and secondary schools.

Wearing two hats during the meeting, I spoke both as a science teacher and as a representative of CESE about our involvement in science and math education reform. Major topics were state standards, professional development, assessment, accountability and data-based decision making, equity, and leadership.

Clearly each of these is a bit like an iceberg—a little shows at the top but the vast bulk is just out of sight. At this conference, we tried to get “under” each of these issues to see where science and math education stand. No doubt the need for further education reform exists. There’s also no doubt that this has not been solved in the last decade and will probably not be solved in the next.

However, Hotspots is a fine example of how meaningful professional development can occur, and serves as a great model for future programs. Talk show host Bruce Williams says that one good idea makes a conference worthwhile. I left this two-day meeting in Dallas with a host of ideas and thoughts: Reform is a slow, complicated process. Much work has been done in the last ten years, and much remains. First-rate reform efforts are happening. And it’s important for CESE to be part of the conversation. This meeting certainly met Mr. Williams’s test. □

HELP FIND E.T.!

If you have a desktop computer, you can participate in what may be the most important scientific discovery of all time (and, incidentally, bring some glory to CESE). A research team at U.C. Berkeley that is involved in the search for extraterrestrial intelligence (SETI) has hit upon the brilliant way to analyze huge amounts of radio astronomy data to hunt for radio signals from E.T.: they've set up a system to farm out chunks of data for people to crunch on their PCs in the form of a screen saver. All you need to participate is a PC and an internet connection. The project, called SETI@Home, has been publicized in the New York Times and on CNN, and currently has millions of participants (making it the largest super-computing research project ever).

Tim Moy and Steve Brugge have founded a CESE SETI@Home group, and everyone is invited to join in the fun. If one of us (or, more accurately, one of our computers) happens to be the lucky one to find a signal from E.T., we all (and CESE) will share credit for the discovery. It's a slim chance, but the more the likelier. It's also a pretty screen saver. And even more importantly, you'll have the satisfaction of knowing your computer is doing something good for humankind while you're watching TV.

If interested, or you just want more information, contact Timothy Moy at tdmoy@unm.edu. □

REPRIEVE FOR IMC

by Marilyn Savitt-Kring, CESE Board Member

The Instructional Materials Commission (IMC) will function for at least another year as the legislature's attempt to abolish it failed. Senator Cynthia Nava (D), a long time opponent of the IMC, introduced the bill (SB 285) a few days into the 30 day session. Later, Senator Rod Adair (R) introduced a similar bill (SB 408). Although both bills received a "do pass" from the Senate Education Committee, they died when the short session ended.

The state Board of Education (SBE) and state Department of Education (SDE), assuming the state-level reviews would continue, approved revisions to the final draft of the original IMC statute supplementary materials, thus reducing the number of items for consideration.

Some changes are:

- Instead of 20, the commission will consist of 12 members to include public school district administrators, educators, parents, the business community, and one representative from the NM Council on Technology in Education.
- The commissioners and their subcommittees will perform detailed reviews instead of cursory screening of educational materials.
- Only core items will be reviewed—no longer supplementary materials.

David Martinez, who has a science background, was appointed IMC director. Last fall, the Legislative Finance Committee (LFC) audited the IMC, and two recommendations were made. First was to eliminate the state adoption process and place the adoption responsibility at the local level. The second option was to strengthen the current state adoption process and require a more thorough review at the state level of core materials only. These would meet the basic educational requirements.

The Legislative Finance Committee (LFC) and the Legislative Educational Study Committee (LESC) met in November to discuss the IMC audit. CESE urged the SBE and the legislature to continue to safeguard the quality of public school instructional materials by retaining state-wide reviews. State Superintendent Michael Davis and Tony Nolan Trujillo presented the SDE's recommendation to reduce the size of the commission to six including educators only. They also wanted detailed reviews of core materials. Although at the January meeting the LESC voted to abolish the state adoption procedure, this was not approved this legislative session.

The SBE approved a new draft at their March meeting incorporating revisions for the IMC. These changes are now on the SDE web site at <http://sde.state.nm.us>. The Section 6 Request for Proposals (RFP) was also approved by the SBE on March 3. It includes some major changes from previous years' RFP's. It is available for download on the SDE website at: <http://sde.state.nm.us/divisions/learningservices/Instructionalmaterials/index.html>.

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The subject areas for adoption this year are language arts, special education, early childhood education (birth through 3rd grade), and New Mexico history, arts, and culture. Subject specialties will be assigned this spring to individual commissioners who will then recruit subcommittee members.

CESE members interested in serving on subcommittees should contact any of the following CESE commissioners on the IMC: Timothy Moy, commission chair, tdmoy@unm.edu; Jeremy Boak, jmboak@lanl.gov; Mark Boslough, mbeb@unm.edu; or Marilyn Savitt-Kring, mmkring@juno.com. □

LESSONS LEARNED

by Eva Thaddeus, Teacher

In a course at UNM, I met a biology teacher from Highland High School. Her final presentation designed to use with her students was a series of evolution lessons. She was surprised when I brought in some cartoons depicting different geologic time periods, which I had made for my elementary school students. “You teach evolution!”

Sharing my students’ fascination with the natural world, and having an undergraduate degree in biology, I’m well equipped to teach elementary science, and I’ve always tried to find a place for evolution in my science curriculum. Opportunities are everywhere: in “Weathering and erosion,” “Fossils,” “Rocks and soil,” and “Animal classification.”

While teaching fourth grade, I developed a long unit on geology. After observing rocks, learning the different ways they’re formed, and studying weathering and erosion, the class focused on geologic time periods and the fossil record. When I switched to teaching second grade last year, I thought I’d have to give up this cherished unit of instruction; but since fossils were part of the second grade science curriculum, I incorporated them into a thematic unit on time.

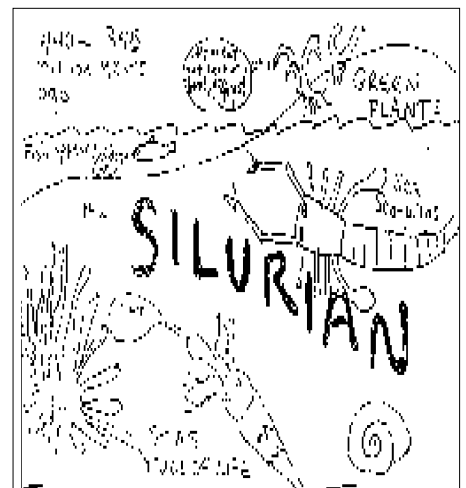
We began studying seconds, minutes, and hours (my students were just learning how to use a clock) and moved to increasingly longer time units. (“How do we know about things that happened before we were born?”) At the end of the unit, we studied how scientists learn about geologic time, and we made strata (different-colored sand layers in a jar). When I checked, almost every second grader in my class could tell me which fossils in a sedimentary cliff face should be oldest, and why. (“The ones at the bottom, because they got there first.”)

Although I never called this “evolution,” I had always anticipated a religious challenge. It came while I taught fourth grade. After sending my students home with review questions for an upcoming science test, one of the friendliest, most supportive moms wrote a polite note to the effect, “I couldn’t help Kristen with her homework. We have strong feelings about evolution vs. creation. Please show me the text you’re using before she does any more work on this topic.” Well, there was no text; the lessons were my own. I consulted the principal, who supported me and recommended I write a polite, neutral note.

My letter to the mom said I understood, *and* that I believed it was

important my students be exposed to mainstream science. I showed the letter to a colleague I knew was a creationist, just to make sure I hadn’t said anything offensive. She judged it fine, “except maybe this word mainstream.” I didn’t respond to that and still kick myself. It was what educators call a “teachable moment.” Though my letter to the mom, got no reply, I have to admit to excusing Kristen from the test.

This small incident made me re-view critically the sheet I’d sent home with the kids. I’d asked questions like, “Where did life begin?” (Correct answer: in the ocean) and “How was the Grand Canyon formed?” I realized this was sloppy science teaching. I should be less interested in kids’ ability to spit out answers to such questions. I didn’t want them to accept evolution as a “fact.” What I really wanted was for them to understand a scientist’s approach and develop their critical skills. It would have been better pedagogy (and might not have triggered alarms for Kristen’s mom either) if I had asked: “Why do paleontologists think life began in the ocean?” and “How do scientists explain the formation of the Grand Canyon?”



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I also learned to distinguish between the “theory” and the “fact” involved in teaching evolution. Evolution itself is a theory. However, it’s a fact that evolutionary theory is part of mainstream science. I’m sorry to have let Kristen off the hook, but feel the real copout was failing to explain to my colleague that in the scientific community, evolution is undisputably mainstream. Most non-scientists don’t understand this.

“You teach evolution!” said another friend. People all know that evolution is controversial. They just don’t realize it’s only controversial outside, not within, scientific circles. This is the FACT we need to keep broadcasting.

Meanwhile, as teachers, rather than presenting evolution as fact (which is an unscientific, “because-I-said-so” approach,) we need to present it as theory. We need to teach what a theory is, how scientists come up with a theory, and how they amass evidence for it. We need to contrast scientific with non-scientific thinking. This can start to happen even in elementary grades.

After the incident with Kristen’s mom, I brought in the Aztec creation story and explained to the class that people have always wondered about the origin of the world—that there are many other explanations besides the scientific one. I wrote SCIENCE on one side of the board and RELIGION on the other. We talked a little about the difference between these two ways of explaining things. Then I read aloud to them “The Fifth and Final Sun.”

Curiously, Kristen was very interested in this story and later asked if she could read it to herself. Religion will come up whenever the history of life is taught. Questions like “Where do Adam and Eve fit into it?” are natural for students who are trying to make sense of all they have been told. I say, “That is a religious story. Right now we’re talking about the scientific explanation.” Eventually, someone will ask, “But which one is true?” And that’s when I get to say, “You don’t have to decide that right now. That’s a question you can keep thinking about for a long, long time.” □

years. Sustained support such as this is a vital part of real learning. Having learned so much through ongoing work with the wonderful teacher team at Inez Elementary, it’s exciting now to incorporate elements of the HOTSPOTS Learning Project into this institute.

Course Description

GEOLOGIC TIME AND EVIDENCE FOR THE HISTORY OF LIFE

What is the fascinating process whereby geologists, biologists, chemists, and paleontologists have amassed evidence for the geologic rock record, and the evolutionary history of life? In any geographical area, it is often the rock layers (i.e., stratigraphy) that demarcate periods of geologic time, and that harbor evidence for past geologic environments and their inhabitants. Indeed, rock stratigraphy is one of the most basic concepts and tools in the Earth Sciences. But how do geologists identify the ages of rocks and classify plant and animal fossils, and how does this relate to the spectacular geologic history of central Colorado?

This Institute will explore these and related topics by relying upon the rich geologic setting of central Colorado. Initially, participants will learn to make geologic observations in the field, and to develop skills for identifying important rock types and geologic processes in the Colorado Springs rock record. This approach will also provide a basis for understanding more fully geologic time, and the geologic evolution of the Rocky Mountain region.

Special attention will be paid to understanding methods of rock

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COLORADO COLLEGE— Summer Institute

by Steve Getty

This year several great colleagues and I worked closely in the Education Department at Colorado College to design a six-week summer teacher institute. Major objectives of the institute are to give teachers a focused chance to discover and learn new science content with their teacher colleagues, and to identify new approaches for bringing that content to their students during the school year. About 35-40 teachers, all of whom are enrolled in the Colorado College M.A.T. program (Masters of Arts in Teaching), will participate and receive eight semester hours toward their advanced degree. Perhaps 1,000 students will benefit next year from what the teachers learn at this institute.

I believe that efforts to link intimately new content and pedagogy are essential in supporting teachers to do their best work. This is not merely a six-week program, however, as the CC Education Dept. plans to support this teacher learning process in math and science over a period of

dating growth of the Rocky mountains and their steady demise by the actions of rivers and glaciers. We will also observe and interpret evidence for past environments and their inhabitants, as revealed by both plant and animal fossils. As appropriate, links will be drawn among geology, soil development, climate, surface water, and vegetation patterns. Field work in outlying areas, including a 4-day trip to the Baca Ranch, will provide participants with a broader experience for understanding the Colorado Springs geologic record.

The Institute will compile internet and library educational resources, and explore instructional methods for teaching the K-12 Earth Sciences, particularly through field work with students. Participants will also identify and discuss links between the Earth Sciences theme of the Institute, and national- and state-level science content standards. Based upon the Institute theme and their school curriculum, participants will develop an Earth Sciences unit for implementation during the 2000-2001 school year.

Enrollment in this course is limited to students who have been admitted to the MAT in Integrated Sciences degree program. Additional information about these programs is available from Dr. Paul Kuerbis, Colorado College Department of Education, 14 E. Cache la Poudre St., Colorado Springs, CO 80903, (719)389-6726.

2 CC units equivalent to 1 unit in Education and 1 unit in the Natural Sciences (8 semester hours) □

STATE BOARD OF EDUCATION (SBE)

by Marshall Berman

The State Board of Education met on February 29 through March 2, 2000. Following are some highlights from these long meetings. New officers were elected: President Flora Sanchez; Vice-President Marshall Berman; Secretary Margaret Davis; Executive Committee Catherine Smith, Eleanor Ortiz, Frances Stevens and Patricia Kelliher. The legislative committee expanded on the process for achieving early literacy (since vetoed) and optional all-day kindergarten (since signed). I am skeptical that all-day kindergarten, as currently conceived, will lead to improved academic achievement; there is no process to evaluate the long-term impact either of this effort, or a comparison of schools with and without all-day kindergarten in New Mexico today.

The Instructional Materials regulation was approved. It focuses on core materials, provides for a 12-member IM Commission from diverse elements of the community, and encourages cooperation with other districts in the state and with other states through BiE IN. The IM RFP was also approved for this year's language arts, special ed, early childhood, and New Mexico history materials. David Martinez is doing an excellent job as IM chief. Details are available on the SDE website. www.sde.state.nm.us

Social studies performance standards were again addressed in the Instructional Services committee. (Steve Sanchez is now heading this effort.) I again raised concern about their poor quality, and read part of a review done by our Professor Moy. The committee and the SDE agreed to complete a rewrite of the content standards, benchmarks, and performance standards by next January. Material will be made available over the course of the year, and I will share it with you.

Subsequently, you may have noticed in the media that APS said it was writing its own performance standards (subject not stated). I would much prefer that this be accomplished in partnership with the state, rather than independently. State assessments will be based on state standards, and fairness requires that students be taught the material on which they will be tested. APS input on state standards would be very helpful in creating a higher quality product. A possible adverse outcome of independent APS efforts might be in making the state performance standards mandatory, rather than optional as they are now.

The Language Arts standards are currently being reviewed.

The major regulatory document called "Standards for Excellence 6NMAC 3.2.9" was approved. In addition, new rules for pest management were adopted.

The preliminary Accountability/Accreditation system was distributed to districts, with information concerning the ratings that would/could be assigned to every school. Several superintendents were very upset with these ratings, and much time was spent discussing them. The Board and SDE have produced a greatly improved accountability process. There are three passing grades: Exemplary, Good, and Acceptable; and two

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unsatisfactory grades: a Probationary Level, and a Disapproved Level. These categories are based predominantly on academic achievement, but also assess strategic planning, attendance, community involvement, drop-out rates, safety, and regulatory compliance.

The most controversial segment dealt with academic achievement on normed tests. The SDE has generated regression curves for two independent variables in the student population: poverty (based on percent free lunch) and LEP (Limited English Proficiency). Schools with high poverty and LEP rates generally underperform schools with more affluent demographics. Since the Board's vision is academic excellence for all students, we can consider this approach as *temporary*, until this discrepancy has been fixed. The process, however, does highlight some extremely important results: 1) Some high poverty schools are doing extremely well, scoring above the 50th percentile on a national basis. Similarly, there are schools scoring above 50% that should/could be doing much better. The former demonstrates the principle that all children can learn, and the poorly performing schools can do much better. The latter was very upsetting to some districts, who felt that they should be scored much higher than "Acceptable." Some also believed that the measurement of LEP or poverty unfairly treated some districts who determine these factors in a more conservative fashion.

The Board voted to delay implementation of the system until the next meeting. The SDE will host meetings around the state to present and discuss these new accreditation standards. The Board also considered the specific steps that will be taken for those schools determined to be in need of improvement. These measures will be discussed again in the next meeting. Last year, I calculated that the passing score on the NM High School Competency Exam (150) was close to random chance, and therefore the exam was worthless. The SDE confirmed both this fact, and the nearly 100% pass rate for students who can take the exam in the 10th grade and continue taking it through high school. The SBE discussed the development of a new, more rigorous standards-based test in the future, and also the SDE recommendation to increase the passing score to 175. The higher score was approved, and development will begin on a new test. At the request of Pam Thomas (Dave's better half and member of the Los Lunas School Board), the next SBE meeting will be hosted by the Los Lunas School District. As usual, much more was discussed, including the denial of an appeal from a Socorro Charter School.

See you at the next board meeting?

Que bueno!

CESE PARTNERS WITH THE HISPANO CHAMBER OF COMMERCE

by Kim Johnson

CESE has met with the Hispano Chamber of Commerce in Albuquerque and agreed to act in a mutual partnership toward aiding our common cause of advancing the level of education in New Mexico.

The Hispanic school enrollment rate in the state is in excess of 48%. The Hispano chamber is actively seeking ways of increasing the effectiveness of education for the Hispanic population, as well as the general population of the state.

Ron Chavez, the Vice President for Education and Workforce Development, stated "It is a pleasure to be working with you in this partnership, and I anticipate that our mutual cooperation will create better results than could be obtained by working separately."

We have to address the full needs of all citizens in the state for science and math education. It is good to be working with like-minded people. Please call Kim Johnson for more information.

CONGRATULATIONS to our SCIENCE FAIR WINNERS **For first prize in solving a real-life problem using scientific methods.**

Amanda Fierro - Senior Division - \$250 Savings Bond
Anthony Menacucci - Junior Division - \$250 Savings Bond

Find out more on our web site: www.cesame-nm.org

Coalition for Excellence in Science and Math Education
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Albuquerque, NM 87112-3157

Return Service Requested



**Rushing to annual meeting
(Saturday, June 17th)**

THE PREZ SEZ....(Kim Johnson)

This year has seen several milestones for CESE, including the rather significant enhancement in the New Mexico State science standards in which we played a very large part. But, please, believe me when I say there is much, much more to be done. We are working on programs, contacts, and ideas to accomplish much more toward solving the larger problem—general science and math literacy. Believe it or not, we—CESE—have what I believe to be the largest membership of any grass roots group dedicated to education improvement in the state of New Mexico. I must admit that I have no hard data on this, but have spoken with a number of like minded people and groups. None has the diversity, numbers, and range of contacts that we have. So, I ask that you help us take advantage of our resources. Please be active, and participate when called upon.

It is *very important* to CESE that you try to make our annual meeting this year. Michael Davis, the Superintendent of New Mexico public schools, will be our special guest. He will speak and answer questions. We hope to have other policy makers and implementers there, too. If you learn one tenth as much as I have this year by listening to Michael Davis and others who will be at the meeting, your attendance will be very much worth your while.

One final word. There have been some very generous people who have participated in terms of time and donations this year. I would especially like to thank Toby L. Merlin, MD., Chief Medical Officer, Lovelace Health Systems, for his very generous monetary support of CESE. Toby and Mark Boslough have discovered that you may designate CESE as a recipient of your United Way gift. I would not ask you to give up your favorite charities. However, if you donate to United Way and do not already designate a specific recipient, please consider CESE. Simply write in our name and contact information, and we receive the gift—totally tax deductible.

I look forward to seeing you on 17 June, 2K! *(And the treasurer sez she'll be happy to accept dues.)*