

SAMEC Outreach Newsletter

News and Information from the University of Arizona Science and Mathematics Education Center. SAMEC is hosted by the College of Science and Lunar and Planetary Laboratory located in the UA Sonett Space Sciences Building.

Professional Development — Programs and Workshops

Discovering the Link Between University and Industrial Environmental Research

Teams of math and science K-12 in-service and pre-service teachers will have an opportunity to work with the U of A faculty, industrial mentors from Raytheon, the City of Tucson, Tucson Electric Power and engineering students on an environmental



Teachers will work on an environmental discovery-based research project (Funded by the National Science Foundation).

discovery-based research project for 5 weeks during the summer. In addition to research, the teams work together to improve classroom pedagogy. Teams attend workshops on current standards related to their discipline, inquiry based learning, stressing/encouraging problem solving as opposed to memorization, and minority and gender equity in the classroom.

This coming summer the 5-week program will be from June 26th – July 28th. Compensation is \$3,500 per teacher. Teacher teams may also apply for funds for supplies/equipment to

implement new experiments during the 2006-2007 academic year. To apply as a team, please contact Kim Ogden, Department of Chemical and Environmental Engineering, University of Arizona (ogden@email.arizona.edu) for an application or visit the web site at <http://www.erc.arizona.edu/Education/k-12.html> to download an application. The application deadline is **March 1, 2006**.

Science and Mathematics Teacher's Colloquium Series

The UA Science and Mathematics Education Center is a forum for K-12 teachers to learn about cutting edge research that is taking place at the University of Arizona. The current schedule for this academic year is as follows:

- **Tuesday: November 15, 2005 — 4:00 - 6:00 pm**
“Air Toxins and Human Health”

Dr. Mark Ryan, UA Agricultural and Biosystems Engineering Dept.

Location: UA Modern Languages Room 404

Dr. Riley will discuss how air pollution including particulates from combustion processes (cars, trucks, etc.) impact the lung and hence are hazardous to human health. The Environmental Protection Agency's regulations on particulate matter release will be discussed in the context of this impact on health. Additional inhalation threats from metals, pesticides, and fungal products will also be discussed. The presentation will conclude with a discussion on how each of these inhalation threats can be detected and identified.

Teachers and speakers will be guests of the University of Arizona Science and Mathematics Education Center, the Lunar and Planetary Laboratory, The Southwest Environmental Health Sciences Center for Toxicology and the UA/NASA Space Grant Program, who are funding this program. Teachers are eligible to receive professional development credit and/or graduate credit. For additional information, contact samec@lpl.arizona.edu, 520/621-8309 or visit our website (<http://samec.lpl.arizona.edu/profdevelopment/stcs.html>) for updates and the Spring 2006 schedule.

Arizona Project WET Workshops

Arizona Project WET is a comprehensive water education program for teachers and educators, grades K-12, based out of the University of Arizona in Tucson, AZ. Workshops are free and can be applied as teacher recertification credit hours.

At every workshop participants receive an *Educators Guide*.

Tucson Saturday Workshops:

November 5, 2005: *Arizona Project WET Workshop* - Tucson

November 19, 2005: *Healthy Water, Healthy People Workshop* – Tumacacori

December 3, 2005: *Discover a Watershed: The Colorado Workshop* – Location TBA

The first two Professional Development Workshops, October 22 and November 5, cover water resources in Arizona. The November 19th Healthy Water, Healthy People training discusses the significance of making water quality relevant. The Discover a Watershed: The Colorado workshop examines the watershed that encompasses all of Arizona.

You can register for workshops at: <http://www.ag.arizona.edu/AZWATER/WET/workshops.html>, or call **Josie @ 520/792-9591x27**. For questions call **Kerry Schwartz at 520/792-9591 x22**.

Check our website regularly for additional exciting workshop opportunities!

Eyes in the Sky Program Seeks Applicants

Eyes in the Sky is a professional development program that prepares teachers (and their students) to use geospatial information technologies...computer mapping programs, aerial and satellite images, and image analysis software...in community-based research projects. The program includes a distance learning course (Spring 2006), a two-week face-to-face workshop (June 19 to 30 in Tempe, Arizona), a classroom implementation phase (2006-2007

school year), and a one-day research showcase event (April, 2007). Participants who complete all phases of the project will receive 4 graduate-level credits from NAU at no charge, plus a stipend of \$750 for participating in the summer workshop.

Teachers of science, technology, engineering, or math will benefit from this program. Successful participants have ample access to student computers and a willingness to use scientific research pedagogy to engage students in learning. The program is actively seeking teachers who are members of historically underserved populations as well as those who teach members of these populations. The program is recommended for grades 7 through 12. Applicants need not live in the Phoenix area, but the program will not offer reimbursement for extended travel, room, or board.

For more information about the *Eyes in the Sky* program, including the online application visit <http://eyesinthesky.terc.edu/>. Applications are due by November 30, 2005. If you have further questions, please contact **Carla McAuliffe** (Carla_McAuliffe@terc.edu) or **LuAnn Dahlman** (LuAnn_Dahlman@terc.edu).

Eyes in the Sky is an Information Technology Experiences for Students and Teachers (ITEST) project, funded by the National Science Foundation and supported in part by ESRI, Inc.

GLOBE Teacher Workshop - January 7, 2006

A *GLOBE Teacher Workshop* focusing on water quality protocols will be held at the University of Arizona on Saturday, January 7, 2006 from 8:30 to 3:30. Six hours of professional development credit will be awarded.

Please contact: **Kat Wilson** (kat@hwr.arizona.edu) 520/850-3407 or register on the GLOBE web site (www.globe.gov).



<http://samec.lpl.arizona.edu>

The *SAMEC Newsletter* is published by the University of Arizona *Science and Mathematics Education Center*, with support from the departments of *Mathematics* and *Planetary Sciences*, and the *UA/NASA Space Grant Program*. The newsletter is distributed in the spring and fall and carries articles, information and notices of interest to the science and mathematics K-12 teaching community in the state of Arizona. Address all correspondence to:

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In this Math Links issue

- *News from the Center for the Recruitment and Retention of Mathematics Teachers*
by Ann Modica
- *Update on the Co-op Program*
by Elias Toubassi

Do you have topics in mind that you wish to be addressed in **Math Links**? Please mail me your thoughts, suggestions or comments.

Kathleen Marrero
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Check out our new website:
<http://math.arizona.edu/>
If you wish to get on the Math Department's email list, please contact me.

News from the Center for the Recruitment and Retention of Mathematics Teachers

Mark your calendars now for the Second Annual Mathematics Educator Appreciation Day Conference sponsored by the University of Arizona's **Center for the Recruitment and Retention of Mathematics Teachers**. Open to all middle and high school mathematics teachers in the Tucson Area at no cost, the conference will begin at Tucson High school with a breakfast sponsored by Prentice Hall, and finish with a luncheon at the



University of Arizona Professor Emeritus Dr. Steve Willoughby congratulates former NCTM President Dr. Lee Stiff after the keynote speech at the Mathematics Educator Appreciation Day Conference.

Doubletree on Alvernon, sponsored by McDougal Littel. Teachers will actively participate in morning workshops, choosing from over 36 offerings. The conference will conclude with the luncheon, door prizes, and an outstanding keynote speaker, Dr. Timothy Kanold— former math teacher, math department chair, principal, NCTM national speaker, text book author and now Superintendent of District 125, Lincolnshire, IL.

Last year's conference drew 270 participants from the Tucson area, including three superintendents— Dr. Roger Pfeuffer (TUSD), Dr. Vicki Ballentine (Amphitheater) and Denise Ryan (Tanque Verde). Dr. Linda Arzoumanian, Pima County



University of Arizona Professor Fred Stevenson displays DO THE MATH 18-disk DVD set.

School Superintendent, Dr. Steve Willoughby, former NCTM President and UA professor emeritus and several professors from the University of Arizona also attended. The enthusiastic response from the teachers at last year's January 22 conference has encouraged the Center to strive for an audience of over 300 for this year.

To learn more about the conference ***In this Math Links issue*** and/or to register, please visit the Center's website at <http://crr.math.arizona.edu>. If you are interested in speaking or would like to recommend a speaker, speaker forms are also available on the website. If you are interested in donating a door prize for our raffle please contact Diane Theriault at detheriault@yahoo.com.

In other news, the Center is proud to announce that the **DO THE MATH** television show, brain child of Dr. Fred Stevenson, is once again on the UA Channel which is Cox 19 or Comcast 76. Each week there is a different program that airs at three different times —Wednesday at 10:30 AM, and Tuesday and Thursday at 4 PM. Each show is in three modules. The first module shows an outstanding local math teacher reviewing concepts from different AIMS

Math Links — continued

strands and solving problems connected to the strand shown on that television show. Another module features Dr. Fred Stevenson who introduces an exploratory problem for students and teachers to think about and work on. Finally, members from the community who use mathematics in their everyday work show how mathematics is used in the real world. The new shows are available to anyone at any time on the UA Channel web site <http://www.uachannel.com>. Suitable for download and classroom viewing the programs not only review AIMS materials but also offer viewers a unique look at mathematics through art, games and puzzles.

For districts and teachers who want more, the Center and the UA Channel have packaged an 18-disk DVD set. These DVDs are an offshoot of the television show. They include nine hours of AIMS instruction, along with the exploratory problems and the real life mathematics done by professionals in the community. They also include more than 50 pages of problems that correspond with each strand. School districts who support the program by purchasing the entire set for \$499.95 can then copy any and all of the disks to distribute to teachers in their districts. Districts that have already supported this project include Amphitheater, Catalina Foothills, Flowing Wells, Marana, Sunnyside, Tanque Verde, Tucson Unified, and Vail. Teachers in any of these districts are eligible to obtain a copy of the tapes from their district office.

In addition to the two projects highlighted above, the Center is excited about their recruitment and retention efforts from their two main projects. The freshman and sophomore students



Professor Fred Stevenson, Exploratory Problem Wizard of the DO THE MATH TV show visits with student teachers at the math conference.

who tutor in middle and high schools are a terrific group with lots of enthusiasm displayed weekly in their 196a Tutoring in the Schools class. This is the fifth year of the program and several of the students who began their journey in mathematics education while in the math tutoring program are now first or second year teachers in our schools. In fact, several are now in

the retention part of our program. This program for new teachers has 24 teachers this year, up from 15 in 2001-2002. In addition to working with mentors at their schools, and consulting with coaches from the University, these teachers attend monthly Saturday sessions throughout the school year. These sessions provide a format to share ideas, materials and concerns, learn new pedagogy, deepen mathematical knowledge, model good teaching and promote collegiality. More information on both of these programs is available at <http://crr.math.arizona.edu>.

Update on the Co-Op Program

The Co-Op Program was suspended this year due to cuts in the department's budget. Last year we were fortunate to have with us Deborah Conway from Palo Verde High School. In future years we hope to have two to four teachers join us each year.

A primary purpose of the Co-Op Program is to promote a regular exchange of ideas between mathematics teachers from the school districts and the mathematics faculty at the University of Arizona. It offers qualified teachers the opportunity to spend a year on campus as visiting scholars. Participants in the program teach nine units each semester in the entry level or math education program, take two courses in mathematics or related fields, participate in the mathematics instruction colloquium, and work on a project that would benefit the participant and their school district. The courses taught range from college algebra to calculus to "Understanding Elementary Math," a course for prospective elementary teachers. The mathematics department has the flexibility to arrange the teaching schedule so that participants have at most two preparations and to select courses and times suitable to the instructor.

Participants in the program remain school district employees with full salary and benefits. In return the University will provide the school district with a replacement teacher. Hence, the school districts and the University will not incur any added costs to cover their teaching schedule. At the end of the program participants must return to their districts for a minimum of one year.

We are looking for individuals who have an educational plan they wish to pursue, who would go back to their schools to share ideas with their colleagues, who are committed to teaching, and who would enjoy working with undergraduate students at the university.

For more information call 520/621-6881 or email jerrie@math.arizona.edu or elias@math.arizona.edu.



Fall Skywatchers

Flandrau provides free information about what's up in the night sky on both a free phone line and on the Internet. For the latest sky information call Flandrau's Astronomy Newslines at 520/621-4310. Likewise, the Flandrau Skywatchers Guide can be accessed via the Internet at: <http://www.flandrau.org/astronomy/index.php>

What's Up

PLANETS

Mars has brightened dramatically - its spectacular apparition occurs this October and November, the closest it will be to Earth until the year 2018. Because of its much higher altitude in the Northern Hemisphere sky, the Red Planet should offer sharper views than in 2003 (when it was at its closest in 60,000 years). Mars started September at negative magnitude -1, but brightens to -2.3 by late October making it the brightest star like object now visible with the naked eye in the heavens apart from Venus. Mars begins October around 18 arc seconds in size when 49 million miles from Earth, but swells to almost 20.2 arc seconds by Oct. 29, when it is closest to Earth at 43 million miles distant. Now is the time to observe the red planet each night (even through small amateur telescopes). However, on October 29 Mars does not rise above 40 degrees in altitude until 9:30 p.m. 40 degrees in altitude is high enough in the sky for typical sharp telescopic viewing (the

higher the altitude, the less air is being looked through). For this reason Mars will offer better convenient evening telescopic viewing in November, when it is higher up, earlier at night, on, and after its opposition date of November 7 (when opposite the Sun in our sky).

Mars should be viewed in a telescope when it is highest in the sky, but viewing is dependent on atmospheric stability and conditions, and of course, the quality and size of the telescope used. Large, high quality amateur telescopes in good "seeing" (stable atmospheric conditions) will best reveal any features on the Martian disk. Mars is highest in the sky by 1 a.m. in late October and early November. When highest in the sky the red planet "transits" the meridian at 74 degrees in altitude for southern Arizona. This is much higher than Mars reached in August 2003. Even though Mars will be 20 percent smaller this year than in 2003, its placement overhead should offer sharper telescopic viewing this autumn, especially for desert Southwest observers. Mars can be first seen when it rises above the east-northeastern horizon by around 6 p.m. in the late October twilight.

The brilliant planet Venus is our so-called evening star this autumn; it appears as an intensely bright star that does not twinkle (much brighter than even Mars). Venus is the first star like object visible, in a clear sky, starting about 20-30 minutes after sunset above the southwestern horizon. Venus starts to gain altitude in the western twilight sky late in October into November. Look for the waxing crescent Moon near Venus in the evening twilight of Saturday November 5.

Cream-white Saturn rises in the east at around midnight in late October, and by 11:30 p.m. in early November. It will continue to gain altitude and rise earlier in the late night sky so that by late November it will rise at 10 p.m. Saturn is in the constellation Cancer the Crab and is near the Beehive star cluster. Look for the last quarter Moon near Saturn in the pre-dawn sky and morning twilight of Tuesday October 25. Saturn appears as a zero magnitude star-like object that does not twinkle.

Jupiter and elusive Mercury are both largely lost into the glare of the Sun this autumn.

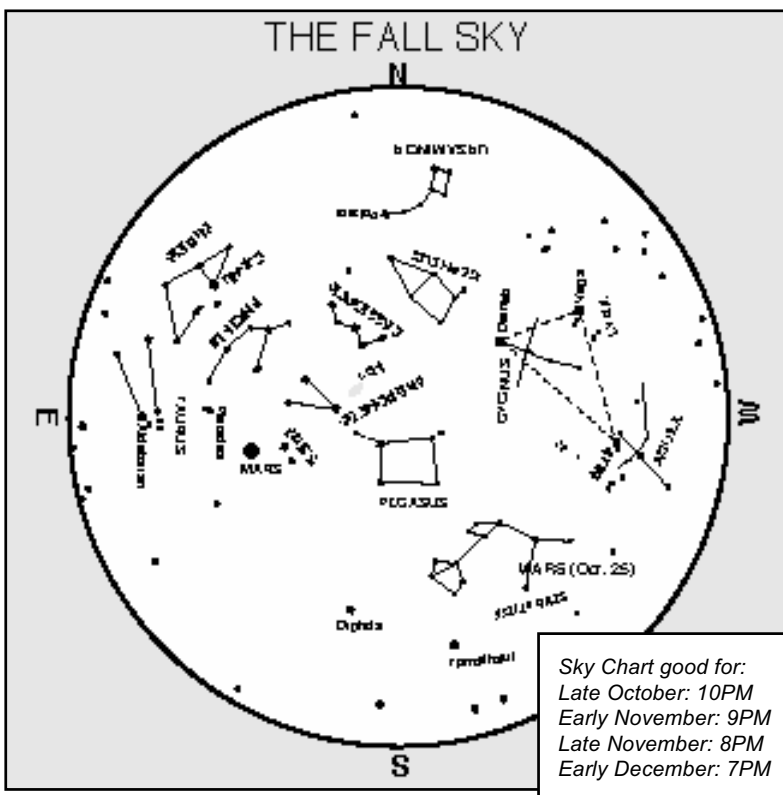
The dim planets Neptune and Uranus are visible in the evening into December to those with binoculars, good quality telescopes, and in Flandrau's 16-inch observatory. For more information on viewing at Flandrau, go to Flandrau's web site.

WINTER SOLSTICE ON DECEMBER 21

Days become shorter in the fall due to the lower altitude of the sun in the Northern Hemisphere sky. The shortest day for the Northern Hemisphere is always on the Winter's Solstice, which this year officially begins at 11:36 a.m. MST (Tucson time) on Wednesday December 21. From this time forward the sun now gains altitude in our Northern Hemisphere sky as winter now begins for the Northern Hemisphere (and summer for the Southern Hemisphere).

What's new?

Flandrau currently closed for renovation until September 2006 "Flandrau Beyond Tomorrow" is the newest phase in the evolution of the University of Arizona's most visionary project to date: the University of Arizona Science Center project in downtown



Resources

Tucson. This new phase will actively involve community members in the design of exhibits, programs, and theater experiences for the new facility through participation in brainstorming sessions, collaborative discussions, and testing of new exhibits and programs.

Beginning in September of 2005 and continuing through the next few years, Flandrau will enter an innovative phase of community engagement in order to learn more about what regional communities want from and can offer to the new Science Center. As part of this process, the Flandrau Science Center building on the University campus suspended regular operations on September 6, 2005 and will re-open September 1, 2006. When it re-opens, the Center will be a living and working laboratory designed to offer the ultimate in sensory exploration with a set of prototype exhibits and planetarium programs for the public to experience and evaluate. For more information, see the Flandrau web site at: <http://www.flandrau.org>

The University of Arizona Mineral Museum will remain open this fall and winter by appointment only and is accepting school groups for visits: Call 520/621-4227 during normal business hours for information and details.

Finally, the Flandrau telescope will remain open for viewing from 7-10PM Wednesday-Saturday, weather permitting, during the temporary closure of Flandrau's main building. Flandrau's 16-inch observatory telescope is the only free public telescope open on a regular basis in the state of Arizona.

PULSE: Promoting Understanding and Learning for Society and Environmental Health

Are you looking for topics that grab your students' attention? How about interdisciplinary curriculum? Are student projects that involve community learning or service interesting to you?

If you answer yes to any of these questions then the "***Promoting Understanding and Learning for Society and Environmental Health***," (PULSE) will be of interest to you. The materials are disseminated freely on the internet at <http://pulse.pharmacy.arizona.edu>. This curriculum uses environmental health and biomedical issues as a context for teaching all subjects in an interdisciplinary constructivist manner. Our goal is to provide rich engaging lessons that meet the standards and do not to produce an extra teaching load. With this goal in mind, a team of classroom teachers and staff of the UA Southwest Environmental Health Science Center (SWEHSC) carefully designed the lessons to meet state education standards for each discipline.

The ***PULSE*** project is seeking individual high school teachers and teams of teachers to use the curriculum in their classrooms in the lesson testing phase of the project. We are seeking teachers who will test either individual learning cycles or complete units. PULSE staff will help participating teachers implement and integrate the curriculum unit into their academic plan for the 2005-2006 school year.

Each unit is organized into three to five learning cycles. Each learning cycle is one to three weeks in duration. Each unit is designed to take approximately one quarter and includes a complete set of lessons for science, social studies and language arts. There are also supporting lessons in mathematics. The unit culminates with a major project that typically has a community service aspect.

Curriculum testing teachers will receive training about the content and implementation of the units and a stipend for participating. Involvement includes the training teaching and providing feedback on the PULSE lessons, and participation in group discussions about the curriculum. For the duration of the curriculum unit, teachers will be able to borrow materials from the Southwest Environmental Health Sciences Center to carry out curriculum testing. For example, PULSE can provide glassware for science labs, and a class set of Silent Spring readings.

The lessons integrate subjects into the specific units. For more about each unit see <http://pulse.pharmacy.arizona.edu/>

To learn more about the project or to apply to be a curriculum testing teacher, please contact **Marti Lindsey** lindsey@pharmacy.arizona.edu <<mailto:lindsey@pharmacy.arizona.edu>> / 520/626-3692

Join the Arizona Earth and Space Science Teachers Association Mailing List

The newly forming AZ Earth and Space Science Teachers Association (AzESTA) is building an electronic mailing list of educators to share teaching ideas, innovative curriculum materials, and professional development opportunities. You can join this electronic learning community at no cost simply by sending a blank email to: azesta-subscribe@yahoogroups.com. For more information, contact **Tim Slater**, tslater@u.arizona.edu; **Steve Semken**, semken@asu.edu; or **Thomas McGuire**, cavecreekdigital@msn.com.

Mars: Fact or Fiction!

Celebrate the 2005 Mars opposition at the free public "***Mars: Fact or Fiction!***" event on **Monday, October 31, 2005**, from 9 pm to 2 am. Look at Mars, the only planet whose surface details can be seen from Earth, through large telescopes at Steward Observatory and Flandrau Science Center! At LPL's Sonett Space Sciences Center, talk to Mars scientists and explore the facts and myths about the Red Planet. Hands-on activities and Mars Halloween treats for kids! See <http://hirise.LPL.arizona.edu/halloween> for more information or call 520/626-7432. Send email queries to loretta@LPL.arizona.edu. Seeing Mars this close is a once-in-a-lifetime opportunity, so don't miss out!

THE UNIVERSITY OF ARIZONA®

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Arizona/NASA Space Grant-UA Cooperative Extension Precollege Mini-Grant



Inspiring the next generation of explorers!

Modeled after an impressive program in Washington state, the Arizona Space Grant Consortium /UA Cooperative Extension Mini-Grant program offers grants up to \$400 for innovative science, mathematics and technology-related projects, or professional development experiences for educators. Public, private, certified home-school teachers and 4-H /Extension professionals and other informal education programs

may apply. Grants must be matched dollar-to-dollar with non-federal funds and aligned with the Arizona State Standards.

The 1-2 page proposal should include: 1) Description of project activities (i.e., what you plan to do); 2) Project goals and objectives (i.e., what students will learn about or to do—how project can boost student learning in science, math or technology); 3) How project addresses math, science, geography or technology; note targeted AZ or national standards where applicable; 4) How you will assess project success (i.e. what will students learn or be able to do at the end of the activity, or how will the professional development activity enhance your teaching?). Application form is due **January 9, 2006** and is available at: <http://spacegrant.arizona.edu/education/minigrants>. Awardees will be informed by January 19, 2006.

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