



# SCIENCE BYTES

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## Earth Day Science Symposium

Earth Day 2008: Tuesday, April 22, 2008

Earth Week: April 20 -26

A 7-day mini unit for science students in grades 6-9. EDSS is provided free to middle-school classrooms through generous funding from the Toyota USA Foundation. Preview at <http://www.earthsbirthday.org>

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## Power Your Future

### How would you Power Your Future?

First annual high school energy competition

May 9-11, 2008

Washington State University, Pullman

<http://www.imagine.wsu.edu/>

<<http://www.imagine.wsu.edu/>>

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<http://science-ed.pnl.gov/> <<http://science-ed.pnl.gov/>>

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## Plan to Attend

**2008 National NSTA Conference** – Boston, MA –  
March 27-30, 2008

### NSTA Regional Conferences – 2008

October – Charlotte, NC: October 30-November 1, 2008

November – Portland, OR: November 20-22, 2008

December – Cincinnati, OH: December 4-6, 2008

**2009 National NSTA Conference** – New Orleans, LA –  
March 19-22, 2009

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## Campbell Creek Science Center

### March 13: Out of This World (No Charge)

For hundreds of years, people wondered whether there were planets around other stars. It was only twenty years ago that astronomers detected the first one, but since then over 250 more have been discovered. Learn how this was done, what it means for the possibility of life in the universe, and more from astronomer Jeff Medkeff. The program begins at 7:00 pm on Thursday March 13 at the BLM Campbell Creek Science Center (6865 Elmore Road). Stargazing will follow if the skies are clear. This will be the final astronomy program of the season at the Center. For more information, please call 267-1247.

### March 19: Alaska's Bats, Frogs, and Loons: Citizen Volunteers Make a Difference! (No Charge)

Scientists know very little about the distribution, abundance, or population status of most Alaskan species. But volunteer citizen scientists are collecting valuable baseline information on a number of species. They're also helping uncover new mysteries and are setting the groundwork for new research. Come learn more about wood frogs, little brown bats, loons, and grebes—and what volunteers have contributed to the understanding of these animals—from Dave Tessler of the Alaska Department of Fish and Game. You'll also discover how you can get involved in citizen science! The program begins at 7:00 pm on Wednesday, March 19 at the BLM Campbell Creek Science Center (6865 Elmore Road). For more information, please call 267-1247.

### March 29: Celebrating Women in Science (Fee)

The Campbell Creek Science Center will be hosting its 6th annual Celebrating Women in Science program held in honor of National Women's History Month (March) on Saturday March 29 from 1-4pm. Participants will learn about Alaskan animals and more as they join local women scientists or a snowshoeing adventure. Program is limited to 30 participants and advanced registra-

tion is required. Program fee applies (\$10/adult; \$5/child) and all participants under 18 must be accompanied by an adult. Please call 267-1247 for more information and to register.

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### **BLM / ASD 6th Grade OUTDOOR Week**

It's time for the annual BLM/ASD Outdoor Week! And you're invited!

**WHO:** 6th grade (or 5/6 combos)

**WHEN:** Tuesday – Friday, May 13-16, 2008 on-site from 9:45am to 1:00pm

**WHERE:** The Bureau of Land Management's Campbell Tract, near the CAT (Campbell Airstrip Trailhead) bridge. You can park at the Campbell Creek Science Center, or Mile 1.1 Campbell Airstrip Road and follow the brightly colored Outdoor Week signs!

**WHAT:** Your class or group will attend Outdoor Week for one of these four days and will travel through either the Bear, Salmon, Wolf, or Eagle activity loop. Along the loop, you will spend 30 minutes at five different stations doing activities such as gold panning, fly-tying and casting, soil science, marine mammals, archeology, stream ecology and water studies, leave no trace outdoor ethics and more! You will have 15 minutes to eat your packed lunches at station #3.

**There is no charge for this event, but reservations are required!**

**Please FAX in your Community Resource Form to request a date.**

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### **NSTA In the News:**

#### **Force and Motion**

[http://science.nsta.org/enewsletter/2008-03/news\\_stories\\_elementary.htm](http://science.nsta.org/enewsletter/2008-03/news_stories_elementary.htm)

#### **Science For All**

[http://science.nsta.org/enewsletter/2008-03/news\\_stories\\_high.htm](http://science.nsta.org/enewsletter/2008-03/news_stories_high.htm)

#### **Making Science Relevant**

[http://science.nsta.org/enewsletter/2008-03/news\\_stories\\_middle.htm](http://science.nsta.org/enewsletter/2008-03/news_stories_middle.htm)

Too busy to sift through the news in search of interesting stories? Click on the link to read current news stories, collected for you by NSTA staff members, that are related to this theme.

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### **FLINN Safety Notes - March**

With the increasing popularity of "crime scene investigation" lab activities involving DNA forensics, this month's topic—"Biotechnology Lab Safety," will help you address some essential safety issues regarding basic equipment, reagents, and procedures.

To print "Biotechnology Safety Issues," please go to:  
<http://www.flinnsci.com/Sections/Safety/Snotes/snotes.asp>

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### **The National Science Resources Center presents...**

Don't miss the hottest PD event of the summer- The award-winning professional development courses for teachers of science return for 2008!

Each of the four Smithsonian Science Education Academies is a week-long immersive science experience, including content sessions to deepen your understanding of key concepts, and behind-the-scenes access to Smithsonian collections and cutting-edge science at world-class research facilities. Three optional graduate-level credits are available for each Academy-please contact the NSRC <<mailto:pdc@nsrc.org>>PD Center for more information.

How to Register for the 2008 Academies- Online- <[http://rs6.net/tn.jsp?e=001neOPZ6mpYo9WRHG12TbNEtCr9aw392V\\_A\\_xKGqSPEjq1WHTObuFZ\\_bVwfmqGBaCfrK6IUI1ziz-9kPrYz7RiCT5Lwiunu5UkxP\\_-JGudfu5v300tIzFSOp5FlgEVhxjXKtx89CzciM-t-ImbZww5GgmKqrQY-QBzvx5wbGR2l-0IhfHJ8TarpLCQHJyHzYlv](http://rs6.net/tn.jsp?e=001neOPZ6mpYo9WRHG12TbNEtCr9aw392V_A_xKGqSPEjq1WHTObuFZ_bVwfmqGBaCfrK6IUI1ziz-9kPrYz7RiCT5Lwiunu5UkxP_-JGudfu5v300tIzFSOp5FlgEVhxjXKtx89CzciM-t-ImbZww5GgmKqrQY-QBzvx5wbGR2l-0IhfHJ8TarpLCQHJyHzYlv)>

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### **Opportunities from ANROE**

#### **Climate Discovery Courses for Educators - Online**

The National Center for Atmospheric Research offers a series of six-week online courses for middle and high school science teachers, combining geoscience content, current climate research, easy to implement hands-on activities, and group discussion. Registration is open for the Spring term, April 4-May 16, 2008.  
<http://ecourses.ncar.ucar.edu/>

#### **Application deadline: March 21 - Wyland Clean Water Challenge Art Contest**

Wyland Ocean Challenge offers a nationwide art and science contest. Have your students create individual works of art or a giant group mural of any aquatic habitat with above and below the water views along with plants and animals that live in the habitat.

<http://www.wylandcleanwaterchallenge.org/index.cfm?mid=4&sid=11>

#### **Adaptations from the Depths curriculum**

The Flower Garden Banks National Marine Sanctuary offers its Adaptations from the Depths curriculum, downloadable from the web. This curriculum introduces

elementary students to animal adaptations as they relate to the octopus. The full curriculum text, including reproducible, or a separate document with just the handout masters are available. Additional materials for this curriculum include full color posters of animal camouflage and a DVD of an octopus moving about on the reef in the FGBNMS, which can be mailed to you upon request, at no charge. Send an email with your mailing address to [flowergarden@noaa.gov](mailto:flowergarden@noaa.gov) to request the supplemental materials. Check out the website for other resources.

[http://flowergarden.noaa.gov/document\\_library/ed\\_documents.html](http://flowergarden.noaa.gov/document_library/ed_documents.html)

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### **Building A Presence for Science presents: Opportunity #1**

#### **Powerful Professional Learning in Science**

July 7-10, 2008, Grove Park Inn, Asheville, NC

Register today!

<http://www.nsela.org/calendar/calendar.html#reg#reg>

The technology of professional learning is changing. No longer are teachers participating in workshops as their primary means of learning. As educators learn more from research and practice about how students learn, they also come to understand more about how educators need to learn.

At this conference, participants will explore the differences between professional development and professional learning. They will experience several powerful designs themselves – deeply enough that they will be able to facilitate these designs with the educators with whom they work. They will evaluate current professional learning programs according to a variety of criteria. Then, using a Backmapping Model for planning, implementing, and evaluating professional learning, they will create a plan to remodel current professional learning approaches so that they more closely align with students' learning needs, meet National Staff Development Council's standards for staff development, and model the type of learning educators want their students to experience.

#### *Participants will:*

- Have a deep understanding about the differences between professional development and learning because they have experienced at least two professional learning designs.
- Summarize the components of powerful professional designs in their own words.
- Match the NSDC standards to the professional learning designs they have experienced.
- Be able to facilitate at least three powerful designs with their own staff members.

- Understand the connection between professional learning and student achievement by using the Backmapping Model to plan, implement, and evaluate professional learning (focus on evaluation).
- Use a visual dialogue design to create indicators of the effect of professional learning

#### *Presenters*

Dr. Lois Easton, recently retired as Director of Professional Development at Eagle Rock School and Professional Development Center, Estes Park, Colorado and author of *Powerful Designs for Professional Development*

Dr. Stevi Quate, Colorado Department of Education and Educational Consultant

#### *Registration*

Register securely online,

<https://secure100.telusys.net/tcsc-bin/regdisplay?1258061837451387>

or download a registration form to mail in

<http://www.nsela.org/calendar/sli08/SLIRegForm08.pdf>

> .

#### *Registration fees are:*

Members \$350 until April 15 and \$375 after April 15

Non-Members \$395 until April 15 and \$420 after April 15

#### *Powerful Designs for Professional Learning*

[http://store.nsd.org/merchant.mv?Screen=PROD&Store\\_Code=NRC&Product\\_Code=B248](http://store.nsd.org/merchant.mv?Screen=PROD&Store_Code=NRC&Product_Code=B248), an \$80+ value, will be given free of charge to participants preregistering by June 1.

The institute qualifies as NCLB, Title II – Part A, Professional Development.

#### *Accommodations and Travel*

Make your travel plans early! We will begin at 2 pm on Monday, July 7 and end at 12 pm on Thursday, July 10. Rooms must be reserved directly through the Grove Park Inn. Download a housing form.

<http://www.nsela.org/calendar/sli08/GPIInn08SLI.pdf>

If you are flying into the area Asheville, NC (AVL) is the closest airport but Charlotte, NC (CLT), Greenville, SC (GSP) and Knoxville, TN (TYS) are all within a 2 hour drive.

Learn more about what to do in Asheville while you are there! <http://www.exploreasheville.com/>

For additional information, contact Pat Shane ([pshane@unc.edu](mailto:pshane@unc.edu)), Karen Charles ([kcharles@rti.org](mailto:kcharles@rti.org)), or Susan Sprague ([susansprague@yahoo.com](mailto:susansprague@yahoo.com)).

#### **Opportunity #2**

Sign up now to participate in **National Environmental Education Week, April 13 - 19, 2008!**

As the nation's largest environmental education event National EE Week, made possible by Canon, pro-

motes understanding and protection of the natural world by actively engaging K-12th grade students and educators of all subjects in an inspired week of environmental learning and service before Earth Day. As partners in EE Week, educators have access to:

Standards-based environmental education lessons and activities; Monthly electronic newsletters that highlight the latest EE curricula, professional development, and funding opportunities; and opportunities for online communication and knowledge-sharing with educators from across the country.

If you work with students in a school, nature center, zoo, museum, aquarium, or other educational setting, you can join EE Week's efforts and gain national recognition for your work.

Log on to [www.EEWeek.org](http://www.EEWeek.org) to register Questions? Email [EEWeek@neefusa.org](mailto:EEWeek@neefusa.org) or call (202) 261-6484

### **Opportunity #3** **NABT Professional Development Conference**

October 15-18, 2008  
Memphis Cook Convention Center  
Memphis, Tennessee

Join us in Memphis and help NABT celebrate its 70th anniversary. Explore new teaching strategies and technologies ... Infuse your understanding of scientific concepts with new information? Hear speakers such as Eugenie Scott and attend the Dover, Pennsylvania Teacher Symposium? And renew your spirit through conversations with like-minded colleagues. Learn more about NABT 2008 on our Web site, [www.nabt2008.org](http://www.nabt2008.org) <<http://www.nabt2008.org/>>, or contact NABT at 703 264-9696.

### **Opportunity #4**

#### **2008 SACNAS National Conference** **International Polar Year: Global Change in Our Communities**

October 9-12, Salt Lake City, Utah  
*Call for Session Proposals*  
<<http://www.sacnas.org/confnew/confclient/current/session/ProposalInfo.asp?sessYear=2008>> – Deadline: March 20, 2008

In preparation for the 2008 SACNAS conference we are pleased to invite session proposals from the professional scientific community. Please consider submitting a session proposal through our online system. Conference sessions are an excellent opportunity to share your valuable insights and experiences.

*About the Conference Theme*

<<http://www.sacnas.org/confNew/confClient/current/highlights/>> – International Polar Year: Global Climate Change in Our Communities:

*lights/*> – International Polar Year: Global Climate Change in Our Communities:

The 2008 SACNAS National Conference theme focuses on global change—particularly climate change and its impact on all fields of science and all ecosystems and populations from the poles to the desert. Timed to correspond with world-wide efforts related to International Polar Year <<http://www.ipy.org>> and supported by a grant from the National Science Foundation <<http://www.nsf.gov/od/opp/ipy/ipyinfo.jsp>>, SACNAS' IPY conference represents an opportunity for the minority scientific community to have a voice in the direction and application of research affecting the health of the planet and her people.

Proposals are encouraged to demonstrate a relationship to polar research, IPY, sustainability, green research, global change, traditional ecological knowledge, or related topics; however, a connection to the IPY theme is not required.

*About the SACNAS Conference*

<<http://www.sacnas.org/confNew/confClient/>> :

A unique blend of science, culture, and community, the conference is both interdisciplinary and highly interactive. Through it, SACNAS seeks to motivate and inspire individuals at all stages of educational and career development with an array of research presentations, mentoring and training sessions, nationally renowned keynote speakers, discussion forums, special events, and cultural performances.

*About Conference Sessions*

<<http://sacnas.org/confNew/confClient/current/session/ProposalInfo.asp>> :

This year, we will feature over 45 different sessions.

Please consider submitting a proposal in any of the following session categories (to learn more, go to our [session proposal page](#)

<<http://sacnas.org/confNew/confClient/current/session/ProposalInfo.asp>> ):

Scientific Symposia

Professional Development Sessions

Precollege Teacher Workshops

Preconference Events

Special Interest Forums

Receptions

Orientations

*About SACNAS* <<http://www.sacnas.org/>> :

For 35 years, SACNAS has been a diverse society promoting opportunities in advanced science education for Chicano/Latino, Native American, and other under-represented minority students. The mission of SACNAS

(Society for Advancement of Chicanos and Native Americans in Science) is to encourage Chicano/Latino and Native American students to pursue graduate education and obtain the advanced degrees necessary for science research, leadership, and teaching careers at all levels.

For additional information about the conference or to submit a proposal, please see the call for proposals website

<<http://www.sacnas.org/confnew/confclient/current/session/ProposalInfo.asp?sessYear=2008>> or contact SACNAS directly at [info@sacnas.org](mailto:info@sacnas.org) <<mailto:info@sacnas.org>> (please reference "SACNAS Session Proposal" in the subject) or toll free at 1-877-SACNAS-1

Bryana Britts, Program Manager  
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website: <http://www.sacnas.org>

**Opportunity #5**  
**Middle and High School Teacher Opportunity**  
**International Polar Year: Science, Technology, Engineering, and Mathematics Polar Connections**

University of Massachusetts Amherst  
14-18 July 2008  
Application Deadline: Tuesday, 1 April 2008  
For further information, please go to:  
<http://www.umassk12.net/ipy>

Funded by the National Science Foundation (NSF) and University of Massachusetts Amherst, Science, Technology, Engineering, and Mathematics (STEM) Polar Connections is designed to promote the teaching of science concepts and processes related to the polar regions and to emphasize connections to state and national science standards in middle and high schools.

This unique teacher opportunity features a week-long program at University of Massachusetts Amherst, which focuses on current science research in the polar regions and makes connections to school science curriculums. The program will address the rapid changes occurring in the physical environment, the corresponding impact on the biosphere, and the history and politics of the polar regions. During the program participants will preview the curriculum materials and draft a plan for incorporating them into the classroom. Online discussion fo-

ums will be held during the academic year to facilitate collaborative efforts between participants and university faculty. Teachers can earn Professional Development Points (PDPs) for participation in this program, and three graduate credits will be available at a reduced cost. Housing, meals, and travel reimbursement will be provided for those who live outside the commuting area. In addition to a \$375 USD stipend, participants will receive various materials, a materials budget, and funds to support their dissemination efforts.

To apply, teachers must prepare a narrative statement on how they plan to use the information from this seminar in the classroom, as well as how and where they will disseminate knowledge about the study of polar regions within the school, school district, and community. Applicants must include a resume and letter of support from the school principal or superintendent. The application package can be submitted by e-mail, fax, or regular mail, but should be received by Tuesday, 1 April 2008. Late applications will be accepted on a space available basis.

The program is sponsored by the STEM Education Institute and the Climate System Research Center (CSRC), and is designed for teachers of middle and high school science, math, and technology.

For more information and application forms, please go to: <http://www.umassk12.net/ipy> or contact: [ipy@umassk12.net](mailto:ipy@umassk12.net)  
Phone: 413-545-0734 Fax: 413-545-3697

**Opportunity #6**  
**COGNO Products**

Our company publishes science games and books, and we provide free weekly science and multi-subject puzzles by email, for grades 3-8 ([www.cogno.com/puzzlers](http://www.cogno.com/puzzlers) <<http://www.cogno.com/puzzlers>> ). We're now over 4,500 teachers, through whom 300,000 students do Cogno science puzzles each week, and we would like to keep spreading the word.

Jermaine Duffis

Content Development Associate

Cogno Products

201 S. Central Ave., Suite 311

St. Louis, MO 63105

314.721.9199 314.721.9299 Fax

[www.cogno.com](http://www.cogno.com) <<http://www.cogno.com/>>

## Opportunity #7

### CELEBRATE SUN-EARTH DAY 2008

Sun-Earth Day is comprised of a series of programs and events that occur throughout the year culminating with a celebration on or near the Spring Equinox, which is March 20 in 2008. The theme for this year's Sun-Earth Day is "Space Weather Around the World". Middle schools are invited to interact with scientists to learn about solar science, solar energy and career choices. Various events [including one at Goddard with home schoolers] will prepare the audiences to watch a total solar eclipse on August 1, 2008 via a live webcast from China. Visit the Sun-Earth Day 2008 Website at <http://sunearthday.nasa.gov> to link to educational resources, multimedia tools, and a calendar of upcoming events for formal and informal education. Following are just a few of the items you will find:

#### Solar Week – March 17-21

During the week of March 17, Solar Week will be open to registered users for activities and online discussion. There will also be a one-hour NASA Edge Vodcast (<http://www.nasa.gov/nasaedge/>) about Sun-Earth Day, Solar Week and Space Weather Action Center.

#### Technology through Time: What Causes an Auroral Storm?

[http://sunearthday.nasa.gov/2008/TTT/61\\_auroral.php](http://sunearthday.nasa.gov/2008/TTT/61_auroral.php)  
The rapidly changing spectacle of an auroral storm dazzles the eye with intense explosions of colors and forms, but their origins are still not fully understood. Read the latest in this series to learn more.

#### In the News! A Problem Based Learning Activity

<http://sunearthday.nasa.gov/inthenews/>  
Since the launch of the SOHO spacecraft, there have been numerous news articles highlighting discoveries about the Sun. This activity will give you and your students the opportunity to learn about those discoveries and to explore the unique challenges that humans face as we prepare for our journeys to the Moon, Mars and beyond.

#### Polar Gateways: Barrow, Alaska

NASA's Sun-Earth Day team traveled to Barrow, Alaska to join scientists from all over the world during the "Polar Gateways Arctic Circle Sunrise 2008" conference. While there, the Sun-Earth Day team presented a live Webcast and produced three on-location podcasts. Subscribe to the podcasts or download the mp3 files at <http://sunearthday.nasa.gov/2008/multimedia/barrow.php>.

### Eclipse Aug. 1, 2008 – Live Webcast Planned from China

NASA's Sun-Earth Day team is partnering with the San Francisco Exploratorium to produce a live total solar eclipse Webcast and broadcast from China, on Aug. 1, 2008. Save the date for exciting activities museums will be able to do for their visitors. More details to come later in 2008; bookmark:

<http://www.exploratorium.edu/eclipse/>  
<http://sunearthday.nasa.gov/>  
<http://eclipse.gsfc.nasa.gov/SEmono/TSE2008/TSE2008.htm>

## Opportunity #8

### POLAR-PALOOZA NATIONAL TOUR CONTINUES IN 2008

POLAR-PALOOZA, the national tour, features high-energy public presentations entitled "Stories from a Changing Planet," tales of adventure and science told by a charismatic cast of characters, and uses HD video and authentic props - such as a piece of ice core 3,000 or more years old or caribou and seal skin mukluks (boots) - to bring polar research to life; 3-day visits to each site; special programs for schools and under-served youngsters; workshops for K-12 educators and museum volunteers; briefings for local news media and business leaders; and camp-ins for Boys and Girls Clubs. The National Science Foundation and NASA sponsor POLAR-PALOOZA.

To see what cities and sites will be on the national tour in 2008, go to: <http://passporttoknowledge.com/polar-palooza/pp04.php>. Upcoming events during March-May are:

March 13-14 – Washington, DC, National Geographic Society

April 17-19 - Salt Lake City, Utah Museum of Natural History

April 21-22 - Norman, OK, Sam Noble Oklahoma Museum of Natural History

May 4-6 - Anchorage, Alaska, Anchorage Museum of History and Art

May 8-10 - Fairbanks, Alaska, University of Alaska Museum of the North

May 24-25 - Raleigh, NC Museum of Natural Sciences

## **Opportunity #9**

### **NAME THAT SPACE TELESCOPE**

Deadline for Suggestions: March 31, 2008

Would you like to name the next great space telescope? Here's your chance. NASA is inviting the general public from around the world to suggest a new name for the Gamma-ray Large Area Space Telescope, otherwise known as GLAST, before it launches in mid-2008.

GLAST is designed to probe the most violent events and exotic objects in the cosmos from gamma-ray bursts to black holes and beyond.

All suggestions will be considered. The period for accepting names closes on March 31, 2008. Participants must include a statement of 25 words or less about why their suggestion would be a strong name for the mission. Multiple suggestions are encouraged.

For the full guidelines and to submit a suggestion for the mission name, go to:  
<http://glast.sonoma.edu/glastname>. Anyone who drops a name into the "Name That Satellite!" suggestion box on the Web page can choose to receive a "Certificate of Participation" via return e-mail. They can also choose to receive a press release notifying them of the selected name, which will be announced about two months after launch, which is planned for mid-May.

## **Opportunity #10**

### **APPLICATIONS AVAILABLE FOR LUNAR AND PLANETARY INSTITUTE 2008 FIELD-BASED WORKSHOP**

**"Floods and Flows: Exploring Mars Geology on Earth,"** a NASA-sponsored workshop for educators, will be held July 13-19, 2008. Spend the week with planetary scientists visiting the site of ancient Glacial Lake Missoula and tracing its flood waters through Montana, Idaho and into Washington. From these field experiences and accompanying classroom activities, participants will build an understanding of surface processes on Earth, including water flow, volcanism, glaciation and sedimentation. Attendees will extend their understanding to interpret what the features on the surface of Mars suggest about the past environments and history of the Red Planet.

The experience will be divided between the field and lab, where participants work with classroom-tested, hands-on inquiry-based activities and resources that can be used to enhance Earth and space science teaching in the classroom. Participants receive lesson plans, supporting resources and presentations.

Applications are due April 7, 2008. For more information about the workshop and to submit an application online, visit

<http://www.lpi.usra.edu/education/fieldtrips/2008/floods20081st.shtml>. Questions about the workshop may be sent to [bnelson@lpi.usra.edu](mailto:bnelson@lpi.usra.edu).

## **Opportunity #11**

### **SPACE MATH PROBLEMS OF THE WEEK**

<http://spacemath.gsfc.nasa.gov/>

#### **Problem 119 GALEX - A Star Sheds a Comet Tail!**

(Grade level: 8-10)

The GALEX satellite captured a spectacular image of the star Mira shedding a tail of gas and dust nearly 13 light years long. Students use the GALEX image to determine the speed of the star, and to translate the tail structures into a timeline extending to 30,000 years ago.

[Skills: Image scaling; Unit conversion; Calculating speed from distance and time]

#### **Problem 120 Benford's Law (Grade level: 8-10)**

Students explore a relationship called Benford's Law, which describes the frequency of the integers 1-9 in various data. This law is used by the IRS to catch fraudulent tax returns, but also applies to astronomical data and other surprising situations.

[Skills: Calculating frequency tables; Histogramming; Statistics]

#### **Problem 121 MESSENGER - Ice on Mercury? (Grade level: 8-10)**

Since the 1990's, radio astronomers have mapped Mercury. An outstanding curiosity is that in the polar regions, some craters appear to have 'anomalous reflectivity' in the shadowed areas of these craters. One interpretation is that this is caused by sub-surface ice. The MESSENGER spacecraft hopes to explore this issue in the next few years. In this activity, students will measure the surface areas of these potential ice deposits and calculate the volume of water that they imply.

[Skills: Area of a circle; volume, density, unit conversion]