



## Iowa Science Teaching Section

## Iowa Academy of Science

**September 15, 2009**

Nadine Weirather, Editor

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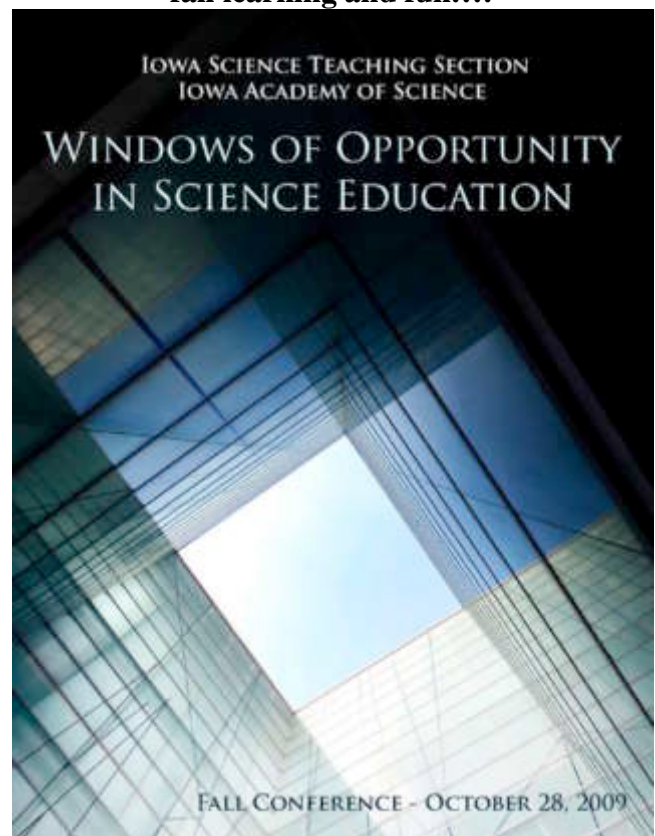
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Mark your calendars for  
fall learning and fun!!!!



## **A Message From the ISTS Chair, De Anna Tibben:**

Welcome to your new school year! Across the state many districts are developing and aligning curriculum to match or follow the Iowa Core Curriculum. (Have you had your cross-walk today?) Many of you (including myself) may be feeling a little overwhelmed from it all... working with new collaborations, implementing extended learning strategies, working through new curriculum materials and resources, and just plain learning your students names!

Well... have I got a deal for you!! Register to attend the SCI Open House event that kicks off the IAS-ISTS Fall Conference 2009 on October 27<sup>th</sup>. Shannon C!de Baca will present "Teaching Great Science: a Journey to the Core." Together we will explore activities that this 28 year veteran teacher developed to help motivate students, provide teacher resources (so we're not so overwhelmed), and to know how to know what our students really know. Confused? Don't be! Go to <http://ists.pls.uni.edu/> for details and for registration information.

Okay... so I get that we're a little stressed. Maybe you're like me and your desk looks like a tornado hit it. Yes, you guessed it... I'm setting you up for our second featured speaker for the SCI event! Dr. Bill Gallus will share the latest research techniques and findings and will show the incredible power of tornadoes via his video resources from his 20 years of tornado chasing. Why not join us for an evening of learning and laughing, of exploring, and of gaining educational resources that you can use in your classroom?

Hope to see you there!  
De Anna Tibben, IAS-ISTS Chair

## **From your Fall Conference Chair, Morgan Masters:**

This is my 39<sup>th</sup> year of teaching middle school science and I still enjoy going to work and this fall is no exception.

I have filing cabinets full of activities and lessons. But I am always on the lookout for new ways to help students understand science concepts.

My goal has always been to manage a classroom where I can help students reach their maximum potential by working very hard and all the while having fun and enjoy learning science in terms of the world around them.

One of the major axioms I teach by is "Interest is the key to education." (Thank you Dr. Bell, Northeast Missouri State University – 1969)

It is my belief that my interest and enthusiasm for teaching science has always been seeded, reinforced and stimulated by the search for and discovery of new

strategies and ideas that best help me reach students with the basic science concepts and understandings. The majority of these ideas and strategies I picked up from conversations with colleagues or were shared by other science educators sharing their success stories **while attending a science conference.**

I use the basic philosophy of taking these ideas and strategies back to my classroom and tweaking them to fit the needs of my students! understandings. I then evaluate their effectiveness by listening and observing my students; if it works, I keep it and search for even better ways of improving upon it. If it doesn't work, it goes into the circular file.

**The major source of these effective and successful strategies comes from attending a State or National Science Conference.** In a single day you can often times pick up a large number of great strategies, make new connections with professional science educators, and come away with a fresh and renewed positive approach to science instruction in your classroom.

Our ISTS Leadership Team has put together one of the best ever programs to provide you with strategies, activities and ideas to take back to your classroom. This October there are many windows of opportunity at the ISTS Fall Conference. Some of these opportunities include:

- 1 – You will have to decide which of the more than 75 presentations you want to attend.
- 2 – Presenters represent the following Areas expertise: Life Science, Physical Science, Earth and Space Science, Environmental Science, Professional Development, Science and Technology, Science as Inquiry, 21<sup>st</sup> Century Skills, Instructional Strategies & Assessments, and more.
- 3 – You will have the opportunity to visit with colleagues with similar questions and answers to what's going on in science education today.
- 4 – You can find out what new ideas are on the horizon in science education.
- 5 – Obtain the latest updates on Iowa Core Science.
- 6 – Sit back, relax, smile and enjoy our luncheon speaker is Phil Plait talks about “7 Ways A Blackhole Can Kill You”.
- 7 – Our Interest chairs have arranged the opportunity for you to enjoy breakfast while listening to a featured speaker.

8 – The Exhibit Hall will be filled with vendors from all areas of science complete with ideas, connections and supplies for your classroom.

9 – The ISTS conference is centrally located.

10 - This is one of the best returns on your money for improving science education in your classroom.

Check out the preliminary program and presentations at: <http://ists.pls.uni.edu/>

Put in your leave request, go online, and register for this the Iowa Science Teaching Section Fall Conference today!

See you at the Conference.  
Morgan Masters, 2009 ISTS Fall Conference Chair

### **A Note From Chair-Elect, Kathy Megivern:**

I'm so excited about being a part of the ISTS 2009 Fall Conference! Do check out the preliminary conference program at <http://ists.pls.uni.edu/>. Among other outstanding events, Dr. Phil Plait will entertain us during the luncheon with "7 Ways a Blackhole Can Kill You." We'll see just what that involves! If that isn't enough to get you to the Conference, consider this: Whenever I've been fortunate enough to attend the Fall Conference, I am so inspired and invigorated for the next year that I realize that when I don't get to go, I feel like I'm in a blackhole in comparison. Get that shot of inspiration and invigoration and don't risk the blackhole syndrome!

### **A Special Message From Joshua Hanna:**

Hello!

Please allow me to introduce myself. I am Joshua Hanna, a biology teacher at Muscatine High School and the appointed Corporate Sponsorship Coordinator of the Iowa Science Teachers Section of the Iowa Academy of Science. I was born and raised in Iowa; I have four children (two of which are in school) and a wife who is also a teacher. It is with a great sense of pride that I call Iowa my home!

As a teacher, I have chosen to give my life to ensure that the children of Iowa succeed in becoming scientifically literate. We, as teachers, cannot do this alone.

I have had, along with many other teachers across the state, the support of the (ISTS) Iowa Science Teachers Section of the Iowa Academy of Science.

The next ISTS Fall Conference is fast approaching and we could use your assistance. On behalf of the Iowa Science Teaching Section of the Iowa Academy of Science, I am asking for your help. We need both individuals and businesses, large and small, for sponsors. Science education is extremely important to the future of Iowa and our nation. Excellence in Education has long been a cornerstone for our state; it is not accomplished alone and we all can play a bigger part. Adding to our list of cooperate donors is a priority of the ISTS. If you know of potential sponsors or would like to help out in someway, my contact information can be found below.

New to this year are four levels of giving, which are recognized in the Fall Conference Program. The levels of giving are:

**Newton!s Circle:** \$2000 or More  
**Curie!s Club:** \$1000 to \$1999  
**Darwin!s League:** \$500 to \$999  
**Galileo!s Group:** Under \$500

We are only as strong as the people we surround ourselves with! Together we can continue to make a difference for the future generations of Iowa.

Respectfully,

Joshua Michael Hanna, Cooperate Sponsor Coordinator  
Iowa Science Teachers Section of the Iowa Academy of Science  
[Sciencegeek24.7@gmail.com](mailto:Sciencegeek24.7@gmail.com) 563-508-5869

## Announcements

### • ISTS Fall Conference ABCs

- A – **Academy** - The conference is brought to you by the Iowa Teaching Section of the Iowa Academy of Science.
- B – **Breakfasts** are available for interest areas.
- C – Iowa!s **Children** are the beneficiaries when teachers have a chance for networking and professional development.
- D – **Door prizes** are generously given by the exhibitors. What will you win?
- E – **Exhibitors** from around the region and the U.S. are here.
- F – **Featured Speakers** in each session bring their expertise to you.

- G – **Great Ape Trust** is one of our featured speakers. **Geology Share-a-thon** is a chance for you to participate!
- H – **History** – Be a part of a long-standing tradition of science in Iowa.
- I – **Inquiry** is one of the session strands – **Iowa Core Curriculum** themes are session strands as well.
- J – **Journey to the Core** (the Iowa Core) is the Tuesday night keynote by Shannon Clde Baca.
- K – **Keynote** – The luncheon keynote speaker is Phil Plait, author of 7 Ways a Blackhole Can Kill You.
- L – **Luncheon** program includes good food, award winners and our keynote.
- M – **Manson Crater** is the topic of Ray Anderson, a featured speaker.
- N – **Networking** and **New Ideas** – two great reasons to attend.
- O – **OPPORTUNITIES in SCIENCE EDUCATION** - our conference theme.
- P – **Phil Plait**, author of 7 Ways a Blackhole Can Kill You will be signing autographs in the exhibition hall in the afternoon.
- Q – High **Quality** speakers!
- R – Opening **Reception** is our welcome to everyone at 9:00 PM Tuesday.
- S – **Science Center of Iowa** is sponsoring an open house on Tuesday evening.
- T – **Tuesday, October 27** is the start of the conference opportunities
- U – Visit the **Universe** at the Science Center of Iowa planetarium Tuesday
- V – **Value** is what you get at the Fall Conference – Two days of networking, presentations for lessons and learning, lunch, updates and more!
- W - **Wednesday, October 28** is the Fall Conference – be there!
- X – **eXcellent** opportunities to learn new lessons and connect with other science teachers.
- Y – **YOU!** are needed to participate in the ISTS Fall Conference.
- Z – **Zero** – what you get for not attending.

## Opportunities

### • Wet Prairies Workshops from eii

**Wet Prairies Workshops for Teachers and Naturalists from eii**  
*Iowa's Roadside Native Communities: Wet Prairies*

**Nov. 6-8, 2009 and Apr. 16-17, 2010 at Sleep Inn, Pleasant Hill, IA** (An eastern suburb of Des Moines.) OR --

**Feb. 5-7, 2010 and Apr. 30-May 1, 2010 at Sleep Inn, Mt. Vernon, IA**

Learn how to help your students explore and improve Iowa Wet Prairies.

The instructional unit coordinates with the Iowa Core Curriculum, K - 12.

The workshop is for primary through

community college teachers and naturalists. Participants receive two UNI graduate credits, materials, meals and housing for only \$198 due to

grants. For more information please visit <http://www.uni.edu/ceee/eii>. Request a paper brochure at [bollwinkel@uni.edu](mailto:bollwinkel@uni.edu), or call 319-273-2783.

## • [The Chemistry of Fire](#)

In 2008, the Society of Fire Protection Engineers (SFPE) partnered with Discovery Education to create a new in-school program entitled *The Chemistry of Fire*. A copy of this program was distributed to each high school in the United States and throughout New Zealand. The teachers who used this program found it to be very informative and a good tool to engage unmotivated students.

This interactive program includes a teacher's guide with five lesson plans, a DVD that demonstrates exciting experiments included in the lessons, a poster and a web site where teachers and students can find more classroom and career resources. The program is aligned to the National Science Teachers Association Standards for 9th - 12th grades. Free copies of this program are still available and can be obtained by contacting [chris@sfpe.org](mailto:chris@sfpe.org).

Chris Jelenewicz  
Engineering Program Manager, Society of Fire Protection Engineers  
301.718.2910 (ext 108)

## • [Free Unit on Conservation and Snow Leopards](#)

*Facing the Future*, in collaboration with the Snow Leopard Trust, has just released *Engaging Students in Conservation: Protecting the Endangered Snow Leopard*, an interdisciplinary 1-2 week unit that includes five dynamic lessons and culminates with a service learning project. The unit is designed for 5-8<sup>th</sup> grade students in science and social studies. Though the lessons are designed as a comprehensive unit, each lesson can stand alone.

This unit, valued at \$14.95, is available for **FREE** download at <http://www.facingthefuture.org/Home/CurriculumDetails/tabid/131/Default.aspx?ItemID=ESC>.

*Engaging Students in Conservation: Protecting the Endangered Snow Leopard* includes:

- Five hands-on lessons
- An introduction to snow leopards and their ecosystem

- An exploration of the human-wildlife conflicts that exist where people and snow leopards overlap
- Opportunities to develop 21<sup>st</sup> century skills such as critical thinking, collaboration, and global perspective
- An examination of community-based conservation
- A service learning project related to the protection of snow leopards in Mongolia and Kyrgyzstan

These lessons were developed and piloted by teachers and conservation experts including the Snow Leopard Trust, the world's leading authority on the study and protection of the endangered snow leopard.

## • Midwest Environmental Conference

The Environmental Education Association of Illinois is proud to announce registration is now open for the 2009 Midwest Environmental Education Conference, October 14-17, at the I Hotel and Conference Center, Champaign, Illinois!

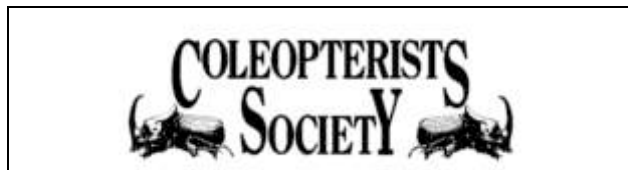
With over 80 Concurrent Sessions, 12 Workshops, 14 Field Sessions, 6 Field Excursions, a dynamic 4-

Speaker Presentation Lineup, a Local Foods EAT-Cology Evening event, plus a myriad of other events to network and connect with other environmental education professionals, this is one conference that promises to deliver!

Visit [www.EEAI.net](http://www.EEAI.net) today to take advantage of Early Bird Registration rates and to find complete conference information! The 2009 Midwest Environmental Education Conference is hosted by the Environmental Education Association of Illinois.

## • Coleopterists Society

### Youth Incentive Award



The Coleopterists Society, an international organization of professionals and hobbyists interested in the study of beetles, has established a program to recognize young people studying beetles. The Society has pledged to provide up to \$300 each year for the Youth Incentive Award Program. In addition to monetary grants of \$150, award recipients will receive up to \$200 (Junior Award)

and \$400 (Senior Award) of equipment credit from the BioQuip Products catalog, In addition to monetary grants of \$150, award recipients will receive a one year subscription to the society journal, *The Coleopterists Bulletin*.

**This is for children of grades 7-12 only.**

The objectives of the Youth Incentive Award are to:

- \* provide encouragement and assistance to young beetle enthusiasts (grades 7-12).
- \* promote the study of beetles, the most diverse group of insects, as a rewarding lifelong avocation or career.
- \* provide opportunities for young people to develop important life skills such as leadership, cooperation, communication, planning and conducting a scientific study, grant writing and managing funds.
- \* provide some financial support to enrich activities or projects.

A Youth Incentive Award Committee from the Coleopterists Society will evaluate the applications and will select up to two winners annually; one each in **junior (grades 7-9)** and **senior (grades 10-12)** categories. The selection committee invites proposals for topics such as field collecting trips to conduct beetle species inventories or diversity studies, attending workshops or visiting entomology or natural history museums for special training and projects on beetles, studying aspects of beetle biology, etc. The proposed activities or projects will be evaluated on their degree of creativity, educational benefit to the applicant, scientific merit, feasibility and budgetary planning. This Award is for proposals by individuals only. Each applicant is strongly encouraged to find an adult advisor (teacher, youth group leader, parent, etc.) to provide guidance in proposal development, but the proposal **MUST** be written by the applicant. The Coleopterists Society would also be happy to assist in establishing contacts between youth and professional Coleopterists.

Additional details and application forms for **The Coleopterists Society Youth Incentive Award Program** can be obtained from: Dr. David G. Furth; Entomology, NHB, MRC 165; P.O. Box 37012; Smithsonian Institution; Washington, D. C. 20013-7012 (phone: 202-633-0990, FAX: 202-786-2894, email: [furthd@si.edu](mailto:furthd@si.edu) ). Also check The Coleopterists Society WebPage: [http://www.coleopsoc.org/default.asp?Action=Show\\_SocietyInfo&ID=Youth](http://www.coleopsoc.org/default.asp?Action=Show_SocietyInfo&ID=Youth)

Applications for this year must be submitted by **15 November 2009**.

- **2009 POLYED Award**

We are now accepting applications for the 2009 Excellence in Polymer Education Award. This national award recognizes innovative and successful contributions to the integration of polymer chemistry into pre-college curricula. The winner must be currently **teaching high school** (grades 10-12) or **middle school** (grades 5-9) in a public or private school in the United States. POLYED is sponsored jointly by the Polymer Chemistry, and the Polymeric Materials: Science & Engineering Divisions of the American Chemical Society.

The national awardee receives a plaque, and a \$1000 honorarium. The award will be presented by an ACS member at the winner's school in the spring of 2010. The awardee also receives an expense paid trip to the Spring NSTA National Conference and will be paired with a Polymer Ambassador during the days in attendance.

The application form may be downloaded from the POLYED web site: [www.polyed.org](http://www.polyed.org). The deadline for applications is December 15, 2009.

- **Mathematics Day for High School Students**

Celebrate math with people who love math!  
Saturday, November 14, 2009  
9:30 – 1:00  
Carver Science Center, Simpson College  
Indianola, Iowa

High school students who perform well in mathematics will learn how mathematics connects to many fields and affords one many possible career tracts. They will learn how studying mathematics gives a competitive edge in today's world.

Participants will have the opportunity to meet current students and hear about their exploits and their career plans. They will have the opportunity to talk one on one with faculty, students, and alums in an informal setting, and be provided an excellent opportunity to find out what can be done with a mathematics degree and how mathematical training can make one a valued employee.

RSVP to Rick Spellerberg, Chair of Mathematics via e-mail by Monday November 9th. Lunch will be provided. E-mail: [rick.spellerberg@simpson.edu](mailto:rick.spellerberg@simpson.edu)

- **American Chemical Society Regional Meeting**



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The Midwest regional meeting of the American Chemical Society will be held October 21-24 in the Sheraton Hotel in downtown Iowa City. A special program has been included for high school chemistry teachers. The Saturday program (October 24<sup>th</sup>) includes hands-on experience with usable classroom demonstrations, an introduction to Process Oriented Guided Inquiry Learning (POGIL), and an awards luncheon at noon. A symposium on chemical education is offered on Friday with topics pertaining to teaching chemistry in college and high school. The meeting registration is \$25 for precollege teachers and the fee for the

Saturday luncheon is also \$25. Deadline for advanced registration is October 7<sup>th</sup>.

Twenty scholarships are available to high school chemistry teachers who are interested in attending the meeting beginning Friday afternoon and continuing through the luncheon on Saturday. Each scholarship will cover the costs of the meeting registration, the price of the Saturday luncheon, and up to \$110 to cover the cost of a substitute teacher for Friday. For participants living outside a 60 miles radius of Iowa City, the scholarship will include a room for Friday night at the Sheraton Hotel and a \$25 stipend to help defer travel expenses. These scholarships will be offered on a first-come-first-serve basis.

Please see the following website (<http://www.mwrm2009.org/home>) or contact either Michelle Wikner at [Wikner.Michelle@iccsd.k12.ia.us](mailto:Wikner.Michelle@iccsd.k12.ia.us) or Mark Arnold at [mark-arnold@uiowa.edu](mailto:mark-arnold@uiowa.edu) for more information.

- **American Physical Society**

PhysicsQuest is a middle school competition that consists of four physical science experiments centered on a mystery. The experiments are designed to be done by small groups in a classroom or after school setting. Each of the experiments gives students a clue that they need to solve the mystery. Classes

can submit their answers online and be entered into a random drawing for prizes. PhysicsQuest kits are provided free to registered classrooms.

The topic for PhysicsQuest:2009 is "SPECTRA The Original Laser Super Hero." The first 1000 classrooms to sign up for PhysicsQuest:2009 will receive a free classroom kit. Visit: [www.physicscentral.com/physicsquest](http://www.physicscentral.com/physicsquest) for more information and to register.

## • IMSEP Career Day

### **SAVE THE DATE – PLEASE NOTE THE CHANGE IN DATE AND LOCATION**

As part of our initiatives, Iowa Mathematics and Science Education Partnership (IMSEP) (<http://www.iowamathscience.org/>) will host a "Teaching Mathematics and Science in Community College" career day on October 27th from 9:30 to 4:00 pm at the Science Center of Iowa in Des Moines.

This workshop is for individuals majoring in biological sciences, engineering, physical sciences, and mathematics who may be considering a career as a college instructor. This workshop is offered to students from Iowa State University, the University of Iowa, and the University of Northern Iowa, as well as students from private and community colleges.

The workshop is free and lunch will be provided.

**Join us at the ISTS Fall Conference in conjunction with this event!!!**

Go to <http://ists.pls.uni.edu/> to register today!!

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## Book Review

This is our second issue with book reviews in the ISTS newsletter. I am claiming no expertise in the area of reviewer, but I do like to read and have resources for help at different levels. Please let me know of a book you want me to review or a review you would like to do. Traci Maxted [tmaxted@cr.k12.ia.us](mailto:tmaxted@cr.k12.ia.us)

### • A Woodland Counting Book

by Claudia McGehee

Starting with "one white oak" and "two luna moths" through "nine blue spotted salamanders" and "twenty gray treefrogs" this delightful picture book counts its way through a woodland community. The illustrator and author of A Woodland Counting Book is Claudia McGehee. She also has



written A Tallgrass Prairie Alphabet with the same style of illustrations. The illustrations are colorful works of art that are large enough to be seen when read out loud in class. These scratchboard illustrations, which look like woodcuts to me, include all “nineteen orchard orioles” for your child to count if you are reading one on one. Woodland notes at the end of the book discuss each of the species listed. These books are locally produced by The University of Iowa Press.

- **One Minute Mysteries – 65 Short Mysteries You Solve with Science** by Eric Yoder



Eric Yoder wrote One Minute Mysteries – 65 Short Mysteries You Solve with Science with his high school aged daughter Natalie as a contest between them. I found this book to have mixed reviews. The set up of the book is easy to use if you like to have a daily or weekly puzzle to challenge your students.

One page is a story that is the “set up” the next page has the rest of the story and the “answer”. That is fun if you want to challenge yourself.

Several of the middle school teachers that read the book really liked the puzzles, and the stories are written at an upper elementary to middle school level. However, I didn't get the sense that the science was at the same level as the reading. While many of the puzzles have beginning science answers, many others require tricks. Some puzzle solutions are beyond the background of an average 9th grader. If you are trying to engage the student that constantly watches the Discovery Channel, this book would be great. If you are using it for all your students, be sure to preview the entire story. The publisher is Science, Naturally!

## **Activity**

- **Iowa Weathering Lab**

*Here's a quick lab that I've adapted to use with my 9<sup>th</sup> graders to help them to understand the weathering and erosion effects of groundwater on Iowa's bedrock. You'll need a peppermint, spearmint, or sugar-free peppermint, one for each student, and a stop-watch. (My diabetic students appreciate the sugar-free option.) I have found the cheaper Great Value mints from Wal Mart work just as well as, if not better than, the Brach candies for this activity. (Other brands do not “crack” or “erode” as evenly and as quickly as Brach and Great Value brands.) During the testing time, I have the students read the portion in the text about groundwater. This*

lab makes for a quiet reading environment! ☺ Email me with any questions or concerns [dtibben@ames.k12.ia.us](mailto:dtibben@ames.k12.ia.us) .

Take care,  
De Anna Tibben, IAS-ISTS Chair

### “Cave-ities” - A Karst topography investigation activity

1. You will be using a peppermint, spearmint, or sugar-free peppermint candy today for the activity. Record which type of candy you are using today.
2. You will record your observations of the candy at 1 minute increments. Your task is to communicate your observations/data in a meaningful way. How will you do this? Share at your table group your ideas for the style/format, giving explanations +/- of each style/format. Once you have shared ideas, determine which style/format you will use and why you chose it over the others offered.
3. Record your information as you do the activity in the chosen style/format.
4. Answer these questions when done with the activity:

Q1. What did the candy in this activity represent?

Q2. What did your saliva in this activity represent?

Q3. How did the candy change from 0 minutes to 4 minutes?

Q4. What Karst landforms could these changes represent?

Q5. Compare your candy observations at 3 minutes to your table mates! observations.

Account for any differences.

5. BONUS: if you have any candy left after 5 minutes, predict how long it will take for your candy to completely dissolve. Test it...keep track of the time and let me know tomorrow if your prediction was correct!

### Q1. What did the candy in this lab represent?

Limestone bedrock (or dolostone – like limestone only more magnesium in its “recipe”)

Sedimentary rock is “glued” either clastic (pieces of other rock) or chemical (precipitates or evaporates) so it is “weaker” – more easily erodes/weathers.

### Q2. What did your saliva in this lab represent?

Groundwater

Chemical weathering – acids in saliva dissolve the candy just as minerals dissolved in groundwater dissolve the bedrock. (Remember from *Mysteries Underground* video we learned that the sulfur dissolved in the groundwater formed Lechuguilla cave system.)

Mechanical or Physical weathering – material carried by groundwater abrades or rubs against the bedrock; through friction, the material erodes the bedrock.

**Q3. How did the candy change from 0 minutes to 4 minutes?**

Answers should vary, but common themes are: smooth, wet, sticky, smaller, thinner, holes &/or cracks formed, color gone, white, thinning at edges, smell not as strong, candy dissolves faster after cracks/holes formed.

**Q4. What Karst landforms could these changes represent?**

caves, caverns, & sinkholes

(karst = a limestone landscape, characterized by caves, fissures, and underground streams.

## News

- **Science Nation Videos Released**

from *NSTA Express* June 22, 2009

The National Science Foundation (NSF) has released the first in a series of video programs called [Science Nation](#), which examine breakthroughs and the possibilities for new discoveries about our planet, our universe and ourselves.

The video series is being created for NSF by former senior science producers at CNN, including Peter Dykstra and Kate Tobin. Each program features a two-minute and five-minute version. To learn more or view the videos, see [http://www.nsf.gov/news/special\\_reports/science\\_nation/about.jsp](http://www.nsf.gov/news/special_reports/science_nation/about.jsp).

- **National Institute on Drug Abuse: Free Videos**



As the lead Federal Agency for research on substance abuse and addiction, the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health, has launched **FREE** education videos on the effects and risks associated with teen nicotine and steroid use, among other topics.

NIDA scientists Gaya Dowling, Ph.D. and Redonna Chandler, Ph.D. educate youth about the physiological affects of nicotine use, especially the long-term

consequences that nicotine use has on the brain. NIDA scientist Ruben Baler, Ph.D., engages teens with a **FREE** short video about the physiological effects of steroid use, especially the consequences for human development and teen hormone levels. These videos are part of a new video-education series provided by NIDA on the *NIDA for Teens* Web site, <http://teens.drugabuse.gov/index.php>.

## • **Science Educators + IMSEP = Success for Iowa**

Science learners in Jason Dayton's Dowling High School science classroom will be seeing the relevance of chemistry this year thanks to a partnership forged between Kemin Industries and other business partners, and the **Iowa Mathematics & Science Education Partnership**. One of twenty-seven separate programs launched last year to support teachers in delivering 21<sup>st</sup> century science to students, Jason's involvement in *Real World Externships for Teachers* has paid off in a number of ways. "I think we should teach kids skills they can use in a work environment and increase their employability," said Jason after a summer's full time work identifying novel compounds for Kemin. Other IMSEP-funded programs support science enrichment, summer camps, professional development, and curriculum design. They can be viewed at <http://www.iowamathscience.org/competitivegrants.shtml>.

Launched in 2008 as a collaborative effort of UNI, ISU, and UI in affiliation with the Department of Education, numerous AEAs, K-12 school districts, businesses, and other education stakeholders, IMSEP aspires to three goals:

1. To improve mathematics and science performance of Iowa students.
2. To prepare more high quality mathematics and science teachers for Iowa's schools.
3. To promote statewide collaboration and cooperation.

Governed by an inter-university Executive Board of faculty and administrators in the STEM education fields, IMSEP supports four core programs in addition to an Institute from which competitive grants emanate. Principal among core programs is ***I-Teach Mathematics & Science***, a comprehensive recruitment project combining the efforts of preliminary partners UNI, ISU, NIACC, and Hawkeye Community College. ***Project Lead The Way, Community College STEM Instructor Preparation***, and of course, ***Real World Externships for Teachers of Math and Science*** round out core efforts. Other functions of the Institute include reports (e.g., "Women and Minorities in STEM Programs At Iowa's Public Universities"), Summits (e.g., Iowa Math and Science Teacher Educators Summit), and marketing

(e.g., “Who knew math and science could be so cool?” campaign posters and public service announcements). These activities and more round out the IMSEP initiative, which unites hundreds of experts from throughout

the state in the common cause of math and science excellence for Iowa. For details on the programs named above, or to contact the Institute team at UNI, log on to our website: [www.iowamathscience.org](http://www.iowamathscience.org).

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**At Right: Dan Payne, Waterloo West High School teacher, spent the summer in Allen Hospital's emergency room conducting lean inventorying analysis to save the hospital money, and to learn some practical applications that he can take back to his classroom.**



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## • **An Essay....**

**Writing a good test is more difficult than taking one!**  
**By Marcy Seavey**

I recently participated in an ATLAST Item Writing Workshop for Math-Science Partnership (MSP) Grant PIs facilitated by Horizon Research. The purpose of the workshop was to give MSP partners direct experience with assessment development using research based principles. I found the workshop extremely enlightening and hope that some of the principles below can assist you in writing your next test. Four major guiding principles introduced were:

- Clarifying the science content to be assessed – identifying the individual benchmarks or standards, breaking these down into smallest assessable piece of information (sub-idea) and identify relevant common student misconceptions.
- Limiting each item to one sub-idea (for precision, coverage and to reduce cognitive load) Reducing the cognitive load helps to prevent a student who understands the concept from getting the item wrong because they misunderstand the question.
- The Necessity Principle – The knowledge in the sub-idea should be required to answer the item correctly.

- The Sufficiency Principle – The knowledge of the sub-idea is ALL that is required to answer the item correctly.

The Necessity and Sufficiency Principles help to prevent students from getting a question right or wrong based upon other knowledge or experiences. Horizon Research provided the middle school question below as an example of a question which does not meet the necessity principle. It was designed to test the sub-idea: Flow of Matter and Energy in Living Systems: Plants transform light energy into chemical energy in sugars made by plants.

Which one of the following energy transformations happens in a plant?

- a) Light energy is transformed into chemical energy.
- b) Heat energy is transformed into chemical energy.
- c) Heat energy is transformed into motion energy.
- d) Motion energy is transformed into heat energy.

Any student who knows that plants need light, will likely select A as the correct answer regardless of whether or not he has knowledge of energy transformations. The student can get the question correct for the wrong reason, thus it breaks the necessity principle.

The workshop also provided some guidance on writing questions which address today's "test-wise" students. For example, students are taught to avoid answers with strong qualifiers (all, always, never). All other aspects of the answers being equal a test-wise student will not select the one answer that has a strong qualifier. The suggestion was to avoid using strong qualifiers or if the correct answer is "all A are B" to mirror the use of the strong qualifier in the other answers.

The highlight of the workshop was interviewing a middle school student about our own test questions – a standard part of the Horizon Research assessment development process and an extremely humbling and enlightening experience!

For additional information: The workshop facilitators Melanie Taylor and Sean Smith published an article outlining the basics of item writing in Science Scope (*How do you know if they're getting it? Writing assessment items that reveal student understanding*. Taylor & Smith. Science Scope. January, 2009. pp. 60-64).

## • [News from The Space Place at NASA](#)

### 1. [NASA Space Place Now on Facebook](#)

For those of you with Facebook pages, we just created a page for NASA's Space

Place Web site, <http://spaceplace.nasa.gov>. The Space Place is an extensive, content-rich Web site for upper elementary age kids, their teachers, parents, and anyone else who likes a simple, readable, fun presentation of a wide range of space and Earth science and technology topics. Most of the site is great for kids to explore on their own, with interactive games, hands-on projects, and fun facts. But it also has lots of stuff for teachers. Teachers especially appreciate the bi-monthly Space Place Newsletter for educators, which has lots of suggestions for how to use the resources of this Web site in the classroom. See the "Teacher's Corner" at <http://spaceplace.nasa.gov/en/educators>.

Check out “**NASA!s The Space Place**” new page on Facebook, where you will also find exclusive content only for our Facebook fans! Become a fan, and we'll also let you know whenever we add a new game, animation, cartoon “talk show,” fun fact, or any other interesting stuff. It's a great way to explore space!

## **2. Test Your Infrared Memory Game**

No human can see infrared light. But the question is, can you think in infrared? Give your visual memory a workout with a few rounds of the Spitzer Infrared Concentration game at The Space Place. Click on tiles in a grid to find matches of striking and colorful infrared images of galaxies, nebulae, and renderings of other solar systems. Start with a 3x3 grid and work your way up to a 9x6 grid<if you can! All the images have short captions so you can better marvel at what you are seeing. Focus your brain at <http://spaceplace.nasa.gov/en/kids/spitzer/concentration>.

## **3. Space Place Newsletter**

We have just published our latest issue of a bi-monthly newsletter for formal and informal educators. The newsletter is all about the many useful and--it goes without saying--free resources on The Space Place website that can be helpful to classroom and home school teachers, after-school program directors, museum and library program directors, and other informal educators.

Find the .pdf version of the two-page newsletter at <http://spaceplace.nasa.gov/en/educators>. We hope you and your colleagues find the newsletter and <http://spaceplace.nasa.gov> helpful.

## **4. SARSAT to the Rescue**

If a plane crashes in the woods and nobody hears it, does it make a sound? Never mind contemplating this scenario as a philosophical riddle. This can be a real life or death question. And the answer most of the time is that, even if no people are nearby, something is indeed listening high above. That something is a

network of satellites orbiting about 450 miles overhead. The "sound" they hear isn't the crash itself, but a distress signal from a radio beacon carried by many modern ships, aircraft, and even individual people venturing into remote wildernesses.

In the last 25 years, more than 25,000 lives have been saved using the satellite response system called Search and Rescue Satellite-aided Tracking (SARSAT). So what are these life-saving superhero satellites? Why they are mild-mannered weather satellites. "These satellites do double duty," says Mickey Fitzmaurice, a National Oceanic and Atmospheric Administration (NOAA) systems engineer for SARSAT. "Their primary purpose is to gather continuous weather data, of course. But while they're up there, they might as well be listening for distress signals too."

In February, NASA launched the newest Polar-orbiting Operational Environmental Satellites (or POES) into orbit. This new satellite, called N-Prime at launch and now dubbed NOAA-19, prevents a gap in this satellite network as another, aging NOAA satellite reached the end of its operational life. "The launch of N-Prime was a big deal for us," Fitzmaurice says. With N-Prime/NOAA-19 in place, there are now six satellites in this network. Amongst them, they pass over every place on Earth, on average, about once an hour. To pinpoint the location of an injured explorer, a sinking ship, or a downed plane, POES use the same Doppler effect that causes a car horn to sound higher-pitched when the car is moving toward you than it sounds after it passes by.

In a similar way, POES "hear" a higher frequency when they're moving toward the source of the distress signal, and a lower frequency when they've already passed overhead. It takes only three distress-signal bursts < each about 50 seconds apart < to determine the source's location. Complementing the POES are the Geostationary Operational Environmental Satellites (GOES), which, besides providing weather data, continuously monitor the Western Hemisphere for distress signals. Since their geostationary orbit leaves them motionless with respect to Earth below, there is no Doppler effect to pinpoint location. However, they do provide near instantaneous notification of distress signals.

In the future, the network will be expanded by putting receivers on new Global Positioning System (GPS) satellites. Fitzmaurice says. "We want to be able to locate you after just one burst." With GPS, GOES will also be able to provide the location of the transmitter.

Philosophers beware: SARSAT is making "silent crashes" a thing of the past. Download a two-page summary of NOAA-19 at [www.osd.noaa.gov/POES/NOAA-NP\\_Fact\\_Sheet.pdf](http://www.osd.noaa.gov/POES/NOAA-NP_Fact_Sheet.pdf). The Space Place gives kids a chance to rescue stranded skiers using their emergency rescue beacons.

The Wild Weather Adventure game awaits them at [spaceplace.nasa.gov/en/kids/goes/wwa](http://spaceplace.nasa.gov/en/kids/goes/wwa).

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## [Iowa Science Teaching Section Information:](#)

### **Iowa Academy of Science Mission:**

- **Promote scientific research and its dissemination**
- **Improve instruction in the sciences**
- **Promote public understanding of science**
- **Recognize excellence in science and science teaching**

**Check out past issues of the ISTS newsletter at:**

<http://ists.pls.uni.edu/newsletters/index.html>.

**Your ISTS Leadership Team can be found at:**

<http://ists.pls.uni.edu/officers.html>.

(We are always looking for good people. Send an e-mail to [dtibben@ames.k12.ia.us](mailto:dtibben@ames.k12.ia.us) if you wish to be more involved.)

### **Invitation to improve/contribute to this newsletter:**

How best can this newsletter serve you? Do you have something to contribute for the good of the ISTS membership? Zing a line at [nweirather@central-lee.k12.ia.us](mailto:nweirather@central-lee.k12.ia.us) or [dtibben@ames.k12.ia.us](mailto:dtibben@ames.k12.ia.us).