



ISTS

The Iowa Science Teachers' Section of the Iowa Academy of Science advocates for excellence in science education by promoting professionalism, influencing policy, and enhancing learning.

Nadine Weirather, editor

September, 2012

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Iowa Academy of Science Mission

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

ISTS Leadership

Your Leadership team can be found at <http://ists.pls.uni.edu/officers.html>



Message From Fall Conference Chair

As the 2012 ISTS Fall Conference chair, I would like to encourage you to attend the 2012 Iowa Science Teachers Fall Conference. The conference title is [Our Students, Our Future: The Social Responsibility to Effectively Teach Science.](#)

I would like for all of us to take a moment and reflect on why we teach science. In an ever changing world, a quality science education is becoming a requirement to compete in industry, decipher public policy, and provide guidance in addressing global changes. As science teachers, we must strive to find places where we

can keep up to date on teaching practices and new scientific information. Luckily for all of us we have such a venue in the ISTS Fall Conference. This year's conference promises to be full of quality speakers and engaging breakout sessions. If you haven't registered, go to <http://www.iacad.org/ists/index.html> and check out the pre-program.

Please consider joining us for our awards dinner Monday night or an interest breakfast Tuesday morning. I would like to thank all of the hard working people who make this event possible, and I hope to see you and your colleagues in October.

--Adam Puderbaugh
Conference Chair

From Our Chair...

Happy Fall Greetings to you! It is hard for me to believe we are beginning the 2012-13 school year! It seems like both yesterday and forever ago that I began my teaching career. The style of textbooks, technology, strategies, class sizes, time for planning, and paperwork required have certainly changed over the years. Even the science content and curriculum demands have put pressures on this veteran teacher! The "art of teaching" is very dynamic. How can we keep up? Help!

Well... one resource that I KNOW will provide ANY teacher with IDEAS, and SKILLS, and HELP, and NETWORKING is the 2012 IAS-ISTS Fall Conference! See YOU there!

--De Anna Tibben



Next Generation Science Standards Update

by Marcy Seavey, IAS

If you were able to participate in the May 11 to June 1 public review of the *Next Generation Science Standards Draft* (NGSS), then you have seen that the new standards vary from the *National Science Education Standards and Benchmarks for Learning* in structure, content, scope, sequence, and coordination. In the 20+ years since the publication of *Science for All Americans*, we have learned much about teaching and learning. In that same time science and technology has changed. NGSS reflects our gains in knowledge and the ever changing environment within which we teach.

The authors of the NGSS Draft make good on several of the challenges set forth in the *Framework for K-12 Science Education*. These include:

- placing the disciplinary core ideas into a scope and sequence that is supported by current educational research
- integrating engineering practices and content into the standards
- making the practices of science (science as inquiry; how science is done) inseparable from the disciplinary core ideas (content areas; what science knows)
- provide connections between science classroom activities and common core standards for other subjects

The structure of the new standards may immediately be identified as the most drastic difference between past standards and NGSS. The standards are organized by grade level and disciplinary core idea. For example, 4.LCT is 4th Grade, Life Cycles and Traits. This organization provides the new sequence for the content of the standards. Under each standard title are a series of related standards written as *performance expectations* (PE). Each performance expectation combines at least one **science and engineering practice** and **crosscutting concept** with a single concept from the **disciplinary core idea** into one statement of what the student will do to demonstrate what they have learned. The performance expectations are what will be assessed. Here is an example of one of the May 2012 draft performance expectations for 4.LCT:

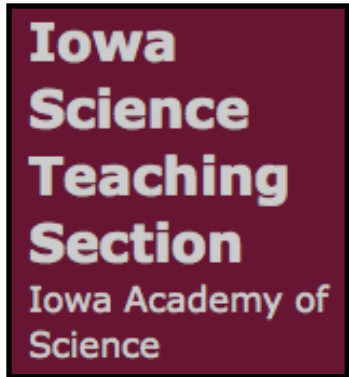
e. **Use evidence** to describe patterns of variation in a trait across individuals of the same kind of organism.

Using evidence is the practice. Describe patterns is the crosscutting concept and being able to identify that there are variation in traits among individuals is the core idea. The performance expectations are backed up with documentation about each PE's scope (italic *clarification statements* and *assessment boundaries*). **Foundation Boxes** match the performance objectives back to the *Framework for K-12 Science Education*. A **Connections Box** provides alignment (coordination) between the performance expectations and all other NGSS and Common Core standards.

Learn more: NSTA is presenting a series of eight web seminars on the practices described in *The Framework for K-12 Science Education*. The web seminars are offered free of charge and are designed so that participants can attend just one or all eight sessions. They will run from 5:30-7:00 pm Central Time every other Tuesday starting on Tuesday, September 11.

For more information and to register go to http://learningcenter.nsta.org/products/symposia_seminars/Ngss/webseminar.aspx

Participate in the next public review – late this fall or early winter. Watch for ISTS Announcements related to NGSS!



Register Today For Our ISTS Fall Conference!!

**Our Students, Our Future
The Social Responsibility to
Effectively Teach Science**

www.iacad.org/ists

Monday October 15th, 2012 at
4:00-9:00pm Reiman Gardens, Ames
and

Tuesday October 16th, 2012 at
Scheman Center, ISU Campus,
Ames.

Advance program with detailed
session descriptions, hotel
information and more available online!

**Tuesday Keynote:
Beaks, The Beagle and other
Historical Misconceptions
about Evolution and its Nature
William F. McComas**

Evolution is the most important concept in modern biology but is also one of the most misunderstood both from a scientific and historical perspective. This illustrated talk will focus on the key aspects of evolution by natural selection, widely held misconceptions regarding the nature of evolution itself, the role of the Galapagos Islands in the discovery of organic evolution, the impact of the finches on Darwin's thinking, and the fascinating parallel discovery of natural selection by Alfred Russel Wallace.

The photographs illustrating this talk are the result of visits to the Galapagos Islands and Down House,

Darwin's home outside of London. The article on which this talk is based, *The Discovery and Nature of Evolution by Natural Selection: Misconceptions and Lessons from the History of Science (American Biology Teacher)* won the Distinguished Achievement Award from the Association of Educational Publishers.

William F. McComas, Ph.D. is the inaugural holder of the Parks Family Endowed Professorship in Science Education at the University of Arkansas following a career as a biology teacher in suburban Philadelphia and professorship at University of Southern California.

**Monday Night October 15,
Activities at Reiman Gardens,
Ames**

4:00-5:45 Registration Desk Open at Reiman Gardens

4:30-5:30 A Guided Tour of Reiman Gardens— Portions of tour will be outside, weather permitting

5:30-6:30 PAEMST Recognition Dinner— Join IAS and the Department of Education in congratulating Iowa's 2011 Presidential Award for Excellence in Mathematics and Science Teaching Winner—Jody Stone

6:30 Social time! Make connections and renew friendships!

7:00 Iowa Governor's STEM Advisory Council—Update Dr. Jeff Weld

8:00 Experience and develop your own star party! Mini hands-on workshop!

8:30-9:00 Iowa Science Teaching Section Chair's Reception - Join ISTS Chair De Anna Tibben, Conference Chair Adam Puderbaugh, and Vice Chair Eric Hall and your fellow educators for refreshments and conversation.

Tuesday October 16, Scheman Center, ISU Ames

- Interest Area Breakfasts
- Exhibit Hall
- Concurrent Sessions
- Keynote Speaker
- Door Prizes
- Network with colleagues from across the state and region



Dr. Jody Stone
Malcolm Price Lab School
PAEMST Winner



Prepare for NGSS at the ISTS Fall Conference!

The ISTS Fall Conference provides an excellent opportunity for Iowa science educators to network, including initiating conversations about NGSS.

Here are a few (by far not all!) sessions with connections to NGSS:

- Elementary Teachers have a special opportunity to discuss Science Writing Heuristic in a small group setting with Dr. Mark McDermott during the Elementary Education Breakfast.
- Featured speakers Lynne Campbell and Melissa Hesner will lead a hands-on look at Iowa Core connections / connections to conceptual framework & Next Generation Science Standards (NGSS) in sessions 1-3. These sessions will use life science as the context but present strategies transferable to all Core Idea areas. Attend one or all three sessions.
- Anna Broer of Drake University will present a concurrent session on “Teaching 2 Things At Once: Content & Nature of Science”
- Join John Weis, NASA education specialist, during Monday night’s social hour or the Earth and Space Science breakfast to discuss engineering and design processes.
- Featured Speaker, Joanne Olson will present “Engineering in the Science Standards: Opportunities and a Cautionary Note” during concurrent session 5.

Meet Eric Hall, ISTS Chair-Elect

I am a classroom science teacher and department leader at Hoover High School in Des Moines. I have taught grade levels 9-12, and have worked with an academically and culturally diverse student body in my 17 years of teaching. I also work as a professional development coordinator for Iowa State University. In this capacity, I have the opportunity to work with a talented group of middle and high school science teachers from around the state. During my time at ISU, I facilitate PD for these science teachers as part of their summer research experience.

I have also spent several summers in a research lab at ISU working on projects ranging from zincfinger endonuclease creation to developing production guidelines for biochar. These varied experiences have fostered an interest in what it means to “think like a scientist”, and – more importantly – how to develop these skills in our students. Recent department and ISU program work has focused on the integration of these scientific thinking skills along with other critical thinking skills into meaningful experiences for students in science. How many times have we heard that we’re “supposed to produce critical thinkers and problem solvers”? But, few people articulate what that looks like in a classroom. I’m working toward coming up with those descriptions and ideas.

As a president of ISTS, I hope to build on the work already done by those talented individuals who have supported Iowa’s science teachers through ISTS before me. Sustaining the success of our yearly fall conference, continuing to expand the

presence of science in elementary classrooms, and creating a new awareness for ISTS are at the top of my “to-do” list. We have an amazing organization that has a lot to offer. Getting that message out to science teachers across the state and asking they become active members is crucial to our continuing success. I look forward to the challenge, and hope to serve you well.

--Eric Hall, ISTS Chair Elect

ACT Reports on College and Career Readiness for Class of 2012

The annual *ACT 2012 Condition of College and Career Readiness* reports little change in college readiness in English, mathematics, reading and science for the 2012 cohort of tested students (over half [52 percent] of all 2012 high school graduates), but more students are prepared specifically in the subject areas of math and science.

According to ACT, the percentages of graduates who met or surpassed the ACT benchmarks in mathematics and science each rose for the third straight year in 2012 with 46 percent of ACT-tested graduates achieving the benchmark in math, and 31 percent achieving the benchmark in science.

Using the ACT College Readiness Benchmarks and ACT® test scores, the Condition of College & Career Readiness reports provide national and state snapshots of college readiness of the graduating seniors of the class of 2012 who took the ACT in high school.

from NSTA Express, August 27, 2012

Fulbright Opportunities

The U.S. Department of State's Bureau of Educational and Cultural Affairs offers Fulbright grants for U.S. primary and secondary classroom teachers, guidance counselors, curriculum specialists, curriculum heads, Talented and Gifted coordinators, Special Education coordinators and media specialists/librarians to participate in international exchanges during the 2013-2014 academic year through the [Fulbright Classroom Teacher Exchange Program](#) (CTE) and the [Distinguished Fulbright Awards in Teaching Program](#) (DA).

Teachers gain new skills, learn new instruction and assessment methodologies and share best practices with international colleagues and students.

Teachers may apply for the CTE Program for one of six countries: the **Czech Republic, France, Hungary, India, Mexico** and the **United Kingdom**. Teachers may apply for the DA Program for one of eight countries: **Argentina, Finland, India, Mexico, Morocco, Singapore, South Africa** and the **United Kingdom**.

The **application deadline** for the CTE Program is **October 15, 2012**. The **application deadline** for the DA program is **December 15, 2012**.

Teachers interested in applying to the CTE program can find more information here: <http://www.fulbrightteacherexchange.org/application-te2>.

Teachers interested in applying to the DA program can find more information here: <http://www.fulbrightteacherexchange.org/application->

eCybermission

Need one more incentive to teach STEM skills in your classroom?

Check out NSTA's eCYBERMISSION Competition: <https://www.ecybermission.com>. This challenge, sponsored by the U.S. Army and administered by NSTA, is a free, web-based, science, technology, engineering, and mathematics (STEM) competition for students in grades six through nine.

eCYBERMISSION challenges teams of students to identify a problem in their community and use the scientific method, scientific inquiry, or engineering design process to find a solution. The top winning teams can receive up to \$8,000 in U.S. EE Savings Bonds. Sign up your team by the early registration deadline of October 15 and receive a free STEM kit for your team.

AESP Webinar Series

Next installments coming September 20th, 25th and 29th

Join our specialists for webinars highlighting NASA Resources that you can use in your education activities.

On September 20 (5-6PM Eastern), Anne Weiss will show you how to use NEON's most important feature, the interest groups, and then role-play several scenarios where NEON's various tools can be utilized to find NASA standards-aligned activities that satisfy your state-specific teaching standards.

On September 25 (4-5 PM Eastern and again at 7-8PM Eastern), Susan Kohler will demonstrate a problem-based learning (PBL) activity that identifies the requirements for life and serves as a bridge to speculate on the possibilities of life (possibly

microbial life) on other planets in our solar system.

On September 29, (4:30-5:30PM Eastern), Anne Weiss will introduce participants to the thinking behind NEON's development, as well as how to utilize basic features of this online professional learning community.

FOR THE MOST CURRENT NEON WEBINAR INFO. & DATES, CLICK <http://neon.psu.edu/webinars/>.

Click [here](#) to join the conversation (log on as a "Guest").

Conduct Authentic Astronomical Research

NASA/IPAC Teacher Archive Research Program (NITARP) is Seeking Educators to Conduct Authentic Astronomical Research for 2012-2013 Academic Year

Successful candidates are partnered with a professional astronomer for an original research project. The goal is for teachers to integrate their research experiences into their classrooms. Applications are due September 21st. Click http://coolcosmos.ipac.caltech.edu/cosmic_classroom/teacher_research/ for more information and to apply.

2012 Humans in Space Art Competition

This international competition invites students ages 10-18 to express their ideas about the future of human space exploration through visual, literary, musical or digital art. Click <http://www.lpi.usra.edu/humansinspaceart/> for more information. Submissions are due October 21, 2012.

Population Education

The September 2012 issue of The Population Educator is now available on-line at www.populationeducation.org. Click on "Free Newsletter for Teachers" to download the PDF file.

In this issue, we announce our second World of 7 Billion student video PSA contest! The contest is back by popular demand for the 2012-2013 school year, information and details are included in the newsletter. Also in this issue: information on updates to our curricula, and a documentary review. As always, you will find new resources and an activity to use in your classroom, as well as a list of conferences where we will be presenting.

Lauren Carlson
Population Connection
www.populationeducation.org

Space Place App

Space Place Prime, a new app, gathers some of the best web offerings from NASA.

Space Place Prime targets a multigenerational audience. Kids, teachers, parents, space enthusiasts, and everyone in between will find fascinating features on this new, free NASA app. Find it in the Apple Store. <http://spaceplace.nasa.gov/ios>

HHMI Holiday Lecture Series

The 2012 HHMI (Howard Hughes Medical Institute) Holiday Lecture Series on Science is free and includes **Changing Planet: Past, Present, Future**.

Guides for the lecture include Andrew H. Knoll, PhD, Harvard University; Naomi Oreskes, Ph.D. University of California, San Diego; and Daniel P. Schrag, PhD. Harvard University.

More Information and to sign up: www.holidaylectures.org

Live Webcast: November 15 & 16
9:30 A.M. ET with re-cast at 10:00 A.M. PT

On-demand Webcast after Nov. 20th.
Free on DVD, Spring 2013 at caralog.hhmi.org

Environmental Issues Instruction (eii)

Environmental Issues Instruction (eii) is offering two professional development opportunities for teachers this academic year. The theme is Wildlife of Prairie Roadsides. Teachers will experience a plethora of instructional activities to assist them in teaching an interdisciplinary unit to their students. All activities are aligned with standards in the Common Core and Iowa Core as well as the 7 Cross-Cutting Concepts of the Framework for K-12 Science Education.

Teachers from Pre-K-12 in all content areas are invited to participate in this graduate level course. For a registration fee of \$198 the teachers will receive: two graduate credits from UIU, a myriad of materials to teach the unit, and lodging and food. Grants from REAP-CEP and LRTF make these workshops possible. Dates and locations are:

Pleasant Hill Sleep Inn—Nov. 2-4, 2012 and April 5-6, 2013

Mt. Vernon Sleep Inn--- February 15-17, 2013 and April 26-27, 2013

You may register on our website: <http://www.uiu.edu/eii>

Energy Workshop for K-12

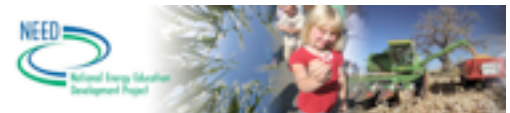
Phillips 66 and the National Energy Education Development (NEED) Project have partnered to provide teachers with energy professional development opportunities and to provide engaging and exciting energy curriculum for students in today's classrooms.

The 2012 Energy Education Workshop will be held on Tuesday, October 30, 2012, from 8:00 AM - 3:30 PM. It will be at the Iowa Space Grant Consortium Extension 4-H Building in Ames, IA.

Thanks to the sponsorship of Phillips 66, there is no cost to attend the workshop. Breakfast, lunch, and substitute reimbursement are included. Substitute reimbursement forms are provided at the workshop.

Participation in this workshop provides educators with a **FREE NEED Science of Energy Kit** designed to teach the concepts of force, motion, light, sound, heat, electricity, magnetism, and energy transformations through hands-on activities.

Go to <http://www.regonline.com/builder/site/Default.aspx?EventID=1057026> to register or for more information.





Beetle Study Award

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. Each of the two awards (Junior and Senior) is a monetary grant of \$150, award recipients also will receive up to \$200 (Junior Award) and \$400 (Senior Award) of equipment credit from the [BioQuip Products, Inc.](#) catalog. In addition to monetary and BioQuip grants, 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 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.

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). Also check The Coleopterists Society WebPage: http://www.coleopsoc.org/default.asp?Action=Show_SocietyInfo&ID=Youth

Applications for this year must be submitted by **1 November 2012**.

Chemistry Webinar

The National Science Teachers Association (NSTA) and the American Chemical Society (ACS) invite middle school teachers from around the country for a free web seminar on middle school chemistry. It is the third in a series of six web seminars covering each of the six chapters in the free middle school science teaching resource www.middleschoolchemistry.com. The seminar, which takes place on October 4, is hosted by the NSTA Learning Center and covers basic concepts related to density.

The seminar will focus on student activities and molecular animations related to density that are immediately usable in the classroom and easily integrated into the existing curriculum.

Find out more and register for this free web seminar at: http://learningcenter.nsta.org/products/symposia_seminars/ACS/webseminar13.aspx.

The American Chemical Society is a non-profit scientific society with a mission of improving science education.

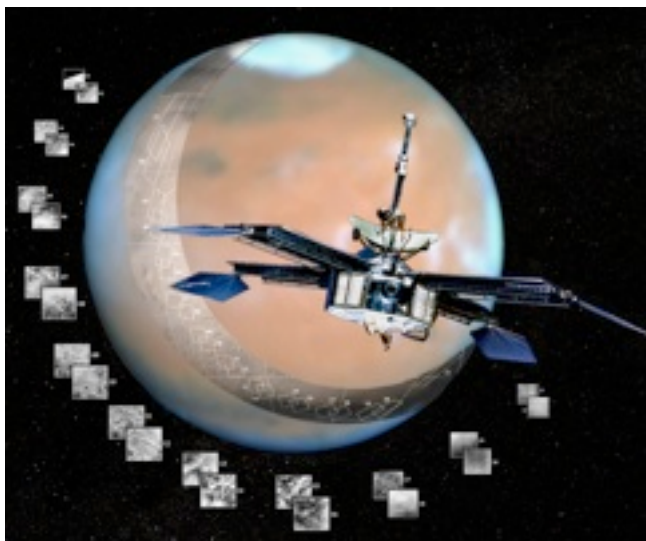
Siemens We Can Change the World Challenge

The Siemens We Can Change the World Challenge, the premier national environmental sustainability competition for grades K–12, is now accepting applications for the 2012–2013 program. Through project-based learning, students learn about science and conservation while gaining 21st-century skills. Educators can access a wealth of free digital tools to help integrate the Challenge into their curriculum. At stake is more than \$300,000 in prizes, including scholarships, savings bonds, school grants, adventure trips, school assemblies, and more.



2012: 2nd Place, Iowa City Junior High
“Compost Happens”

The deadline for all entries is March 5, 2013. Finalists and winners will then be announced in April 2013. For more information on the Siemens We Can Change the World Challenge, visit www.wecanchange.com or www.facebook.com/wecanchange.



Doing Science With a Spacecraft's Signal

by David Doody

Mariner 2 to Venus, the first interplanetary flight, was launched August 27 fifty years ago. This was a time when scientists were first learning that Venus might not harbor jungles under its thick atmosphere after all. A Russian scientist had discovered that atmosphere during the rare Venus transit of 1761, because of the effects of sunlight from behind.

Mariner 2 proved interplanetary flight was possible, and our ability to take close-up images of other planets would be richly rewarding in scientific return. But it also meant we could use the spacecraft itself as a “light” source, planting it behind an object of our choosing and making direct measurements.

Mariner 4 did the first occultation experiment of this sort when it passed behind Mars as seen from Earth in July 1965. But, instead of visible light from the Sun, this occultation

experiment used the spacecraft's approximately 2-GHz radio signal.

The Mariner 4 experiment revealed Mars' thin atmosphere. Since then, successful radio science occultation experiments have been conducted at every planet and many large moons. And another one is on schedule to investigate Pluto and its companion Charon, when the New Horizons spacecraft flies by in July 2015. Also, during that flyby, a different kind of radio science occultation experiment will investigate the gravitational field.

The most recent radio science occultation experiment took place September 2, 2012, when the Cassini spacecraft carried its three transmitters behind Saturn. These three different frequencies are all kept precisely “in tune” with one another, based on a reference frequency sent from Earth. Compared to observations of the free space for calibration just before ingress to occultation, the experiment makes it possible to tease out a wide

variety of components in Saturn's ionosphere and atmosphere.

Occultation experiments comprise only one of many categories of radio science experiments. Others include tests of General Relativity, studying the solar corona, mapping gravity fields, determining mass, and more. They all rely on NASA's Deep Space Network to capture the signals, which are then archived and studied.

Find out more about spacecraft science experiments in “Basics of Space Flight,” a website and book by this author, <http://jpl.nasa.gov/basics>. Kids can learn all about NASA's Deep Space Network by playing the “Uplink-Downlink” game at <http://spaceplace.nasa.gov/dsn-game>.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.