SPECTRUM

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The Journal of the Illinois Science Teachers Association

In this Issue:

Plan Ahead:
ISTA Conference 2009 - November 12-14, 2009

Spectrum

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Volume 34, Number 3

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Send submissions and inquiries to the editor. Articles should be directed to individual area focus editors (see next page and *write for the SPECTRUM information).*

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Cover photo - Black-eyed Susan, courtesy of James Brinson. See the article "From Cocktail to Ultraviolet Map: The Many Facets of the Hairy Coneflower" on pages 18-19.

SPECTRUM

The Journal of the Illinois Science Teachers Association

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Greetings Fellow ISTA Members!

I hope you're all having a good year. Many of us are experiencing an increasing number of challenges in the classroom. ISTA is here to help! This issue of the *Spectrum* offers new ideas for all of us. Be sure and check them out. Make plans now to attend next fall's conference. It will once again be held in Peoria on November 13th and 14th, 2009. Our conferences offer members a chance to pick up new ideas for the classroom, time to visit our fabulous vendors and check out new products, network with other teachers, curriculum specialists, administrators, and others, and buy ISTA shirts and NSTA Press books at the NSTA Store. We also have a social event on Friday evening so that we can all relax!

ISTA will soon be offering you the option of renewing online. We also plan on having online registration for our next conference. Our next election will have electronic ballots. We are also planning some online surveys of our membership so that we can more adequately plan for the future.

We want you to get more involved in your organization. Contact your regional directors and let them know what you'd like from ISTA. Sign up to be on the listserv. This is a great way to communicate with other teachers of science in the state. We applaud your commitment to our professional organization and we look to your guidance as we continue to plan for the future.

I have enjoyed my term as ISTA president. Thank you for the suggestions and comments you have offered to me. A hearty thank you goes out to the entire ISTA board. You're an amazing group of dedicated professionals! Please join me in welcoming the new president, Gwen Pollock. I know she'll do a fabulous job!

Best wishes,

Jill

2007-09 ISTA Executive Committee

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Join the ISTA listserve to Network Online!

ISTA encourages all of its members to join the list serve of our organization. News of timely value and networking opportunities are posted regularly. Safeguards have been incorporated to protect you from unneccessary electronic intrusions. Please send Harry Hendrickson (hrhendrickson@comcast.net) a simple note with your email in the body of the note and the wording on the subject line: please add me to the ISTA list serve.

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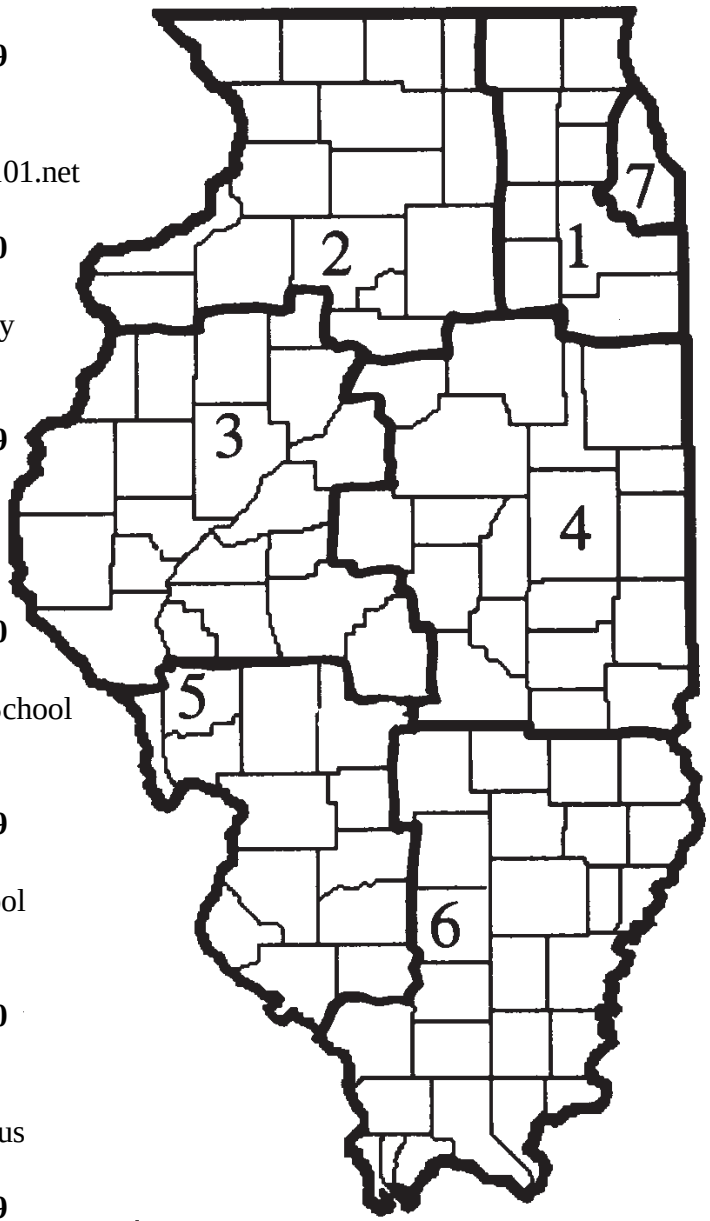

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dnedelson@cps.k12.il.us

http://www.ista-il.org/

Illinois Science Teachers Association

2009 Membership Application

Please print or type and fill-out complete form

_____	_____
Name	Day Phone
_____	_____
Affiliation (School or Organization)	Home Phone
_____	_____
Address of Above Organization	Home Address
_____	_____
City, State, Zip Code	City, State, Zip Code
_____	_____
Email and/or Fax	County in Illinois/ ISTA Region (see map)

Check Applicable Categories in Each Column

O Elementary Level
O Middle Level
O Secondary Level
O Community College
O College/University
O Industry/Business/ Government
O Other_____

O Elementary Sciences
O Life Science/Biology
O Physical Sciences
O Environmental Science
O Earth Science/Geology
O Chemistry
O Physics
O General Science
O Integrated Science
O Other_____

O Teacher
O Administrator
O Coordinator
O Librarian
O Student
O Retired

Send form and check or money order, made payable to Illinois Science Teachers Association, to: Sherry Duncan (email: sjduncan08@comcast.net), ISTA Membership, PO Box 295, Urbana, IL 61801.

Membership Option (see below)_____ FFSEMembership Yes/No _____ Amount Enclosed _____

ISTA Membership Categories

Option 1: Full membership dues - $35.00. Full membership entitles individuals to the following benefits: a one year subscription to the *Spectrum*; inclusion in the members-only ISTA-TALK listserv; notification of regional conferences and meetings; voting privileges; and the opportunity to hold an ISTA officer position.

Option 2: Two-year full membership dues - $60.00. Two-year full membership entitles member to full membership benefits for two years.

Option 3: Five-year full membership dues - $125.00. Five-year full membership entitles member to full member benefits for five years.

Option 4: Associate membership dues - $15.00. For full-time students and individuals who are on retirement status. Entitles member to full menbership benefits, with the exception of the opportunity to run for office.

Option 5: Institutional membership - $75.00. Institutional membership entitles the member institution, for a period of one year, to two subscriptions to the *Spectrum*; notification of regional conferences and meetings, and a reduced registration fee for the annual ISTA conference for a maximum of three members of the institution.

Fermilab Friends for Science Education (FFSE): Thanks to an ISTA-FFSE board agreement, for Options 1, 4, and 5, teachers may receive a regular $10 membership in the FFSE for an additional $4.
See http://ed.fnal.gov/ffse/ for membership details.

ISTA / ExxonMobil Outstanding Teacher of Science Awards Program

The Illinois Science Teachers Association with the generous support of ExxonMobil announces the 2008 - 2009 ISTA / ExxonMobil Outstanding Teacher of Science Awards Program. Applications will be accepted from K – 8 teachers of science who have demonstrated extraordinary accomplishment in the field of science teaching. These accomplishments are intended to be something that goes beyond the classroom and enriches the lives of students. Examples include personal or community-wide achievement which is science related (grants for the school, working on environmental projects, and so forth). It could be working with other teachers or community members to develop a product or process related to science education. It could also be the creation of a science group at the school which enriches and extends beyond the school day.

The 2008 – 2009 program consists of seven one thousand dollar prizes. One $1000 award will be presented to one K – 8 teacher of science from each of the seven ISTA regions in the state of Illinois.

The awards are intended to recognize extraordinary accomplishment in the field of science teaching. Applicants must provide evidence that demonstrates accomplishments that go beyond normal classroom teaching.

Criteria for consideration include:

1. Current ISTA membership
2. Full time teaching assignment
3. Teaching assignment in the ISTA region for which application is submitted
4. Written narrative (maximum of 500 words) describing the teacher's extraordinary accomplishments in the field of science teaching
5. Evidence that supports the teacher's description of extraordinary accomplishments in the field of science teaching
6. Two letters of support from individuals who can attest to the impact of the extraordinary accomplishments in the field of science teaching
7. A completed application form with required supplementary materials submitted by March 6, 2009 to:

Tara McDonald
ISTA Awards Chair
Sixth Grade Science, Minooka Intermediate School
305 Church Street,
Minooka, IL 60447
email: taracmcdonald@gmail.com

Winners will be notified by April 15, 2009.

For more information contact Tara McDonald at taracmcdonald@gmail.com

ISTA/ExxonMobil Outstanding Teacher of Science
Awards Application Form
Application Due Date March 6, 2009

ISTA Region:_____

Name:_____

Position (grade and subject taught):_____

School Name/Address:_____

_____

School Phone Number:_____

Email address:_____

Home Address:_____

_____

Home Phone Number:_____

I hold 2009 calendar year membership in ISTA: _____

I certify that the information provided in this award application is true and accurate.

Signed:_____ Date: _____
(Applicant)

ISTA New Teacher of the Year Award Application

Applications due June 30, 2009

Purpose: The goal of this award is to recognize "new" teachers for their excellence in facilitating science learning in their classes. This award is to encourage some of the bright, up-in-coming teachers to continue to strive to be the best teachers that they can be.

Requirements:

- Must be a teacher with their initial certification
- Encouraged to be a member of ISTA (either student or teacher category)
- Must be nominated by an ISTA member teacher or school administrator
- Currently teaching in the field of science (can be teaching science in an elementary setting)
- Completed nomination form and biography highlighting innovative teaching experiences, exemplary service, and trend setting practices in the field of science
- This is a one-time award per awardee

Name of Nominee:_____

School: _____

School Address: _____

Home Address:_____

Home Phone:_____ email address: _____

Current Teaching Assignment: _____

Year Teaching (circle one): 1st 2nd 3rd 4th

Include all colleges attended, degrees obtained, and list the year in which the degree was obtained.

Attach a brief narrative about the nominee. Include any pertinent background experience, innovative teaching styles and lessons, extracurricular involvement, unique attributes, staff, student, and community rapport which make the nominee an up and coming star science teacher.

Nominated by: _____

School: _____ **ISTA Region**: _____

Send Applications To: **Troy J. Simpson**
Glenn Raymond School
101 W. Mulberry St., Watseka, IL 60970
email: tsimpson@watseka-u9.k12.il.us

Winners will be notified in September, 2009.

2008 ISTA Conference Vendors

Amsco School Publishers
Bedford, Freeman, and Worth/ W.H. Freeman
Carolina Biological Supply
CommGraphics Interactive
CPO Science
Cross bow Water
Delta Education/FOSS
Discovery World
Eastern Illinois University
EMC Publishing
Environmental Education Association of Illinois
Fermi National Accelerator Laboratory
Fisher Science Education-Fisher Scientific
Flinn Scientific, Inc.
Fotodyne, Inc.
Fox Tales, International
Frey Scientific
Glencoe Publishers
Grace Education Resources
Holt McDougal
Illinois Agriculture in the Classrrom
Illinois Association of Aggregate Producers
IL Dept. of Commerce and Economic Opportunity Office of Coal Development
Illinois Destination ImagiNation
Illinois Department of Natural Resources
Illinois Environmental Health Association
Illinois Environmental Protection Agency
Illinois Mathematics and Science Academy
Illinois Petroleum Resources Board
Illinois State Museum
Illinois Water Environmental Association
Its About Time - Herff Jones
John G. Shedd Aquarium
LAB-AIDS, Inc.
Lakeview Museum of Arts and Sciences
Loose in the Lab
Microtech
Museum of Science and Industry
National Science Teachers Association
Northern Illinois University - STEM Outreach Program
Science Companion
Science Kit and Boreal Laboratories
Pasco Scientific
Pearson/Scott Foresman Publishing
Riverside Scientific
Science Companion
Smithsoniam Books
The Scope Shoppe, Inc.
Texas Instruments
Vernier Software and Technology

ISTA Shirts For Sale!

ISTA has polo shirts and denim shirts for sale. The shirts are blue, with the ISTA logo; ISTA is red and the State of Illinois outline is in white.

Indicate style, size, and number:

Polo Shirt	Women's	Men's	S - XL cost $22;	XXL costs $24
Denim Shirt	Unisex		S - XL cost $24;	XXL costs $26

shipping and handling: add $4 for 1-4 shirts
add $6 for 5-12 shirts

Make checks out to ISTA and mail to: Lynne Hubert
4243 W. Lee St., Skokie, IL 60076

2008 ISTA Conference

Conference participants enjoyed our pillars of science - Charles Darwin, Abe Lincoln, Marie Curie, and Galileo.
Conference photographs courtesy of Larry McPheron.

Conference Committees

Be sure to thank these great ISTA members who volunteered many hours to make our 2008 science education conference a huge success!

Conference Chair:	**Harry Hendrickson**
Program:	Donna Engel
Gala:	Julie Gianessi
Volunteers:	Colleen Martin
Promotions:	Karen Zuckerman
Publications:	Judy Scheppler
Photography:	Kristi Van Hoveln
	Larry McPheron
	Carl Koch
Vendors:	Gwen Pollock
Digital Presentations:	Kendra Carroll
NSTA Store:	Sherry Spurlock
ISTA/BaP Exhibit:	MaryLou Lipscomb
Pre-registration:	Sherry Duncan

Conference Volunteers

Thanks to all of the volunteers listed below, who joined us during the days - and evenings - of the conference to make sure that all of the events, registrations, sessions, and the exhibit hall ran smoothly.

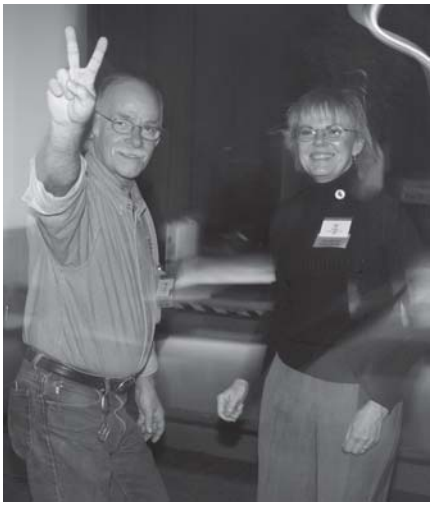
David Abendroth
Cammy Abendroth
Kendra Carroll
Bob Carter
Jill Carter
John Clark
Donna Engel
Tom Foster
John Giffen
Ashley Hendricks
Harry Hendrickson
Laverne Logan
Coleen Martin
Jim Martin
Tiffany Olson
Ann Pastucha
Gwen Pollock
Judy Scheppler
Linda Shadwick
Troy Simpson
Lori Vallas
Paul Wilson

ISTA President Jill Carter presents a certificate of appreciation to Pat Schlinder and the Scope Shoppe for many sustained years of supporting ISTA.

Troy Simposn and Jill Carter present new teacher awards at the conference luncheon.

John Giffen, John Clark, and David Abendroth kick back and enjoy the Friday night gala.

Tom Foster explores new demonstratations for the classroom in the conference exhibit hall.



Treasurer Bob Carter and President Jill Carter take time to relax and enjoy the band, food, friends, and conversation at the ISTA conference gala - always a big hit!

A Future in Science

Starts Now!

ISTA Conference Door Prize Donations

One of the highlights of the ISTA conference is always the door prize drawings that follow our annual general membership meeting. This year, conference vendors and other ISTA science teacher supporters donated a huge number of door prizes. From water bottles to microscopes, books to gift certificates, microscopes to software packages, very few attendees walked away empty-handed from our Saturday meeting. Please thank the following companies, organizations, institutions, and individuals for their generous gifts.

Bedford, Freeman, and Worth
Delta Education
Destination Imagination
Eastern Illinois University
Fermi National Accelerator Laboratory
Fisher Science
Flinn/Scope Shoppe
Forsyth ISAWWA
Fotodyne
Fox Tales
Grace Educational Resources
Illinois State Museum
Illinois Assoc. of Aggregate Producers
Illinois Petroleum Resources Board
Joe's Crab Shack
Museum of Science and Industry
Pasco
Science Weekly
Scope Shoppe
Smithsonium
Sun Foundation
Wheaton Scientific

Conference vendors took time to meet the pillars of science.

Secretary Kendra and President Jill jive with the band at the gala.

Participants took full advantage of conference exhibits and presentations.

Member Notes

ISTA's New Column!

We'd like to keep you informed of news from ISTA members, so we have started a new column. Please send us your news. The column will be divided into these segments:

- Marriages
- Births
- Deaths
- Announcements - What are you PROUD OF!!!
- Retirements
- Promotions

Please include these items:

Marriages

- Names (only one person must be a current ISTA member)
- Date of ceremony

Births

- Names of parents (only one parent must be a current ISTA member)
- Date
- First name of baby (if desired) and gender

Deaths

- Name of deceased (individual could be a current ISTA member *or* was a member prior to retirement)
- Date

Announcements

- Name of individual (must be a current ISTA member)
- Include a brief summary of the announcement. This could be an item about a new job, a new position, an award or grant received, a retirement, or other professional announcement.

Please send all information to Julie Gianessi at schimm_julie@yahoo.com. Please write "Member Notes" in the subject line so I know the message is not spam. I look forward to your submissions.

Julie Gianessi: schimm_julie@yahoo.com

Building a Presence For Science
Mary Lou Lipscomb
BaP Illinois State Coordinator

The Building a Presence for Science (BaP) meeting at the ISTA Annual Conference was quite well attended this year. Participants learned about BaP and were able to sign on as points of contact for their school. Most of the attendees won great door prizes donated by the following BaP state partners:

Fermilab
Flinn Scientific
Illinois Department of Natural Resources
Illinois State Museum
LabAids, Inc.
Northern Illinois University STEM Outreach Initiative
Science Kit and Boreal Laboratories.

Building a Presence for Science is an electronic network initiated by the National Science Teachers Association and implemented in Illinois by ISTA to foster communication, collaboration, and leadership among science educators. All members of the BaP Illinois network receive monthly issues of a national eblast from NSTA and the Illinois eblast, *Network News*, which contain information about professional development opportunities, opportunities for your students, and information about science teaching resources.

If you have not been receiving these email newsletters, but you are a member of the network, check your SPAM folder and/or check with the technology staff in your district. Because the mailings are sent in bulk, many districts' spam filters will not allow the email to get through to the intended recipients. In addition, many schools or districts have changed the email addresses of all or some employees; if that is the case, you must update your contact information on the BaP website (www.bap.nsta.org). If you do not remember your login and/or password, please contact the Illinois state coordinator (lipscomb@imsa.edu), with a brief message of your need; include your full name and the school at which you teach.

The BaP network is growing in Illinois and if you are not member, you are encouraged to participate. Our ultimate goal is to have a point of contact in every school in Illinois. Points of contact are seen as communicators, leaders, and advocates for standards-based science education. For more information about BaP-Illinois go to www.ista-il.org and click on the link for Building a Presence for Science. When you visit the BaP Illinois web page be sure to check out our state partners. BaP partners support quality science education for all. Many of the partners have direct links to their web sites.

Any organization or institution interested in being a part of the Building a Presence for Science network in Illinois is invited to check out the opportunities and responsibilities of BaP state partnership by going to www.ista-il.org and clicking on the link to Building a Presence for Science in Illinois and then state partners. Contact the state coordinator (lipscomb@imsa.edu) for more information.

Teacher to Teacher

Educators Share Information, Lessons, and Tips

Mary Lou Lipscomb

Professional development for an educator involves more than going to workshops or taking course work. It includes all of the ways teachers learn how to perfect their skills as educators. As lifelong learners, teachers accumulate a wide variety of knowledge and skills that can be used to create ideas, activities, or entire units. Whether used to spark or maintain interest, keep things moving, or help students understand a concept in a way that is unique or different, sharing these ideas, activities, or units with colleagues provides professional development opportunities for all involved.

In this issue, four teachers have sent classroom management tips or lessons that they have successfully implemented. Although suggested by middle school and high school teachers, the ideas might also be implemented in upper elementary classrooms.

A sincere "Thank You" to the teachers for sharing their ideas.

Forming Groups for Discussion or Activities

Alexis Liakakos, a biology teacher at Maine South High School in Park Ridge, writes that although her students have assigned seats and lab partners, they meet with different groups and partners frequently for brief discussions or for entire class periods to work on an activity. In order to form the groups quickly and efficiently, Alexis has created several different stacks of note cards with different themes and grouping numbers (pairs, threes, or fours). The theme of one stack might be *Big Ten Teams* and students find their group of three by matching the name of the school, the school colors, and the mascot. Another theme could be Disney movies and the groups might consist of the movie title and the names of the main characters. Alexis keeps the different stacks of cards for the various groupings handy so they are ready when she needs them. She says, "It's a great way to get your students up and moving and is an awesome ice breaker for students who might not otherwise talk with each other."

Incorporating Environmental Education Activities

Jennifer Kinley, a sixth, seventh, and eighth grade teacher and BaP point of contact at Hadley Junior High School in Glen Ellyn, writes that teachers can incorporate environmental education in their classrooms and school by using what she calls "filler" activities. Some of these activities might include:

- making a poster about "Ways to Recycle;"
- creating book markers to be given to librarians that spread "green" messages to library patrons;
- decorating a large bin to be placed outside the classroom door for collection of old/mismatched gym shoes (soles of shoes are used for playground turfs and making basketballs);
- writing school announcements regarding recycling used batteries in all science classrooms;
- distributing blue bins to all classrooms for paper, plastic, glass, and cardboard recycling;
- making a Power Point slideshow of environmental trivia questions to be shared with the school during homeroom times;

- taking the class outside for school grounds litter clean-up;
- making sculptures from all recycled materials;
- conducting recycling duties throughout the school by emptying blue recycling bins from all classrooms one time per week (different students are assigned the duty on different days);
- posting signs in the cafeteria encouraging students to use reusable cloth lunch bags instead of paper sacks;
- peer teaching on mini-topics that students researched such as, "What is global warming?" "What are rain barrels?" "What in the world is recyclable?"
- offering students the opportunity to write articles for a school-wide environmental newsletter that spreads the knowledge about "going green" to members of the district's community.

Connecting Science with Language Arts

Liz Charlton, a sixth grade teacher and BaP point of contact at Spring Avenue School in La Grange writes, "To combine language arts and atmospheric lessons in science, my teaching partner and I had the students create cinquain poems (two syllables, four syllables, six syllables, eight syllables, two syllables) about the atmosphere and the weather unit we were doing. For example,

Cirrus
Form really high
Look feathery and thin
Do not result in rain or storms
Thin clouds

By Riley

"The students were instructed to have a theme (focused idea) and use as many science terms or descriptors as possible. As I looked around the room, it was fun to see the students counting on their fingers as they figured out the syllables. I was amazed at how many of them not only had fun with this, but were also creative, and it honestly helped them to learn the science content in a different, effective manner!"

Fungus of the Month

Ann Trent, a seventh grade life science teacher and BaP point of contact at Iroquois West Middle School in Onarga writes, "I have found that finding high interest activities for studying the fungi kingdom can be challenging. We seem to reach that unit in the middle of winter when it is not conducive to outdoor exploration. I have tried growing mushrooms in the classroom, but the aromas drove the other teachers to revolt. A fellow teacher told me about Dr. Tom Volk's Fungi website. I have used his ideas and adapted them to the middle school level and to the concepts that I want to teach the students."

The students go to Tom Volk's Fungi web page at http://TomVolkFungi.net and are encouraged to look around and see what they can find! There are many pictures and descriptions of the fungi.

The assignment is to check out the varieties of the "Fungus of the Month" for their birthday month and select one. They will have several choices for that month, since Professor Volk started the "Fungus of the Month" in January of 1997.

After reading about the chosen fungus, the students each prepare an electronic paper to tell about the fungus they chose. The paper includes the following:

1. Month and year of the fungus chosen
2. Common and scientific name of the Fungus of the Month for the birthday month
3. Where does this fungus live? (range and habitat)
4. What is the food source for this fungus?
5. Is the fungus a saprophyte or parasite? How do you know?
6. Give at least two interesting facts about this fungus.
7. Copy and paste a picture of your fungus at the bottom of the page.

Ann likes this activity because it is fun, takes only one class period, and incorporates technology skills.

+++++

If you have lab or classroom management hints, great websites you have used, science activities, lessons, or demos that you have found to be effective with your students, please send them to me electronically at lipscomb@imsa.edu .

Articles

From Cocktail to Ultraviolet Map: The Many Facets of the Hairy Coneflower

James R. Brinson and Kasie L. Brinson

Ivy Tech Community College, Terre Haute, Indiana

The Black-eyed Susan is a common wildflower native to North America.

So, what do you get when you mix two parts Bourbon, one part citrus vodka, three parts sweet and sour mix, one part orange juice, and garnish it with an orange slice and a cocktail cherry? A Black-eyed Susan, of course!

Besides being the official mixed drink of the Preakness Stakes horse race, the Black-eyed Susan (*Rudbeckia hirta*) is a common wildflower that is native to North America, tracing its origins to the plains and meadows of the Midwest. It made its way to New York by at least 1856 (Clute, 1944), and it is the state flower of Maryland. It seems to have traveled to the Northeast United States due to the clearing of forests during early colonization, possibly being transported either purposefully as an ornamental or else as a contaminant in transported seed (Foote, 2002). It is found in Europe as well, apparently having been brought over from North America; it was reported in Britain by 1714 (Coats, 1973), which, interestingly, is well before *R. hirta* actually made it to Northeastern North America!

R. hirta is a member of the genus known as *coneflowers*, and one of its common English names is actually *hairy coneflower* (Miller, 1884). *Hirta* is Latin for *hairy,* and is attributed to the Black-eyed Susan on account of its fuzzy leaves and stem. Carolus Linnaeus classified *R. hirta* in 1753 (Fernald and Schubert, 1948) as part of the *Rudbeckia* genus that he named in honor of his botany professor Olof Rudbeck at the University of Uppsala (Blunt, 1971).

A mature Black-eyed Susan is usually around one to three feet tall, with a dark purple or brown cone-shaped disk in the center of the flower, from which radiate orange-yellow rays that usually range from 1-1.5 inches long (Gleason and Cronquist, 1991). Research suggests that this species does not self-fertilize (East, 1940; Abrahamson and McCrea, 1977), although the certainty of this obligate out-crossing remains inconclusive. An interesting trait of these plants is a characteristic known as *sensitive stamens,* in which the anther tube retracts upon being tactilely stimulated by visiting insects (Small, 1917). In doing so, some of the pollen is swept off by and remains stuck to the stylar brush to be presented to the pollinator.

The Black-eyed Susan has an "invisible" map on the surface of its flowers due to the UV absorption of the flower rays.

Perhaps the most interesting evolutionary discovery related to *R. hirta* is how the flower caters to the visible spectrum of insects, which, unlike humans, shifts down to include ultraviolet (UV) wavelengths (Mulligan and Kevan, 1973). An interesting experiment utilizing a UV sensitive video camera showed that the Black-eyed Susan actually has an "invisible" map on the surface of its flowers due to the UV absorbing bases of the flower rays (Eisner et al., 1969). Rather than the yellow-orange flower with the dark center as seen in the accompanying picture (seen on the cover), a bee sees three concentric rings on the flower head—light-yellow ray tips, darker yellow UV-absorbing ray bases, and a central black disk (McCrea and Levy, 1983). In other words, a bee sees a three-ringed bull's-eye in which the rings darken as they approach the center!

References

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Podcasts: Getting More Classroom Time to Teach

Richard A. NeSmith

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In many of his teacher seminars, Harry Wong often joked that he taught middle school students part-time. He would then proceed to say that if you know young teenagers, then you would know why he only taught part-time. Many middle school teachers can relate to Dr. Wong's satire, for it seems that we actually get fewer minutes in the classroom to teach now than ever before in the profession. With announcements, attendance, tardy students arriving, absentees, absentees returning, and the talking and confusion that can easily occur with preadolescence, one wonders how we ever get the lesson off the runway and into the air. This is a serious problem in many schools, and research suggests that *on-task* time is the vital component, indicator, and correlate of student achievement. Wise is the teacher who has streamlined their attendance-taking, procedure-run classroom. But there may be more ways of getting more class time and more valuable one-on-one and small group instruction bolused into one's lesson simply by providing your digital students with a few out-of-class tools that most of them, if not all, already own and utilize outside the class (Melville, 2008).

We previously asked whether technology has already transformed our classes and our schools (NeSmith, 2008). It has…or at least it should have...and whether it has or not, the technology is already an inseparable part of our students' lives. The digital generation is anything but squeamish when it comes to technology. There is now a great deal of "chatter" in the educational journals, specialty education magazines, and in some educational circles about how technology will change education. With the current financial recession, how we spend already cut budget monies is a grave concern. There is one thing you can count on during the next few years…and that is that your budget is going to shrink and that your class size is going to grow. With such changes, we need to plan now how we are going to adjust…and how we are going to provide each student with the opportunity to learn. Technology may not be the silver bullet but it can be utilized in a more productive manner than is being done presently. And, the integration of technology into the curriculum is more likely to improve the educational experience than to simply ignore it as though it is not relevant to education (Muir, 2006). Elearning was being well utilized by 2006, but we are now seeing another change with the growth of what is being called mlearning (mobile learning). Podcast, first coined in 2004 (by Adam Curry, a video MTV jockey), seems to be at the base for this innovative refinement (Jardin, 2005).

Your budget is going to shrink ... your class size is going to grow

In posing a means of increasing one's actual time available in a given class for instructional purposes, why not utilize some of the technology that our students have so enthusiastically embraced, for instance podcasts (Kajder, 2008; Poole, 2005)? Some middle school teachers have caught the vision for podcasts and how they might utilize this medium for the good of their students and the teaching of lessons. Realizing that podcasts are simply short audio or video presentations recorded in digital format that can be accessed on most computers and

Technology can be utilized in a more productive manner than is being done presently.

miniature players often referred to as iPods™, Zunes™, or other simple MP3 players. Podcasts can even be played on cell phones! One of the advantages of using podcasts includes the ability to have these automatically disseminated to subscribers as they are made available using technology referred to as RSS (acronym for really simple syndication). Students could, as is their practice, sign up for a podcast which interests them and have those automatically downloaded and made available on their computer, iPod, or cell phone, which they listen to or view at their convenience. Podcasts can be shared through numerous means, such as Facebook, Myspace, Blogger, Livejournal, and emails. Having said that, it is conceivable that a science teacher could begin to accumulate an array of podcasts presentations which students could subscribe to, and, which students would utilize as part of the classroom experience. Now, before anyone begins the fallout that all students do not have access to such technology…survey your students. Ask! Keep in mind that mp3 players can now be obtained from as low as $15-$20 each.[1]

Ways Podcasts Could Add to Class Time

There are several ways that the use of podcasts could benefit a science teacher's lesson. First, the teacher, students, or teacher-student collaborative effort could produce podcast snippets over various aspects of science lessons. It is conceivable that one could go through the classroom textbook and extract what might be the most important aspects that are typically addressed in a class session. These could be constructed in various modes to help students (creativity here is unlimited…as podcasts are not held to any one means of communicating its message). These could be recorded and saved on a server such as iTunes[2], MabryOnline[3], The Education Podcast Network[4], or even to a webpage server, such as PodcastAlley, or even one's own homepage.[5] Creating one's own podcast is not nearly as time-consuming as one might think; and like anything else, after creating a few, it becomes easier.

In Podcasting in Education: A New Way to Inspire, Apple™ explained that, "Podcasting allows educators to take their students beyond traditional assignments by allowing them to include voice recordings, photos, movies, and sound effects to share their knowledge. For example, students can draft and perform scripts as a writing assignment, create a visual progress report for an ongoing project, or submit a recorded version of a science presentation (2008, n.p.)."

Self-made podcasts are not as difficult as most technological immigrants might believe. Ratcliff (2008) suggests that it usually takes most people two or three podcasts to get fully comfortable with the process. Student-created podcasts can be a valuable learning experience and process that would also be archived for future students (Deubel, 2007; Focus, n.d., Kajder, 2008; Villano, 2008).

The most difficult aspect of creating a podcast is not using the technology, but being creative. From personal experience, thinking of creative ways to present the material is far more time-consuming and demanding than producing the mp3 podcast. This, too, comes with time and practice. Often keeping an idea pad nearby to record one's inspirational ideas when they occur will be very helpful for the teacher when time to create useful podcasts.

If, however, you are just not the motivated, dedicated technology enthusiast and you rebel at

the idea of creating your own podcast (which is the most advantageous way for any teacher to control the content and provide the emphases on what you believe to be the most vital), then one could exercise another option, such as locating what others have already created about your subject area content. The time one might spend in creating a podcast is simply a trade off to time needed in searching for excellent podcast presentations, as there are thousands available…but one must be selective and locate the best and most useful ones. Content and presentation are paramount (Deubel, 2007).

Williams (2007, pp. 44-49) suggested ten questions the teacher should pose when evaluating podcast for the classroom. These are:

- Is the content appropriate for your area of study?
- Does the podcast add to or enhance your current lesson plan?
- Does the content and production of the podcast meet school and community standards for acceptable use in your school?
- Is the content of the podcast well organized and easy to follow?
- Is the content of the podcast compelling enough to hold the attention of your audience?
- Is the podcast in a digital format that works for your classroom?
- Was the podcast produced by a source you consider credible?
- Is listening to the podcast the best method of learning about this topic for your students?
- Is the podcast supported by additional online content (such as a website with further resources or archives)?
- Does the podcast include any usage rights that limit the broadcast or distribution of content?

Williams provides a useful rubric for evaluating podcast on pages 50-51 in his book, Educator's Podcast Guide. Bell (2007) also provides a useful and easy to use podcast rubric. There are free podcast "channels," like Podbean, as well as those charging a fee, such as Podfeed.net.[6] Once identified, these could be placed on one's personal webpage, school website (Deubel, 2007), simply listed as hyperlinks which would connect one to iTunes or a similar podcast server.

Characteristics of Good Podcasts

If creating your own…and you should try this at least a few times before deciding against making your own…there are a few do's and don'ts one will want to keep in mind. First, and foremost, podcasts are to be short! They are not feature length lectures and if you create them as such you will not be able to get students to listen to them and they will not be useful. Secondly, they are to be unique. Richardson (2009, p. 111) suggested that one can

A podcast should complement the class lesson to provide the teacher with more time in the classroom to teach, interact, converse one-on-one, and to facilitate learning.

Students' minds are already rewired for using technology on a daily basis.

learn what makes a good podcast by taking the time to listen to a few shows. This is highly recommended as doing so is an education in "broadcasting."

It is said that Sony judges of podcasts note the following regarding good podcast presentations:

- Has "pace and energy"
- Captures "the intimacy of internet radio"
- Fits a niche
- Displays first-class techniques
- Has an "intelligent and witty tone"[7]

The first and last characteristic of good podcasts are probably the most important ones…length and tone. Buster Ratcliff, creator of MuseumPods and Creative Commons, has some excellent suggestions in his, "What makes a good podcast."[8] The most effective podcasts will tend to be short (8 to 10 minutes in length), snappy, preppy, or unique in means of presentation. These should not simply be homework assignments but have some vital connection with what is being taught in the class. If done properly, the homework assignment actually complements the class lesson in such a way as to provide the teacher with more time in the classroom to teach, interact, converse one-on-one, and to facilitate learning. Like homework, it should be assessed and students should be accountable for it. Someone is probably thinking, "How can I convince students to use the podcasts?" If the teacher constructs (or find such constructed) podcasts that are useful, interesting, and grabs students' attention, then you will not have to convince them of anything. Keep in mind that most adolescent and pre-adolescents are already using this media. What one has to do is to produce podcasts (or find a great collection of productions) that students will want to listen to, then make these vital to not just freeing up more class time, but in freeing you up to work more one-on-one and in small groups, and to lead students in achieving the best that they can do to master the learning outcomes. Students will not be accountable if you do not include feedback in the incorporation of podcasts. The combination of interesting podcasts, and knowing that these are part of classroom lessons, will have students listening to your podcasts repeatedly. Making them accountable and providing ample follow-up and feedback will not only enhance your class discussions but will create a learning environment where students are not bored by the over use of lectures and PowerPoint presentations in class. The ramifications for remediation are apparent.

Podcasts and Science

Middle school students, like none before them, are digitally-inclined (digital natives). Most already possess the hardware…and their minds are already rewired for using this technology on a daily basis. Science teachers could greatly benefit in planning to utilize this technology to enhance their lessons and to improve the classroom learning experience. Williams observed that, "Whether you are a science teacher or looking for interdisciplinary activities to incorporate across the curriculum, science podcasts are a great way to strengthen your activities. There are many more podcasts available for science teachers than most of the other curriculum areas in both audio and video formats. You'll find everything from the usual suspects like NASA and *Scientific American* to the classroom teacher who's sharing tips and techniques" (2006, p. 115).

A simple Google search will turn up hundreds of sites specializing in podcast of various science topics and all of their sub-disciplines. In just the few already mentioned, Podfeed.net, which has a designated section for middle school students, presently includes 172 podcasts on science; alone.[9] Podbean.com[10] offers 274 science-related podcasts for all ages; and the Education Podcast Network includes 107 science-related podcasts (including student and class podcasts).[11]

What Research Says About the Use of Podcasts

Is middle school too early an age for the utilization of podcasts for classroom purposes? This may simply be pre-training for even more future technological practices as high schools and universities move forward in utilizing Web 2.0 tools. The Millennial Generation has moved quickly in their adapting to daily use of technology for its mobility. Rhea Kelly, editor of *Campus Technology* points out that the present trend in higher education is that of *lecture capture* (2008). She stated, "Today's students demand anytime, anywhere access to content on the web—any content" (p. 6). She further explained that this demand for asynchronous delivery is by students ages 12 to 29. The use of podcasts for student use can facilitate organization and "delivery of information tailored to users' individual preferences and learning styles" (Harris & Park, 2008, p. 549), as well as to motivate students and, if student-created and student-produced, can help them organize their thinking (Villano, 2008). Henderson (2008) posed that "Creativity, ingenuity, and innovation are the keys to success in the evolving global economy" (p. 6), thus having students create podcasts might even have a dual benefit: content and creativity skills. Some will readily see how it can make the most of multiple intelligences. The verdict is still out on the effectiveness of the new Web 2.0 technology, but it is sufficient to say that students are presently utilizing the technology on their own. Some consume it daily. Teachers, therefore, need to begin to consider how they can improve the educational experience by using the current popular technology. To do so could improve the interaction within the classroom by providing the teacher with more effective class time with students and with learning.

Teachers need to consider how they can improve the educational experience by using the current popular technology.

Endnotes

1) See http://www.nextag.com/Dell-20-gb-Digital-511612977/prices-html?nxtg=e5a10a1c0532-990E465567165A9D. One could seek a sponsor to provide mp3 players for truly needy students in exchange for a short commercial blurb on the posted podcasts or some agreeable term.

2) iTunes is Apple's free software for downloading, uploading, and sharing podcast and is available at www.apple.com/itunes. Other similar share providers include http://www.tegrity.com and http://podcast.com.

3) See http://mabryonline.org/

4) See http://epnweb.org/

5) See http://www.masternewmedia.org/news/2005/02/28/podcast_straight_from_your_web.htm. Also, for

an additional listing of podcasts providers, see http://learninginhand.com/podcasting/find.html
6) There is a comprehensive list of useful podcast providers in chapter 7 of Williams' Educator's Podcast Guide along with suggestions for classroom application.
7) See http://srh.typepad.com/blog/2007/05/what_makes_a_go.html
8) See http://www.museumpods.com/id350.html
9) See http://www.podfeed.net/category_list.asp?id=11
10) See http://www.podbean.com/start-podcast?sourceid=goog_66
11) See http://epnweb.org/index.php?openpod=9#12

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Derecho

R. James Vavrek[1] and Jim Allsopp[2]
[1] Henry W. Eggers School, Hammond, Indiana;
[2] National Weather Service, NOAA, Romeoville, Illinois

July 1877
Northwest to Eastern Iowa
First time the term *derecho* had been used to describe a strong straight-line wind that is capable of causing extensive damage and death over a wide and long path.
July 1983
The Interstate 94 Derecho
Occurred first over Eastern Montana, then redeveloped over Eastern North Dakota and travelled to Northern Indiana and Southwest Michigan. Winds maintained speeds of 58-75 mph (93-120 km/hr); some gusts over 100 mph (160 km/hr). Numerous causalities occurred, with extensive damage to homes and businesses.
July 1999
Boundary Water Canadian Derecho
Traveled from North Dakota to Maine in 22 hours with maximum winds of 91 mph (146 km/hr) lasting for nearly 40 minutes. Several deaths and extensive damage occurred.
May 1998
Southern Great Lakes Derecho
The most damaging derecho event in North America traveled 975 miles (1,569 km) at 65 mph (104 km/hr) in 15 hours. It destroyed four hundred homes and businesses and damaged 20,000 others. Damage estimates were three hundred million dollars; nearly two million customers were without power and six people were killed.

Introduction

The purpose of this paper is to offer Earth science students, science educators, and other interested individuals the opportunity to learn about an unusual and destructive type of windstorm. It will focus on the United States and Southern Canada where several wide and long lasting severe windstorm events occur each year. They predominantly develop during the warm season, but have occurred during the cool season in the Southern United States. They can travel hundreds to over a thousand kilometers causing death, injury, and destruction of property totaling millions of dollars.

Derechos are severe, long-lasting, straight-line winds occurring during the thunderstorm season.

These severe, long-lasting, straight-line winds can occur anytime during the thunderstorm season. These winds are not associated with tornadoes, which are smaller rotating wind events, and are considerably more widespread than downburst winds. A downburst is a strong downdraft that exits at the base of a thunderstorm (not always severe), and spreads outward at the Earth's surface as a horizontal wind. Small downbursts are less than 2.5 miles (4 km) in diameter and called microbursts. Larger downbursts, larger than 2.5 miles (4 km) in diameter are called macrobursts.

Origin of the Word Derecho

The word *derecho*, pronounced "deh-RAY-cho," was first applied to wind storms by Dr. Gustavus Hinrichs, a physics professor from the

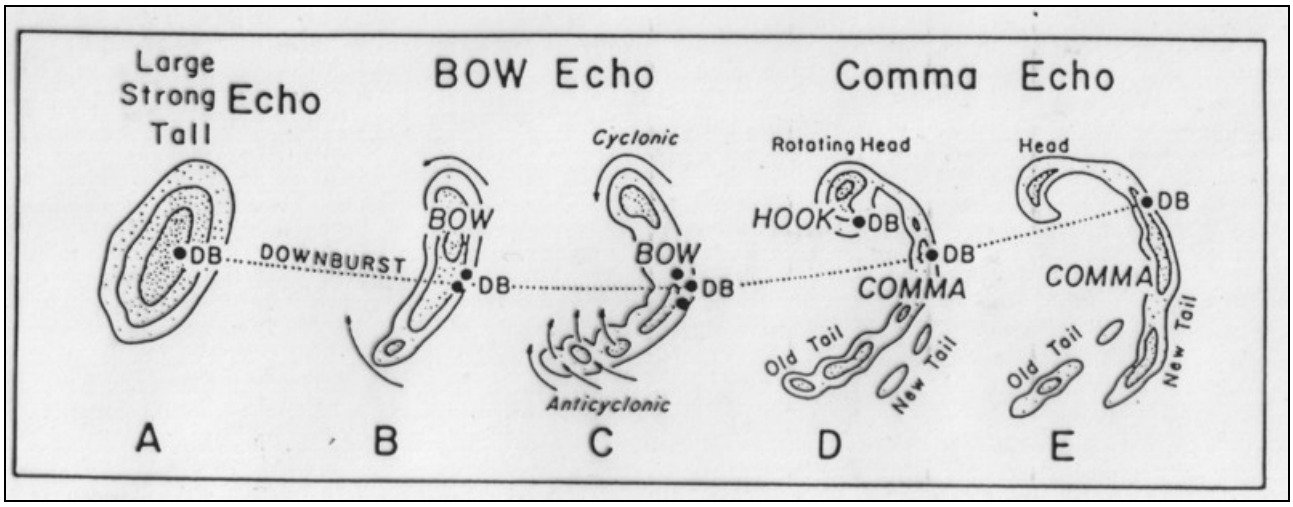

Figure 1. **Bow Echo Evolution.** The figure above is a prototype of the evolution of a bow echo drawn by Dr. T. Fujita of the University of Chicago during the late 1970's. Bands of rain showers or thunderstorms bow out when strong damaging winds reach the surface and spread like pancake batter. The bowed rain band is near the leading edge of the damaging winds. Derechos vary in scale and typically go through an evolution that has at least some of the aspects shown above.

University of Iowa, in a paper published in the *American Meteorological Journal* in 1877, and in the *Special Bulletin, No. 1,* of the Iowa Weather Report. The word derecho is Spanish in origin and means straight ahead. It is defined as a widespread and long-lived windstorm associated with a band of fast moving thunderstorms. Hence, Dr. Hinrichs chose the name derecho for thunderstorms that produce strong straight-line winds over a large long area.

Thunderstorm Producing Derechos

Derecho-producing thunderstorms are often curved in shape. These bowed out thunderstorms are called *bow echoes* and are capable of producing damaging winds that reach the Earth's surface. Derecho winds spread outward, may vary in scale (Figure 1), and often form along a line of thunderstorms (squall line). The bowed rain band of a derecho is located near the leading edge, apex, of an advancing thunderstorm complex or squall line. A derecho can be associated with one event or several events during its lifetime and have multiple bow echoes. The bow echoes may die-off then redevelop later during the course of derecho evolution. In addition, derecho winds can be enhanced on a smaller scale by embedded supercell thunderstorms within the derecho producing thunderstorm system. A supercell thunderstorm has a persistent, intense, rotating updraft that is usually larger than a common thunderstorm, and produces some form of severe weather during its mature stage.

Causes of Derechos

Derechos are the result of thunderstorm outflow winds caused by precipitation (rain) downdrafts. Damaging winds produced from thunderstorm rain outflow is more common than damage from tornadoes. Several factors contribute to damaging winds at the Earth's surface. As precipitation falls, it drags some of the air with it; this precipitation drag initiates a downdraft. The downdraft is intensified by evaporative cooling as drier air from the edges of the thunderstorm mixes with air within the thunderstorm. Also, some strong winds aloft are carried down within the downdraft by a process called *momentum transfer*. These processes lead to a rapid downward rush of air. Also, dynamic pressure perturbation causes sinking air.

Initial surface winds produced by all thunderstorms are called a *gust front*. They are generally short-lived and usually not severe. A gust front is a descending downdraft of rain cooled air hitting the ground and spreading outward in front of an advancing thunderstorm. This causes a shallow turbulent layer of air along the ground or

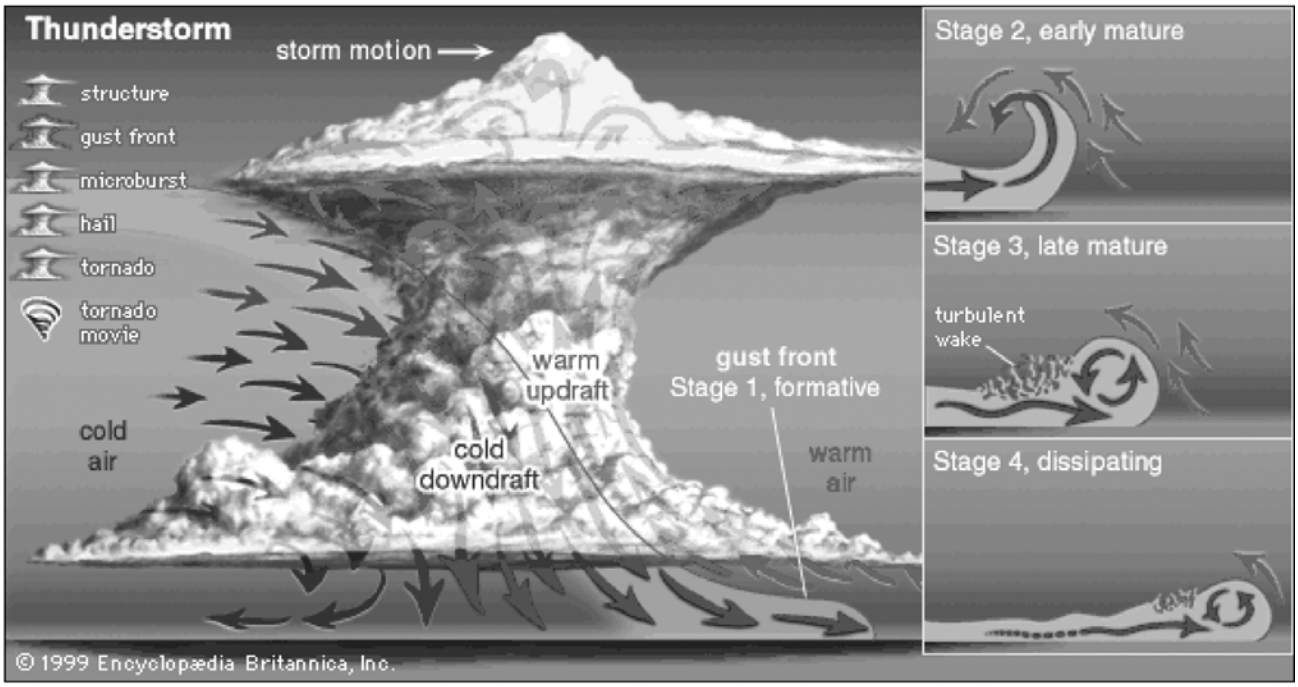

Figure 2. **Gust Front Evolution.** Evolution (formation, early mature, late mature and dissipating stages) of a gust front during a thunderstorm. Source: By courtesy of Encyclopedia Britannica Inc. © 1999; used with permission, http://www.britannica.com/eb/art-19393.

just above it. Behind a gust front the air has a cooler temperature and higher humidity (Figure 2).

A derecho is a widespread convective windstorm consisting of a complex of thunderstorms that develop into a long-lived squall line. A *squall line* is a line or narrow band of thunderstorms sometimes stretching hundreds of mi/km or a mesoscale convective system (MCS) with straight-line winds. An MCS is an organized cluster of thunderstorms that organizes during the night and persists for hours. Sometimes an MCS continues producing showers or thunderstorms the following day.

Some MCS's may grow to be as large as the state of Iowa. They are responsible for the majority of summer rainfall at some locations on the Great Plains. Derechos are considered to be a part of any family of strong thunderstorm downdraft winds predominantly moving from west to east.

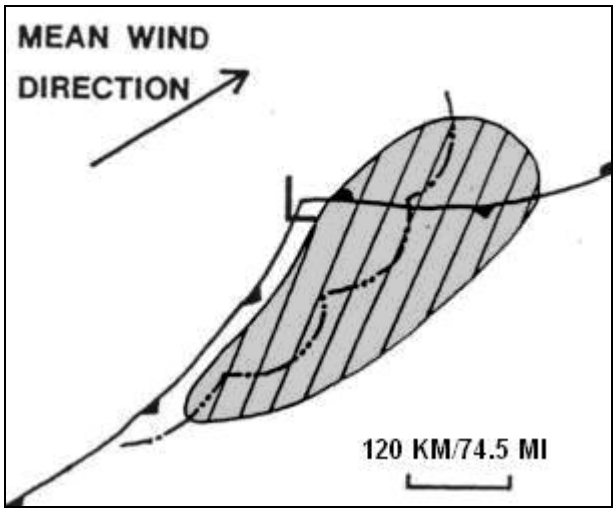

Figure 3. **Serial Derecho**. A serial derecho event (hatched shaded area) is typically associated with an extensive squall line (dashed two dotted line) with embedded bow echoes. Within the squall line, the bow echoes may be of widely varying sizes. Serial derecho events are usually associated with a well defined migrating low pressure system. Source: Storm Prediction Center, NOAA, Norman, OK.

Typess of Derechos

There are three types of derechos. The first is called the *serial* derecho. It is produced by multiple bow echoes embedded in an extensive

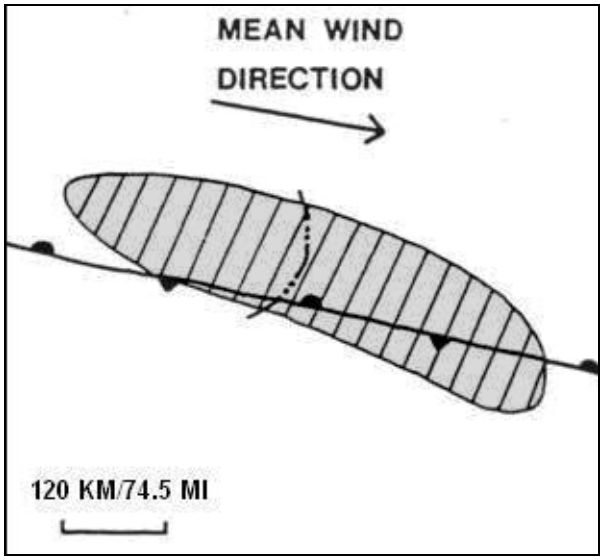

Figure 4. **Progressive Derecho**. A progressive derecho event (hatched shaded area) is typically associated with a squall line of restricted length (dashed and dotted line) which may involve a single bow echo at a time or multiple bow echoes. Progressive derecho events are usually associated with a stationary front in a rather stagnant weather pattern. Source: Storm Prediction Center, NOAA, Norman, OK.

squall line that travels across a long large area **(**Figure 3). The serial derecho varies in length and can extend for a few hundred kilometers.

The second is called a *progressive* and is associated with a relatively short narrow line of thunderstorms, typically from 40-250 miles (64-402 km) in length, which at times takes the shape of a single bow echo, particularly in the early stages of development (Figure 4). In some cases the width of the progressive derecho and its associated bow echo system remain relatively narrow even though they may travel for hundreds of kilometers. In other cases, the progressive derecho, and associated bow echo system grows in scale, and exceeds 250 miles (402 km) in width towards the middle, and later portions of their path. Initially, the line of thunderstorms may start out as a single short bow echo but as it evolves, it produces more than one bow echo segment. The progressive derecho is relatively narrow compared to the path of a serial derecho.

The final type of derecho is called a *hybrid*. It has mixed characteristics of both a progressive and serial type derecho. This type of derecho is associated with a strong migrating low pressure system. By comparison, however, the derecho path and associated bow echo system often has more characteristics of a progressive derecho than a serial derecho over its path length.

Derecho Wind Speeds

The longer-lived, larger-scale, and most intense windstorms are termed derechos. Much of the structural damage and deaths resulting from thunderstorm induced winds are associated with derechos. Winds in a derecho must meet minimum National Weather Service (NWS) criteria for severe wind gusts over 57 mph (91 km/hr) at most points along its path. In stronger derecho events, winds often exceed 100 mph (160 km/hr).

For example, a derecho roared through Northern Wisconsin on July 4, 1977 with winds of 115 mph (185 km/hr). More recently, a derecho swept across Wisconsin and Lower Michigan during the early morning hours of May 31, 1998 producing a recorded wind gust of 128 mph (205 km/hr) in Eastern Wisconsin, and an estimated wind gust of 130 mph (209 km/hr) in Lower Michigan.

On July 18, 1991 in the Pakwash area of Northwest Ontario, Canada, so many trees were knocked down that the amount of timber could construct 200,000 homes. This greatly impacted the community, and its economic welfare. A long section of railroad track was closed for days because of the number of trees lying across and blocking the tracks.

Derechos are the result of thunderstorm outflow winds caused by precipitation.

Independence Day (July 4th) Derechos		
1969	Ohio Fireworks Derecho	MI, OH, PA, WV
1977	Independence Day Derecho	ND, MN, WI, MI, OH
1980	More Trees Down Derecho	NE, IA, MO, IL, WI, IN, MI, OH, PA, WV, VA, MD
1999	Boundary Waters Canadian Derecho	ND, MN, QB, NH, VT, ME
July 1995 Derecho Series Montana to New England		
	Right Turn Derecho	MT, ND, MN, WI, MI, ON, OH, PA, WV
	Ontario-Adirondacks Derecho	MI, MN, ON, QB, NH, VT, ME
Labor Day Derecho Events		
September 7, 1998	Syracuse Derecho of Labor Day	NY, PA, VT, MA, NH
	New York City Derecho	MI, OH, WV, PA, NJ, NY, CT
Serial Derecho Events		
April 9, 1991	West Virginia Derecho	AR, TN, MS, AL, KY, IN, OH, WV, VA, MD, PA
March 12-13, 1993	Superstorm Subtropical Derecho	FL, Cuba
Southern Plains Derecho Events		
May 4-5, 1989	Texas Derecho	TX, OK, LA
May 27-28, 2001	People Chaser Derecho	KS, OK, TX
Other Significant Derecho Events		
June 7, 1982	Kansas City Derecho	KS, MO, IL
July 28-29, 1986	Supercell Transition Derecho	IA, MO, IL, PA
July 7-8, 1991	Southern Great Lakes Derecho	SD, IA, MN, OH, ON, NY, WI, MI, IN
May 30-31, 1998	Southern Great Lakes Derecho	MN, IA, WI, MI, ON, NY
July 22, 2003	Mid-South Derecho	AR, TN, MS, AL, GA, SC

Table 1. **Significant Derechos in North America.** Source: Storm Prediction Center, NWS/NOAA, Norman, Oklahoma.

Are Derecho Winds Constant?

Winds associated with derechos are not constant and vary considerably in strength along its path. They range from minimum severe limits to greater than 100 mph (160 km/hr). The patches of stronger winds embedded within the path are called downbursts and often occur in clusters. A derecho is made up of a family of downburst clusters, and by definition must be at least 240 miles (402 km) in length.

Derecho Risks

During an eighteen year period from 1986-2003 there were 377 derecho events with 153 fatalities. Those who are most at risk are people involved in outdoor activities, or who are traveling. People camping or hiking in forested areas are especially vulnerable to being killed or injured by falling trees. People in boats on lakes and other bodies of water are at risk of drowning or being injured from strong winds and having high waves overturn their boats.

People in cars, buses, sport utility vehicles, and trucks are also vulnerable to being hit by falling trees, power poles, and so forth. People in high profile vehicles such as semi-trailer trucks, buses, and sport utility vehicles are at risk of having their vehicles blown over or off of the road. At out-of-door activities, such as picnics, athletic events, amusement parks, fairs, festivals, and parades, people are at risk of being killed or injured by collapsing tents and flying debris.

People who are inside buildings can also be at risk of death and injury in certain structures and situations. Mobile homes, in particular, are at risk of being overturned or destroyed. Barns, and other

Clues of the approaching derecho typically do not offer much time to take protective action.

weakly constructed out-buildings, can be at risk of collapsing. People inside homes and businesses can be victims of large trees or branches falling through the roof, windows breaking, and glass flying inside, or the building structure being significantly damaged. Nearly half of all deaths by derechos are associated with boating and vehicle events. During the period from 1986-2003, there was an average of 8.5 deaths caused by derechos each year. During the same period, there were 2,605 injuries with an average of 145 injuries per year. In 1988, no one killed by a derecho. However, in 1998 there were 21 people killed.

Another reason derechos can be very hazardous to people involved in outdoor activities is their rapid movement. Typically, derecho producing bow echo systems move at speeds of 50 mph (80 km/hr) or greater and a few have been clocked at 70 mph (112 km/hr). Darkening skies and other clues that alert people to the approaching danger of a derecho occur quickly. Therefore, for those involved in outdoor activities, the clues of the approaching derecho typically do not offer much time to take protective action. At night, campers might not see any visual clues at all.

Cities at Risk

A factor that often affects large numbers of people in a city after the passage of a derecho is the widespread loss of electrical power. In large cities, the loss of electricity can affect hundreds to thousands of people. In some instances, portions of a city may be without electrical power for up to two weeks or more. Some examples include Kansas City, Missouri in 1982 and Memphis, Tennessee in 2003. Both cities had large sections without electrical energy, affecting as many as ten thousand people.

Where and When Do Derechos Occur?

Derechos in the United States and Southern Canada occur during late spring to summer (May through August), and typically occur along two axis. One axis extends along the Corn Belt from the upper Mississippi Valley into the Ohio Valley, perhaps extending all the way to New England. The other axis extends from the upper Mississippi Valley into the Southern Plains. During the cool season (September through April) derechos are not as frequent, but may occur from Eastern Texas into the Southeastern states. Although derechos are extremely rare west of the Great Plains, isolated derecho events have occurred in the interior Western United States during the spring (Table 1).

Other Derecho Locations

Derechos occur in other locations of the world. However, only one such event has been formally documented. On July 10, 2002, a serial derecho occurred over Eastern Germany and adjacent portions of other European countries. In Berlin and the surrounding area, eight people were killed and thirty-nine injured, primarily from falling trees. In Bangladesh and adjacent portions of India, a type of storm known as a *Nor'wester* occasionally occurs in the spring. From descriptions it appears that these storms may be progressive derechos.

Derechos and Tornadoes

Derechos and tornadoes can occur within the same thunderstorm system. This is particularly true with strong, migrating low pressure systems that produce serial derechos. Tornadoes may occur with isolated supercells ahead of a derecho producing squall line, or be associated with the squall line itself. In fact, many people are confused by damage produced by a derecho and often think it was caused by a tornado. Any winds over 57 mph (91 km/hr) can produce roaring sound similar to a tornado. Some individuals will emphatically state it was a tornado**,** when it was actually a derecho.

Derechos on the Great Lakes

Derechos crossing the Great Lakes occasionally produce what is called a *seiche* (pronounced "say-sh") where the water level changes by as much as 10 feet (3.1 m) at any particular point. Numerous deaths, injuries, and damage to boats have occurred during such events. Fishermen on piers have been washed off to their deaths by seiches produced by derechos.

Conclusion

A derecho, a Spanish term first applied to windstorms in 1877, is a long-lived (hours), and long path (hundreds to over a thousand mi/km in length) windstorm that often produces extensive damage. These events occur in the United States and Southern Canada during the warm season. The three types of derechos are serial, progressive, and hybrid.

From 1986-2003, derecho winds were responsible for over one hundred fifty deaths, 2,600 injuries, and millions of dollars in property damage. Flying debris, trees, tree limbs, and branches are threats to falling on people or into a structure. In addition, the high winds are capable of knocking over cars, high profile sport utility vehicles, campers, semi-trucks, and mobile homes. Derechos can be a serious threat to people who are in forested areas or on lakes, and rivers. They can also be responsible for producing a seiche on the Great Lakes as high as 10 feet. Human beings should be alert to the warning signs of these conditions for such violent weather.

Acknowledgements

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A Teaching Model Quest to Integrate the Illinois Learning Standards into Science

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Benedictine University

A child's education is more than a series of lessons.

In school, subject matter is usually packaged into disciplines. Teaching by disciplines often lacks connections to real life, which can result in lower student motivation because the lessons and activities may seem artificial and fabricated. The sentiment has been intensified with the ushering in of the No Child Left Behind (NCLB) mandate. Illinois science teachers are given ten learning standards to guide their curriculum, instruction, and assessment. The feelings about teaching to the standards are mixed partly due to the lack of clear accountability and partly due to the challenge of meaningful standard-driven instruction. Many educators feel that there are two areas that must be tackled. One is to soften politically the NCLB requirements and the other, which is the thesis of this article, is to deal professionally with what we are trained to do – teach!

Progressive Education and Learning Integration

A child's education is more than a series of lessons. We view the learning process as a tapestry where the threads of knowledge are weaved to create interdependent, meaningful understanding. Though teachers aspire to innovative classroom strategies, many acknowledge their roots in the tradition of progressive education. Progressive education is based on the belief that humans learn best in real-life activities with other people. Most progressive education strategies have the following six qualities in common:

- An emphasis on learning by doing - experiential learning;
- Integrated curriculum and instruction strategies;
- A focus on problem solving and critical thinking;
- Encouraging group work and developing social skills;
- Understanding and action as the learning goals as opposed to rote knowledge;
- A de-emphasis on textbooks in favor of varied learning resources.

What we see in integrative classroom practices owes much to the work and inspiration of John Dewey and Jean Piaget. John Dewey (1859 – 1952), perhaps the most famous American educational philosopher in the twentieth century, is credited with originating the progressive education philosophy. Dewey honored the importance of children's activity and focused on the meaningful relationship between learning and social progress (Dewey 2005). He felt that we needed to make schools active to reflect the life of society by making connections to various learning areas. When the school brings each child into membership in a community, it reinforces him with the spirit of service, and provides him with the process of effective self-direction. This way, we shall guarantee that we help create a society which is worthy, lovely and harmonious. From Dewey we learn to cultivate the integration between personal fulfillment and social responsibility in both teaching and learning.

Jean Piaget (1896 -1980) was a Swiss educational psychologist well-known for his research in children's developmental thinking. Piaget meticulously examined the natural learning patterns in children and encouraged teachers to accommodate their teaching to better match children's learning styles (Piaget 2000). Piaget contends that we need students who are active learners: learners who find out for themselves, partly through their own spontaneous activity and partly through resources teachers set up for them. Teachers

are not mere knowledge dispensers but are catalysts in knowledge creation. From Piaget we learn to avoid mindless information memorization and aspire to a model of education where students are actively involved in making sense of the world through problem-solving and critical thinking.

From John Dewey to Jean Piaget we now have a different but holistic view of the effectiveness of integrated learning. Integrated learning is an approach to help teachers fuse multiple resources in a purposeful and practical way. Integrative means incorporating information into a larger picture. From an educator's perspective, any strategies are only as good as their applicability and effectiveness. A strategy is valuable if it doesn't require excessive effort and more importantly, if it brings desired results. The reality of schools nowadays dictates that teachers follow curriculum guidelines, meet state standards, and prepare students for high-stakes state tests and other academic requirements. Integrated learning respects all these realities. The integrative approach is designed so that it can be incorporated into current practices easily without asking teachers to redesign everything they do.

A Theoretical Boat with Three Anchors

What we do in education we often borrow from real world experiences. Can we learn from a fishing story? A friend once shared her fishing experience on a lake up north. She enjoyed fishing from a boat because she had an unobstructed view of the landscape. This fisherwoman loved to cast from the boat toward the shallow of the shoreline. There was one problem with her fishing from the boat because the boat constantly moved with the water current. To stabilize the boat she would secure it with an anchor. That, however, did not stop the boat from moving because the water current still spun the boat around the anchor point. In a situation like that, the fisherwoman would lower a second anchor for additional stability. Theoretically, the boat can still move slightly even with two anchors (that is, side to side). How about a boat that has three anchors?

If we are to search for a teaching model in the spirit of progressive education described, then the anchored boat is a good place to begin. In general, the student learning experience is tied or anchored with strategies of progressive education such as experiential learning, problem solving, and group work. In addition to the general level of anchoring, student experience can still be further integrated at the learning standards level. In science education, student learning experience can be integrated and reinforced with the ten Illinois Learning Standards (ILS) divided up in three broad goals (that is, ILS 11, ILS 12, and ILS 13). If the learning experience is likened to be the boat, then the ILSs in the three broad goals are likened to be the three anchors. At this point in the teaching model quest, we are acknowledging a theoretical boat with three anchors (Figure 1).

Launching the Prototype

To demonstrate the applicability of the boat with three anchors, I will use a study of the cutaneous system in human biology (middle school level) using the two-point discrimination (2PD) test. The 2PD test is familiar to many teachers and is used to determine the distance that two points must be from each other in order for receptors in the skin to sense two points, rather than only one (Wong 1986).

One common approach to teaching this is to introduce the students to the anatomy and physiology of the skin as a major human body

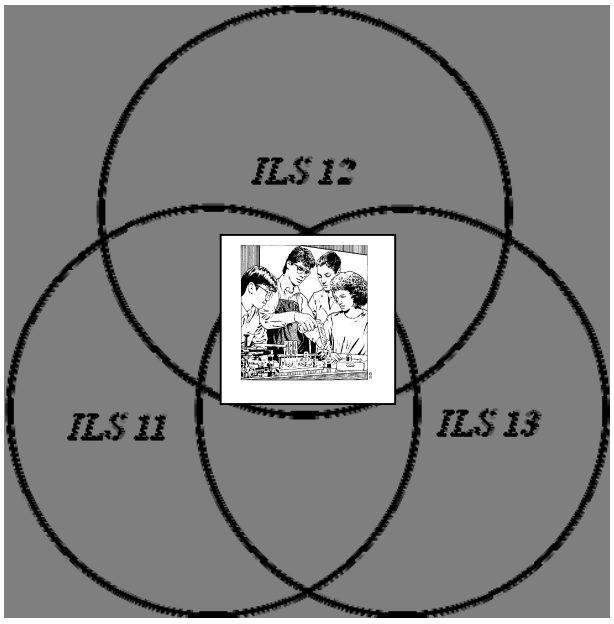

Figure 1. A Boat with Three Anchors

system. This introduction presents human skin cross sections and models including such structures as the dermis, the epidermis, and their specialized cells. What has been described, in essence, supports the understanding of ILS 12 content area. To compliment the lesson, the 2PD test can be used to show the how cutaneous skin functions to protect the body from environmental elements. This additional lesson component supports the understanding of ILS 11 in the area of scientific inquiry.

How can we go beyond the lesson plan described and improve learning? Let us go back and teach the lesson using student engagement as described in the learning cycle (Wong 2008). During the week before the lesson, an eighth student came in one morning with a minor skin burn on his left hand. The teacher saw that as a valuable teachable moment and launched his science lesson the next day to study the human cutaneous system. He introduced the hazard of skin damage to springboard the class to a real world lesson. Students studied the anatomy of the human skin with the aid of microscope slides and diagrams

Students quickly learned that the skin is the largest sensory organ of the body. It is sensitive to many different kinds of stimuli, such as touch, pressure, and temperature. Within the skin, there are different types of receptors that are activated by different stimuli. When a receptor is activated, it triggers a series of nerve impulses. For a person to feel the stimulus, the nerve impulses must make their way up the brain. The students gained a knowledge base through direct instruction by the teacher and by reading the book. The knowledge part of the lesson addressed the minimum requirement of ILS 12 in addition, benchmark 12A.3c. This the first anchor of the boat.

ILS 12A (first learning standard anchor) Know and apply concepts that explain how living things function, adapt, and change.

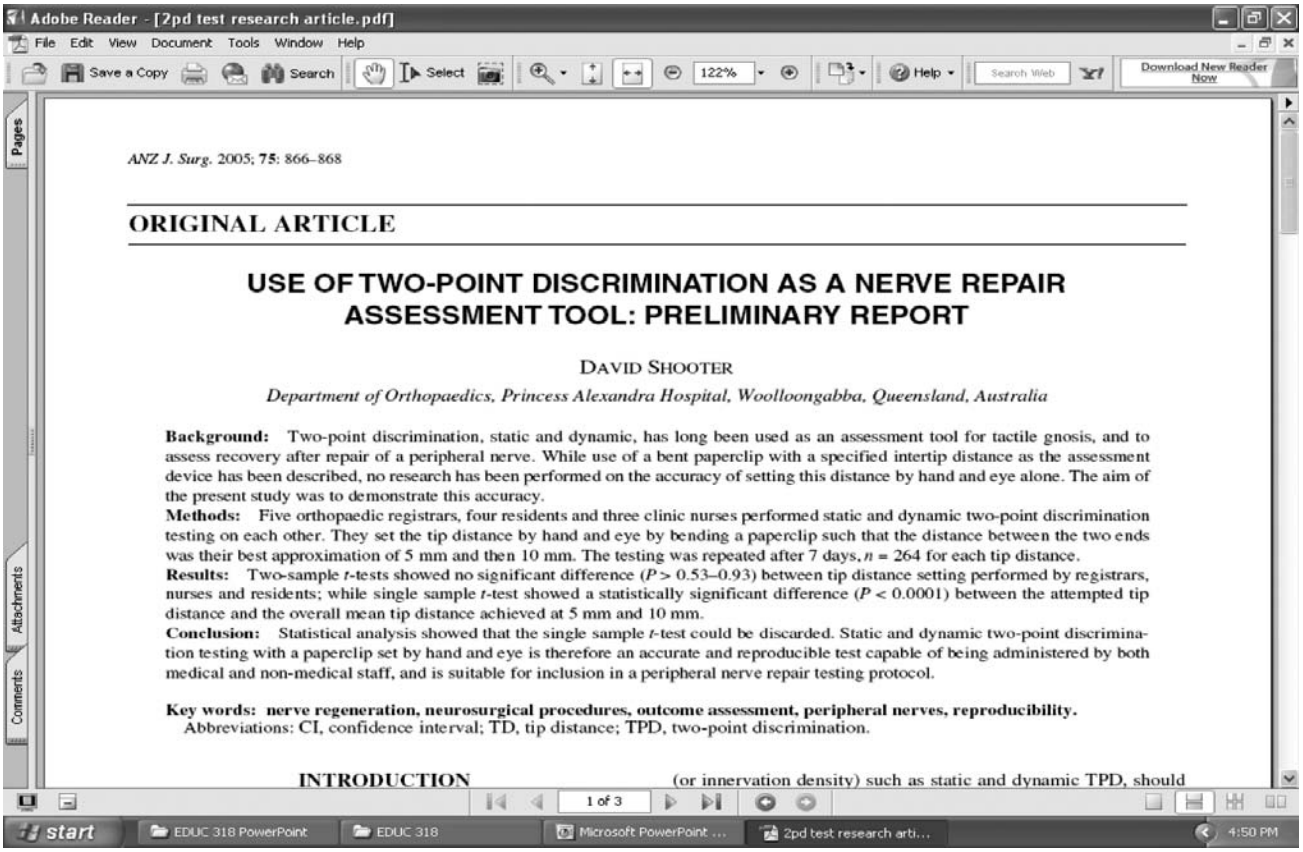

Figure 2. Two Point Disrimination Web Article.

12A.3c (benchmark) Compare and contrast how different forms and structures reflect different functions.

Unfortunately, if this knowledge is not reinforced by a second learning anchor, it will become isolated and soon forgotten.

In a lesson the next day, the teacher connected the previous lesson to the research of skin repair (that is, after a surgery) assessment by way of the 2PD test. Information about 2PD and skin repair assessment in medicine can be accessed easily via the internet and Figure 2 is only one example.

To render learning in the context of real world research and practice health professionals intensified the learning climate of the class. Students learned that 2PD was first developed in 1846 by Ernst Weber, a German physiologist, with other scientists to develop tests examining cutaneous sensation. Weber's work in this area, which included the development of the bedside test for 2PD, was influential in the study of tactile physiology and later became Weber's law. Here, the connection to historical and contemporary science practices supports the requirement of ILS 13 (and benchmark 13A.3b) and more importantly it integrates and reinforces ILS 12A. What have we established now? A boat that has two anchors.

ILS 13A (second learning standard anchor) Know and apply the accepted practices of science

13A.3b (benchmark) Analyze historical and contemporary cases in which the work of science has been affected by both valid and biased scientific practices.

The teacher saved the experiment part of the lesson until the third day of the lesson knowing that the class was ready and eager to explore the concept further. To do the experiment a 2PD board is needed. The teacher chose to invite students to construct their own 2PD test board because he wanted to fulfill ILS 11B.

ILS 11B (third learning standard anchor) Know and apply the concepts, principles and processes of technological design.
11B.3C (benchmark) Select the most appropriate design and build a prototype or simulation.

Technological design in ILS 11B has been a great teaching challenge because teachers often raise the question of "Should the design be teacher-driven or a student original?" In the interest of time, the teacher decided to suggest a 2PD test board design (Figure 3) and asked students to construct it following given design specifications.

Despite the easy design directions, some students still had trouble placing the pins evenly and at right angles to the card. Obviously, the use of a metric ruler and good hand-eye coordination were required to construct the 2PD board. Some students found out later that the construction of the card

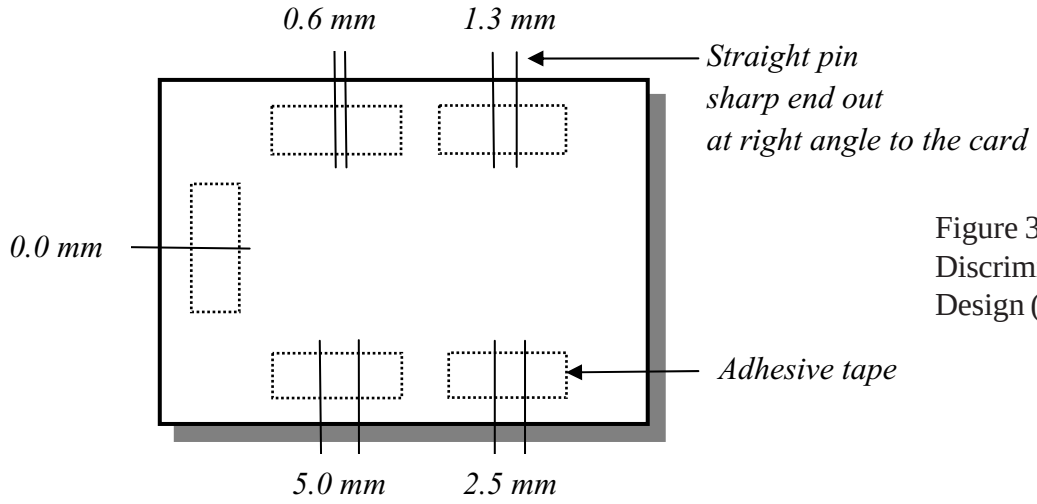

Figure 3. Two Point Discrimination Board Design (not to scale).

Name of Tested Subject _____ Date_____

- finger tip
- hand (palm of)
- hand (inside of)
- forearm (inside)
- forearm (outside)

0.0 mm	0.6 mm	1.3 mm	2.5 mm	5.0 mm
x	x	x	x	x

Figure 4. Two Point Discrimination Tested Area Data Reprot.

affected the accuracy of data collection and interpretation. With the completion of the testing instrument the students were then prepared to investigate the sensitivity of different skin areas (that is, fingertip, palm of hand, back of hand, inside of forearm, and outside of forearm). Students were asked to work in groups of two; one was the investigator and the other was the test subject. The investigator was to lightly touch the two ends of the pin to various skin areas on the test subject. The tested subject should not look at the area of the skin that was being tested. Students were cautioned not to press too hard and make sure all the tip(s) touch the skin at the same time. The test subject was asked if he or she felt one or two pressure points (yes or no). The investigator then recorded the information on a data table. Figure 4 shows that the fingertip (circled) was tested and the tested subject correctly answered whether it was a one point or a two-point touch.

The 2PD testing procedure was then repeated with all five areas of the hand or arm tested.. With sixteen students, the experiment was repeated sixteen times and the combined data analyzed for trends (Figure 5).

When all the students completed the experiment, each student was asked to enter the data in a table on the board similar to Figure 5. The group data trend can be quite dramatic if it is done using a Microsoft EXCEL spreadsheet projected on a screen, changing immediately as data is entered. The EXCEL formula used in the cell expressing the percentage total of correct answer per test area is: = + C O U N T A (H 3 : L 1 8) / (ROWS(H3:L18)*COLUMNS(H3:L18))

Please note that the teacher needs to adjust row and column number (depends on the number of participants) count. Compare the percentage total cell in each tested area (bottom row of the spreadsheet). Which one has the highest percentage of correct answers? Based on the percentage data, which tested area is the most sensitive to touch? What is the implication of touch receptor distribution based on the data trend? How is structure of the skin related to the function of the specialized nerve cells? The investigation process of the 2PD test truly reflects the nature of scientific inquiry and it supports the understanding of ILS 11 and the three subsuming benchmarks.

ILS 11 (fourth learning standard anchor) Know and apply the concepts, principles and processes of scientific inquiry.
11A.3c (benchmark) Collect and record data accurately using consistent measuring and recording techniques and media.
11A.3f (benchmark) Interpret and represent results of analysis to produce findings.
11A.3g (benchmark) Report and display the process and results of a scientific investigation.

Conclusion

How do we measure successful student learning? We measure what students know and what they can do. Based on these criteria, the students met and exceeded the expectations of the learning standards. Student interest was noteworthy because a high level of engagement was sustained. Students engaged in the process of scientific inquiry, applied the biological science knowledge of structure and function, and appreciated the historical and contemporary development of science practices all in one comprehensive learning packet. More importantly, the three-day lesson sequence leading to the 2PD experiment integrated the understanding and application of ILS 11, ILS 12, and ILS 13.

The preparation of an effective integrated lesson is very time consuming. It takes teacher creativity and diligence to connect meaningful ideas and resources. For that reason, initially, it might be a challenge for every single teacher to prepare every single lesson in an integrative manner. As we grow professionally in our teaching experience, we can add integrative lessons to our lesson plan folder. Collaborate with your colleagues in the school community; they will help or give you ideas for lesson integration. The most creative time in education has been when conventional boundaries between disciplines and ways of thinking have become permeable or have been dissolved altogether. This is precisely why the most creative lessons are progressive and interdisciplinary.

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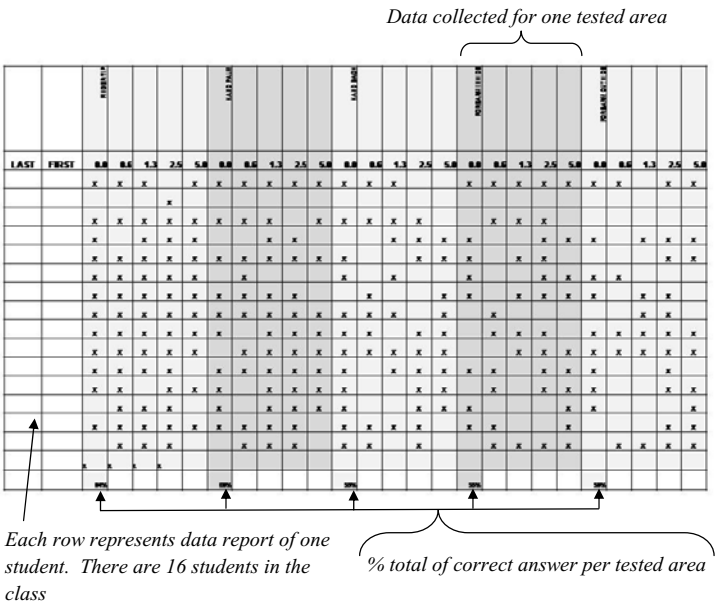

Figure 5. Two Point Discrimination Data Trend Report.

Web Resources for Teaching and Learning about Science 2009 Edition

Jean Mendoza
University of Illinois at Urbana Champaign

It's no secret that the Internet is always changing. This article lists a few of the more recent additions to the Worldwide Web that are likely to be of use to educators who want to engage young people with science, from preschool through middle school.

The internet is always changing.

The Illinois Early Learning Project

The Illinois Early Learning Project has recently added several easy-to-use tip sheets related to science. The tip sheets, aimed at teachers and caregivers of prekindergarten children, are also useful to teachers of older children who want a little easy-to-read inspiration to help them get an investigation going. If it can be studied with preschoolers, elementary and middle-schoolers can study it, too.

Encouraging Scientific Thinking: Rain or Shine
http://illinoisearlylearning.org/tipsheets/weather.htm

Get Growing: Planning a Garden with Young Children
http://illinoisearlylearning.org/tipsheets/garden-planning.htm

Get Growing: Learning about Seeds
http://illinoisearlylearning.org/tipsheets/garden-seeds.htm

Natural Illinois: Insects
http://illinoisearlylearning.org/tipsheets/insects.htm

Natural Illinois: Leaves Are All Around
http://illinoisearlylearning.org/tipsheets/leaves.htm

Natural Illinois: The Trees You See
http://illinoisearlylearning.org/tipsheets/trees.htm

The Project Approach: Children Taking Surveys
http://illinoisearlylearning.org/tipsheets/projects-surveys.htm

The Illinois Early Learning Web site recently began adding videos demonstrating good classroom practices. At http://illinoisearlylearning.org/videos/index.htm, you can view video clips showing three, four, and five-year-olds involved in a variety of investigations and other activities. Titles include:

Experimenting with Balance
Experimenting with Balls
Exploring Windshield Wipers
Magnets and Cars
Getting to Know Rabbits
Flubber

Early Childhood Research and Practice

Online, open-access journals have many advantages. For one thing, a teacher doesn't need a subscription in order to take advantage of the resources such journals offer. For example, each issue of the journal, *Early Childhood Research and Practice* includes a thorough description of a project approach-based study of a topic "close to home" that is of interest to children, done in classrooms ranging from preschool to third grade. Two recent Project descriptions, both by Illinois educators, are "Investigating the Tallgrass Prairie" and "Building Bob: A Project Exploring the Human Body at Western Illinois University Preschool Center."

Online, open-access journals have many advantages.

At University Primary School, the preschool class and the kindergarten-first grade classes studied a nearby restored tallgrass prairie. Teachers Marcia Burns and Sojin Chi, along with principal Nancy Hertzog, report on how their study proceeded and what the children learned. The report is available online at:
Investigating the Tallgrass Prairie
http://ecrp.uiuc.edu/v10n1/burns.html
Una investigación de la pradera de hierbas altas
http://ecrp.uiuc.edu/v10n1/burns-sp.html

In the Project report "Building 'Bob': A Project Exploring the Human Body at Western Illinois University Preschool Center," teacher Scott Brouette describes how children in his class created a life-sized model of a person using found materials as they learned about the characteristics of important body parts. The report is available at:
Building "Bob": A Project Exploring the Human Body at Western Illinois University Preschool Center
http://ecrp.uiuc.edu/v10n2/brouette.html
La construcción de "Bob". Proyecto de explorar el cuerpo humano en el Centro Preescolar de la Universidad de Illinois Occidental
http://ecrp.uiuc.edu/v10n2/brouette-sp.html

Another *Early Childhood Research and Practice* report that might be of interest to kindergarten and elementary teachers who want to bring more science into the classroom is "At the Zoo: Kindergartners Reinvent a Dramatic Play Area." Authors Mary Bowne and Sue Brokmeier decided to follow up on the interest in animals shown by Ms. Brokmeier's class. They made a number of secondary sources available to the students, each of whom became a specialist about animals they selected. Perhaps the most innovative approach was the teacher's use of an interactive whiteboard called a *Smartboard* to provide a wide-screen virtual tour view of the San Diego Zoo (http://www.sandiegozoo.org) which the students revisited several times. Even teachers who work with older students may find inspiration in what the class accomplished:
At the Zoo: Kindergartners Reinvent a Dramatic Play Area
http://ecrp.uiuc.edu/v10n2/bowne.html
El zoológico. Niños de kindergarten trasforman un área de juegos dramáticos
http://ecrp.uiuc.edu/v10n2/bowne-sp.html

Professional Development Opportunity Described Online

Educators interested in finding out more about using the Project Approach in preschool through elementary grades may be interested in a special professional development offering. A four-day institute on teaching with the project approach, led by internationally known educators Dr. Lilian G. Katz and Dr. Sylvia C. Chard is being held at the University of Illinois, Urbana, in July 2009. The Engaging Children's Minds institute will take place July 16 - July 19, 2009 on the campus of the University of Illinois at Urbana-Champaign. More information can be found at http://www.conferences.uiuc.edu/conferences/conference.asp?ID=189.

More Internet Resources for Pre-K through Middle School and Beyond

The Illinois Department of Natural Resources

The Illinois Department of Natural Resources has updated its Website and seems increasingly teacher-friendly. The educators' main page for the IDNR is http://www.dnr.state.il.us/education/index.htm

Downloadable activity books about nature in Illinois are available at http://www.dnr.state.il.us/education/CLASSRM/ActivityBooks.htm.

Find out about native Illinois plants at http://www.dnr.state.il.us/education/CLASSRM/ForYourGardengeneral.htm. You can even find podcasts about the featured plants in Spanish, Arabic, Mandarin, and Polish! If your school serves families with those home languages, the podcasts may be a great way to engage parents who speak little English.

Concerned about meeting specific standards? The IDNR site offers SmartBoard activities matched to the Illinois Learning Standards and Early Learning Standards. http://www.dnr.state.il.us/education/SmartBoardintro.htm.

Register for participation in biodiversity studies focusing on spiders, squirrels, or frogs and toads at http://dnr.state.il.us/education/spiderstudy.htm.

Other Websites

For brief reports about the what's going on in the world of scientific investigation on Earth and in space, teachers and middle school students and up are sure to find items of interest on the Web site, *EarthSky, A Clear Voice for Science* (http://www.earthsky.org/). This site features podcasts, science news headlines, and a thumbnail sketch of what's going on in the night sky tonight. Recent headlines include: "Scientists Develop Species Distribution Grids;" "Research Identifies U.S. Climate Change Hot Spots;" "Seagoing Scientists Find Gigantic Sea Creatures;" "Paleontologist: Dinosaurs not Special, Just Lucky."

Engaging Children's Minds Institute, July 16-19, 2009, at the University of Illinois at Urbana-Champaign.

Who says a teacher needs expensive materials and equipment to teach science? Apparently, all you need to make science come alive is a ready supply of paper plates. The Paper Plate Education Web site (http://analyzer.depaul.edu/paperplate/Video.htm) includes videos that explain such activities as making a moon finder, a "platisphere," and a light pollution experiment.

Plenty of information about flora and fauna is available to students in a low-key and accessible format on the University of Illinois Cooperative Extension Service horticulture pages (http://web.extension.uiuc.edu/state/hort13.html). The site features informative, interactive cartoon videos such as A Walk in the Woods, Dr. Arbor Talks Trees, The Great Plant Escape, Let's Talk about Insects, My First Garden, Exploring the Secret Life of Trees, and Trees Are Terrific.

If your students are interested in the Big Picture of science, direct them to the PBS Web sites pages for *Stephen Hawking's Universe*. http://www.pbs.org/wnet/hawking/html/home.html. Features include "Strange Stuff Explained" (such as gravity, dark matter, superstrings, and uncertainty theory) http://www.pbs.org/wnet/hawking/strange/html/stuff.html.

If you're a Spectrum reader with a favorite Internet science resource not mentioned here, Jean Mendoza would like to hear about it. Contact Jean at jamendoz@illinois.edu.

The Spectrum Needs YOU!

Author Guidelines

Share with us your teaching ideas for curriculum, laboratory experiences, demonstrations, assessment, portfolios, and any innovations that you have found to be successful with science students. Photographs for the cover are also needed. Please send to the editor, Judy Scheppler, at quella@imsa.edu, or to the appropriate area focus editor. Your manuscript should:

Be typed or printed, double-spaced copy with standard margins,

Be less than 3000 words in length, although there is no strict length guideline; articles of substance of most any length will be reviewed and considered for publication,

Be submitted electronically, as an email attachment or on disk (IBM or Mac), saved in Word format,

Include a title page with the author's name and affiliations, a brief biographical sketch of three or four sentences, home address, home telephone number (If there is more than one author, send all information for each), and email address (if applicable),

Include sketches, photographs, figures, graphs, and tables when appropriate. These should be numbered and referenced in the text by number. Any sketches, figures, graphs, or tables should be included at the end of the document on separate pages. They should not be embedded in the text. Photographs should be jpg images, included as separate files. Photographs, sketches, and so forth should be back and white, of good composition, and high contrast,

Include references if necessary, in the format of your choice (APA style is preferred),

Include a statement indicating whether or not the article has been published or submitted elsewhere.

The *Spectrum* is published three times a year. Materials submitted must reach the editor by the following dates: February 15, June 15, November 15. Materials, including photographs, will be returned only if accompanied by a request in writing and a self-addressed stamped envelope.

Our diligent and talented editors are eagerly awaiting YOUR article!

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Write for the *Spectrum!*

The *Spectrum* is actively seeking articles, tips, announcements, and ideas that can be shared with other science teachers. Articles should be sent to the appropriate area focus editor, listed below. Other submissions and inquiries should be addressed to the editor-in-chief , Judy Scheppler, at quella@imsa.edu. Please send all submissions electronically. Further information about writing for the *Spectrum* can be found at: www.ista-il.org/spectrum.htm

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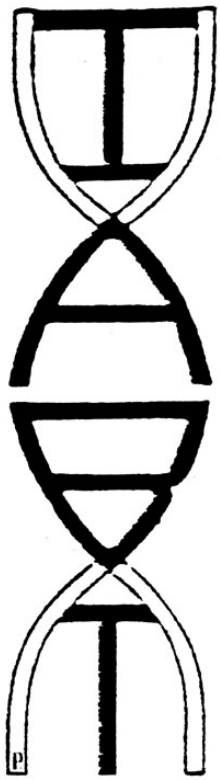

The Illinois Association of Biology Teachers Wants You!

Are you a new biology teacher? Or are you an experienced teacher, just looking for a few new biology tricks? Do you have tips to share? Then IABT is for you!

Find us at:

The web: www.iabt.net/
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The IPRB is governed by an unpaid, 12-member board made up of independent oil and natural gas producers and royalty-owner representatives.

The IPRB was formed to clean up abandoned well sites and provide public awareness and education programs throughout the state. Funding for IPRB programs comes from voluntary contributions of oil and natural gas producers and royalty owners in Illinois.

Our educational goals demonstrate and inform the public of the importance of Illinois oil and natural gas and are funded by the Illinois oil and gas industry. The FREE educational programs are designed to increase awareness about the science and business aspects of the Illinois oil and gas industry. Over 6000 products are made from petroleum: medicines, cosmetics, plastics and gasoline are just a few of the products that we use every day!

For more information on the IPRB and how we can visit your classrooms, conferences, or special events, please call the Illinois Petroleum Resources Board at 1-618-242-2861 or via email that is accessible through our website at www.iprb.org and arrange for us to visit!

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Announcing A New Search for Exemplary Science Program (ESP) for 2009

The NSTA Exemplary Science Program Series (ESP) is announcing a new search for programs that succeed in achieving success with Goal 3 of the National Science Education Standards (NSES).

The NSES includes only four goals for teaching science in PreK-12 schools and/or other situations than schools per se. Goal 3 indicates that an exemplary program should prepare students to "Engage intelligently in public discourse and debate about matters of scientific and technological concern." The New ESP will focus upon learning from work on local issues with personal relevance and local importance.

The new planned ESP monograph will utilize the procedures and organization characterizing the previous ESP Volumes which include:

1) Pre-K Science
2) 5-8 Science
3) 9-12 Science
4) Professional Development
5) Informal Education
6) Inquiry
7) Science for Resolving Social Issue/Problems

Basically, attention to the NSES More Emphasis features are needed as programs are described. An essential ingredient (about one-third) of the information needed for the chapter must be actual evidence for student learning.

All teachers, organizations, and professionals who have developed ways for meeting Goal 3 of the NSES should prepare a 3-6 page outline describing their programs for review for our National Advisory Board for ESP who will offer suggestions and recommendations before a full 20 page draft is produced. These initial outlines can be submitted anytime – preferably before the end of 2008. The new monograph is planned for completion by May 2009.

Send inquiries and outlines to:
Robert E. Yager
ESP Coordinator
767 VAN
University of Iowa
Iowa City, Iowa 52242
Telephone: 319-335-1189
E-mail: Robert-yager@uiowa.edu

Mark ISTA's 2009 Conference on Science Education on YOUR calendar!

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Peoria, Illinios

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