SPECTRUM

ISTA

Spring 2009, Vol. 35, No. 1

The Journal of the Illinois Science Teachers Association

In this Issue:

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

Spectrum

The Journal of the Illinois Science Teachers Association
Volume 35, Number 1

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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).*

Judith A. Scheppler, Ph.D.
Coordinator of Student Inquiry and Research
Director of the Grainger Center for Imagination and Inquiry
Illinois Mathematics and Science Academy
1500 West Sullivan Road
Aurora, IL 60506
quella@imsa.edu

Cover photo - Spring is Science Fair season, and on the cover is a photo from the poster session of the IMSA Student Inquiry and Research Program's annual IMSAloquium. Students pursuing investigations present their work in both oral and poster venues. (Photo courtesy of the Illinois Mathematics and Science Academy.)

The *Spectrum* is printed on recycled/recyclable paper

SPECTRUM

The Journal of the Illinois Science T eachers Association

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ISTA News

President's Corner

Gwen Pollock

As the school year ends, ISTA wishes to sincerely thank you for being the vitality in our new mission statement: *promoting excellence in science teaching and learning throughout Illinois.* We, the board members who represent you, have so much to share about our strategic plans for the future to help you accomplish even more, even better.

As the new ISTA president, I'd like to introduce myself to you. I have come to know so many of you through my seventeen-ish years of teaching high school sciences in Riverton and Chatham, and then my near-seventeen years at the Illinois State Board of Education as the state science consultant, working with scientific literacy and the Mathematics and Science Partnerships grant funds. I've started a new chapter of retirement and finding it not really retiring, yet. Enough about me…

Here are some of the grand plans that ISTA is working on now to meet your needs as you face the challenges of a teacher of science:

- Our fall conference, set for Peoria, November 13-14, 2009, will have the theme: The Evolution of Science Education. The call for papers (deadline June 15) is posted on the ISTA website, and of course we need you!
- We'll be providing on-line registration and credit card functionality for the fall conference and extending this capability for membership renewal.
- We're expanding the membership privileges more broadly to a new listserve that will guard your identity and provide more efficient and mutually beneficial updates and communication networks for you (contact Kendra Carroll at kcarroll63@gmail.com to join). We are working on possible plans to incorporate a new generation for the Building a Presence network that can meet our needs even more effectively.
- We're responding to the national initiative for "No Child Left Inside" with an Illinois-specific focus, working with our partners from the Environmental Education Association of Illinois and Chicago Wilderness.
- We've voiced our interest in working with ISBE on the American Diploma Project for the science standards—for which we will rely heavily on your expertise and network.
- We're starting partnerships with the Illinois Council of Teachers of Mathematics for a special recognition for elementary science and math specialists, as well as with the Technology Education Association of Illinois for a special focus on pre-engineering opportunities. We are working on building partnerships with other science-connected professional organizations, as well.
- We're working on developing networks that will support our new, experienced, and retiring teachers of science, teacher-educators, supervising master teachers, and student affiliate organizations at our colleges.
- Hopefully, by the time that you receive this issue, our new website will have been christened for your more effective utility.

There will be more information about all of these nuggets soon through our list serv and website. I am hoping for your expert participation. Let me know if I can be of assistance to you, or to listen to your ideas and interest areas to help ISTA accomplish our new mission. ISTA provides a direct line of communication between science educators and state decision-makers. Our organization is focusing advocacy efforts to voice concerns and recommend programs with funding for K-16 science classrooms, teachers, and learners. Please contact me at *gpollock@casscomm.com* to be one of those voices.

2009-11 ISTA Executive Committee

Vice President
Julie Gaubatz
Hinsdale South High School
jgaubatz@hinsdale86.org

Secretary
Kathy Schmidt
Jay Stream Middle School
2Schmidt1345@sbcglobal.net





President Elect
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Community HS District 218
Carol.baker@chsd218.org

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carter@niu.edu

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Pekin Community HS
jcarter@pekinhigh.net

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Nominations and Elections	Past President – Jill Carter
Public Relations	
Professional Development/Building a Presence	Mary Lou Lipscomb
Publications Committee	Judith A. Scheppler

Join the ISTA listserve to Network Online!

ISTA encourages all of its members to join the listserve 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 Kendra Carroll (kcarroll63@gmail.com) 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 listserve.

Regional Directors

Region 1 Director 08-10a
Lynne Hubert
Joseph Sears School
lhubert@kenilworth38.org

Region 1 Director 09-11a
Margaret Corp
W.B Orenic Intermediate School
mcorp@troy30c.org

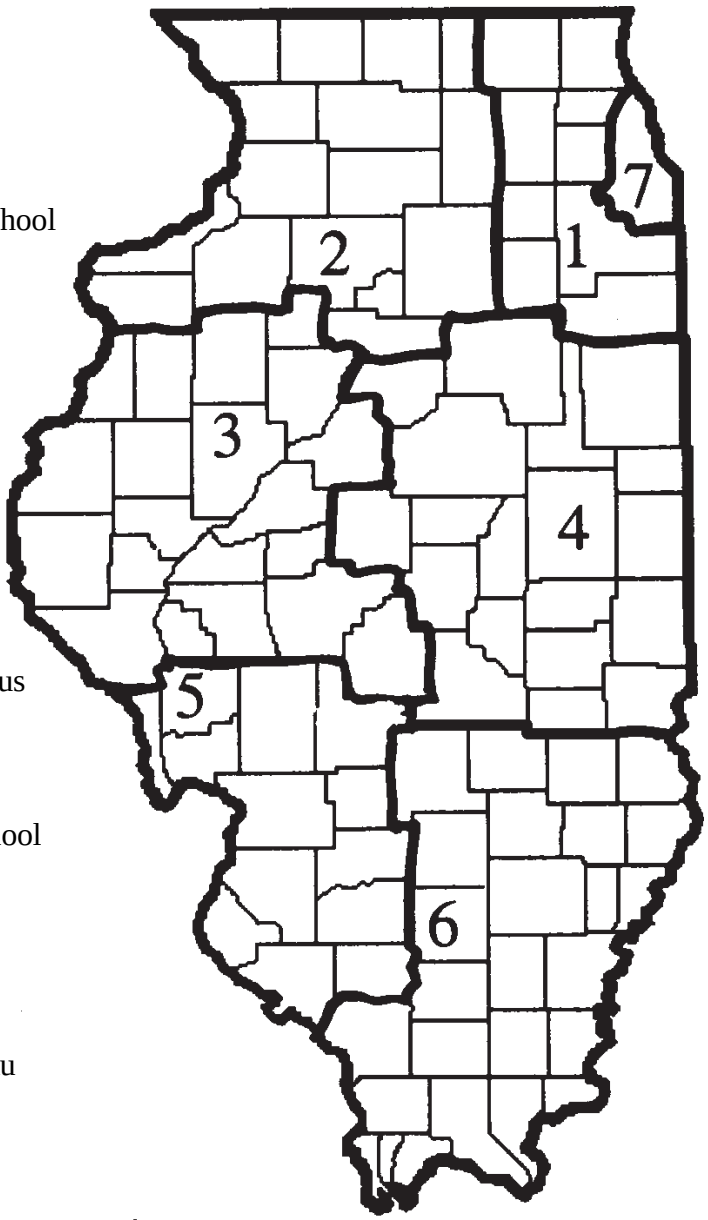
Region 2 Director 08-10a
Laverne Logan
Western Illinois University
LK-Logan@wiu.edu

Region 2 Director 09-11a
Amy Sandgren
Rock Island Regional
Office of Education
amy.sandgren@riroe.k12.il.us

Region 3 Director 08-10a
Sherry Spurlock
Pekin Community High School
sspurlock@pekinhigh.net

Region 3 Director 09-11a
Bob Wolfffe
Bradley University
rjwolffe@bumail.bradley.edu

Region 4 Director 08-10a
Kristi Van Hoveln
Milford Grade School
kestnerk@milford.k12.il.us



Region 4 Director 09-011a
Kendra Carroll
Shiloh CUSD #1
carrollk@shiloh.k12.il.us

Region 5 Director 08-10b
Tom Foster
Southern Illinois University
tfoster@siue.edu

Region 5 Director 09-11a
Kathleen Roper
Hoyleton Public School
kroper@washington.k12.il.us

Region 6 Director 08-10a
David Steele Abendroth
Red Hill High School
dabendroth@roe12.net

Region 6 Director 09-11b
John R. Clark
jrc2346@yahoo.com

Region 7 Director 08-10a
John Loehr
Chicago Public Schools
jfloehr@cps.k12.il.us

Region 7 Director 09-11a
Christian Greer
John G. Shedd Aquarium
cgreer@sheddaquarium.org

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

According to ISTA bylaws, regional directors may serve only two consecutive terms. Directors noted with an "a" are in the first of a two-year term; those noted with a "b" are in the second consecutive two-year term.

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.

Call for Presentations

The Evolution of Science Education: From So Simple a Beginning . . .
Illinois Science Teachers Association 2009 Conference on Science Education
Peoria Civic Center & the Hotel Pere Marquette
Friday & Saturday, November 13 & 14, 2009

Deadline for Submission: Postmarked by Monday, June 15th, 2009

Principal Presenter: (Only Principal Presenters will be notified of presentation acceptance and scheduling.)
Name: _____ Day phone _____

Affiliation/School _____ Evening phone _____

Mailing Address _____ Email (**required**)_____

City, State, Zip _____

Additional Presenter(s): Please attach additional sheet.

Title of Presentation: _____

Program Description (exactly how you want it to appear in the program) – 25 word limit**:**

_____

Detailed Description of Presentation (for committee review purposes only) – 200 word limit)**:**
Please attach additional sheet. This will only be used by the program committee for presentation selection.
***Preferred presentation date:** ☐ Friday (50 minutes only)

☐ Saturday – Select one: __ 50 minutes**;** __ 1 hour, 50 minutes; __ 2 hours, 50 minutes

**The Program Committee will attempt to honor the preferred presentation date, but due to scheduling issues this may not always be possible. All presentations longer than 50 minutes will be on Saturday only.*

Check the intended audience: ☐ K-3; ☐ 4-6; ☐ 7-8; ☐ 9-12; ☐ K-12; ☐ preservice;

☐ college/university; ☐administration

Subject: ☐ biology; ☐ chemistry; ☐ earth science; ☐ environmental; ☐ general/integrated; ☐ physics;

☐ technology; ☐ other (specify) _____

Equipment: I will need a screen: ☐ yes; ☐ no. In order to minimize costs, presenters needing other equipment ***must*** furnish their own.
Room Set-up: All rooms will be set up with tables unless requested otherwise: _____
Safety: All ISTA presentations must conform to NSTA minimum safety guidelines for presenters. Check the ISTA website for those guidelines: http://www.ista-il.org. Will you be using chemicals or hazardous materials? ☐ yes; ☐ no; If so, please describe: _____

Agreement: I have read and understand the NSTA minimum safety guidelines for presenters. I agree to conform to these guidelines while giving my presentation at the 2009 ISTA Annual Conference. I understand that I will be notified via **email** by July 15, 2009 as to whether my presentation proposal has been accepted or not. If I must withdraw my presentation request, I agree to notify ISTA ***no later than*** September 21, 2009, so that another presenter can be found in order to fill my slot.

I also understand that ISTA does ***not*** furnish LCD projectors or computers for presenter use. If one is needed for my presentation, I will be bringing my own or renting one at my own expense from the Peoria Civic Center (see below) or from a vendor of my choice.
http://www.peoriaciviccenter.com/Online_Ordering_Forms.html

Signature: _____ Date: _____

Note: ISTA requires that **all** presenters register for the conference.

Return to: Jill F. Carter, Past President ISTA (by mail or email)
Pekin Community High School
1903 Court St.
Pekin, IL 61554
jcarter@pekinhigh.net

(email submission receipt will be confirmed within one week; if confirmation is not received, please send again)

Illinois Science Teachers Association
42st Annual Conference on Science Education
Peoria Civic Center & the Hotel Pere Marquette
November 12-14, 2009
Pre-Registration Form

Deadline for Early Bird Pre-Registration: Postmarked by October 10, 2009

Deadline for Advance Registration: Postmarked between October 11, 2009 and October 31, 2009

Registration on or after November 1, 2009: On-site only

Fill out form completely, one per registrant. Print clearly. Information will be used for our records.

Name: _____ Spouse/Guest Name (if attending) _____

Home Address _____ Home phone (_____) _____

City/State/Zip _____ County where you work _____

Affiliation/School _____

Business Address: _____ Business phone (_____) _____

City/State/Zip _____ Email _____

☐ Check here if you need special assistance due to handicap (describe on extra sheet)

☐ Check here if you would like to be a presider for a session.

☐ Check here if you have been teaching 3 years or less.

☐ Check here if you need a non-meat meal.

Conference Registration (Thursday, Friday and Saturday)

(Includes Thursday exhibit preview, exhibit hall reception, & Friday luncheon.)

Please circle correct amount.

Registration Fees and deadline for postmark	**Earlybird** 10/10/09	**Advance** 10/31/09	**Full Rate** After 11/1
☐ Current ISTA member	$125	$140	$150
☐ Nonmember (includes one-year membership)	$160	$175	$185
☐ Institutional members (up to 3 individuals) *	$120person	$135/person	$145/person
☐ Full-time student	$30	$30	$30
☐ Only Thursday or Saturday (no meal)	$70	$75	$80
☐ Non-teaching spouse/guest (no meal)	$20	$20	$20

Enter Registration fee _____

Social Events (Tickets for these events will not be sold at the door)

Thursday Reception in Exhibit Hall (4:00 to 7:00 pm) No charge, but please register $00.00 _____

Friday Luncheon – Peoria Civic Center – Included as above, but please register $00.00 _____

--price for registered non-teaching spouse/guest $20.00 _____

Friday Night **GALA** (bus, drinks, food, light & night show, live band, prizes, awards– open to anyone attending Thursday, Friday, and/or Saturday. **DON'T MISS THIS!** $35.00 _____

Internet registration convenience fee if registering online (with credit card.) **$5.00**_____

Total Due: _____

* Please send all registrations in the same envelope.

Make checks payable to: **Illinois Science Teachers Association**. Send to **Sherry Duncan, ISTA Registration, P.O. Box 295, Urbana, IL 61801.** No one will be admitted to any part of the convention without registering. If your registration form is received by November 3rd you will receive a confirmation in the mail. If it is received after that date, you may pick up your information at the registration area in the Peoria Civic Center.

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: 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 in September, 2009. Awardes will be honored at the 2009 ISTA Conference on Science Education. They will receive ISTA membership, certificate, and idea pack.

ISTA Thanks

Jill Carter

for

Serving as ISTA President
and
- inviting and encouraging greater participation from members

- organizing and documenting conference procedures

- tracking ISTA history and successes

Kendra Carroll

for

Serving as ISTA Secretary for the past Five+ Years

and

helping keep ISTA on track

She is staying active in ISTA, in her role as Region 4 Director

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

Member Notes

This column is devoted to news from our members. Do you have a birth, marriage, job promotion, new job, or retirement you'd like to announce? Just send the information to me. Please include everything you'd like to appear in the announcement. You must self-report this. If you know of the death of any ISTA members (or retirees who were past members), please send that information to me as well. My email address is: schimm_julie@yahoo.com.
Thank you! Julie Gianessi

Births
Julie Gianessi and husband Frank have a new daughter, Caroline Jane. She was born December 18, 2008. Caroline was welcomed by big sister, Sofia, 2.

Retirements
Congratulations to Coleen Martin who is retiring at the end of this school year after teaching for thirty-five years. Coleen teaches fith grade at Wilder-Waite Grade School in Dunlap, Illinois. She recently completed her second term on the ISTA board as a director from Region 3.

ISTA Thanks ...

Ray Dagenais

for serving ISTA as

President
Executive Director
Past President
President-Elect
Conference
Program Chair

This will be the first year in over ten that Ray has no "official" role with ISTA. But we know he'll still be around!

Donna Engel

for serving as

Vice President
Conference
Program Chair
Finance and
Membership
Chairs

Donna stepped up when ISTA's previous vice president moved. We greatly appreciate her willingness to step in. Conference presenters will miss her thank you bags of treats!

No Child Left Inside

ISTA Advocacy for Science Teaching and Learning

The national movement, No Child Left Inside (NCLI), is an extraordinary opportunity for civic action and advocacy for science education. The proposed federal legislation and optimism for its appropriation is gaining momentum in Congress. The legislation will provide funding for professional development for teachers and activities for their students.

You can review the resources on the No Child Left Inside site: www.nclicoaltion.org, which is organized for your immediate utility to learn more about the legislation, the research that substantiates the power of environmental education, and how a classroom, building, district, and state can become a part of the effort.

There are two major venues in which ISTA members can become actively involved:

1) If you have activities planned for this week or the near future, try to multiply the impact into the national effort by adding the event summary and so forth to the NCLI master listing for events set all over the country, that will be tracked on Google Maps.

- First, sign up for a Google account. Then the steps are simple: just add your contact info, the date of the event and a summary. The map is geo-referenced to show Congressional districts, and the national leaders be using it to compile a list of events to pass along to Congressman's Sarbanes' office. The map link is http://www.cbf.org/site/PageServer?pagename=act_sub_actioncenter_federal_nclb_day_map.
- A toolkit with materials like a media advisory template and tips for inviting your legislators to attend your event is available on the NCLI website.

2) Enlist your building or district to become a national stakeholder in the No Child Left Inside movement. At this point, Illinois already has nearly seventy organizations who have registered on the national website; however, fewer than ten are schools. Classrooms, schools, and districts will be the prime beneficiaries for this legislation. Please pursue your local options for becoming a stakeholder – instructions are provided at www.nclicoliation.org TAKE ACTION page.

Vendors and Exhibitors for the ISTA Science Education Conference contact:
Harry Hendrickson
Executive Director
Illinois Science Teachers Association
218 Cumberland Drive
Rochester, IL 62563
hrhendrickson@comcast.net
phone 217-498-8411, fax 217-498-8408

Science Matters/Building a Presence

Mary Lou Lipscomb
Science Matters/BaP Illinois State Coordinator

At the National Science Teachers Association (NSTA) annual conference in March, NSTA Executive Director Francis Eberly formally announced that the Building a Presence for Science network is now one part of the new *Science Matters* initiative of NSTA. Although there will be no immediate change in the way in which the BaP network functions, there will be a gradual name transition from "Science Matters/BaP" to just "Science Matters." You may also notice that the BaP logo is no longer used by NSTA; the new Science Matters logo is used in its place. Check out the Science Matters homepage at www.nsta.org/sciencematters. Clicking the "Teachers" link will bring you to the Building a Presence for Science home page.

The Science Matters/BaP initiative is an electronic network implemented in Illinois by ISTA; the purpose being to foster communication, collaboration, and leadership among science educators. All members of the Illinois network receive national eblasts from NSTA and the monthly 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 the eblasts but are a member of the network, please update your contact information on the Science Matters/BaP website (www.bap.nsta.org). If you do not remember your login and/or password, 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 ultimate goal of Science Matters/BaP is to have at least one contact person in every school in Illinois. Contacts in this network are seen as communicators, leaders, and advocates for standards-based science education. For more information about Science Matters/BaP in Illinois go to www.ista-il.org and click on the link. When you visit the Science Matters/BaP-Illinois web page be sure to check out our state partners. Science Matters/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 Science Matters/BaP network in Illinois is invited to check out the opportunities and responsibilities of 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

Educators may engage in their own professional development in ways other than going to workshops. Professional development includes all of the ways that teachers learn to perfect their skills as educators. As lifelong learners, teachers accumulate a wide variety of knowledge and skills that they use to create new activities, lessons, or entire units. Teachers also use their accumulated knowledge to develop new ideas to spark or maintain interest, keep things moving, or help students understand a concept in a way that is unique or different, and sharing these ideas with colleagues provides professional development for all involved.

In this issue four educators have sent classroom management tips, ideas, and lessons that they have successfully implemented with students both in formal and informal educational settings.

A sincere "Thank You" to all who have shared their ideas.

Managing Materials for a Lab or Hands-On Activity

Tammy Knippenberg, a BaP key leader and seventh through ninth grade teacher at Lexington Junior/ Senior High School in Lexington, writes that teaching three subjects to six classes with only one prep period has presented certain challenges. Her classroom has only one large teacher demonstration table and sink at the front of the room.

She says, "I have found a great way to stay organized and keep my sanity in between classes. I use plastic baskets that I have purchased at the dollar store to organize lab materials for each class. Each subject that I teach has a set of ten numbered baskets. It works best if there is a specific color per subject. Each basket gets a full set of lab materials that a group of two to four could use. I usually include a roll of paper towels (my custodian saves for me the end rolls of the restroom paper towels when they change out the rolls).

"During lab prep with the students, I review the contents of the basket, and they keep track of materials and notify me of any deficiencies. At the end of the period, they return all materials to the baskets so they are ready for the next class. I have tables along one wall in my classroom where the baskets are kept, and the students know that is where they pick up and return the baskets when instructed to do so. I also have a specific spot at the tables for materials that need to be cleaned. The baskets are a life saver when I have labs in each class simultaneously. I couldn't live without them!"

Assigning Point Values to Test Items of Varying Difficulty

Monika Langdon, a BaP key leader and tenth grade teacher at Maine South High School in Park Ridge writes, "The difficulty in a multiple choice test in chemistry is that a simple question like 'Is this a physical or a chemical change?' would be worth the same amount of points as a more in-depth problem. So what I did on the final exam was to have a calculation problem be assigned multiple question numbers. For example, one problem would be questions 77, 78, and 79. This would make this question be worth three times as many points (as a single multiple choice question)."

Tying the Concept of Density to the Densest Thing in the Universe - Black Holes
John Van Horn, the contact person for BaP state partner the University of Illinois Extension - STEM team located in Cook County, sends an activity that is based on one found in the NASA program *After School Universe*. He has used it with students in grades five through eight.

This activity simulates what happens to the density of a star's matter during the core collapse which forms a black hole (or neutron star) immediately prior to a supernova explosion. It addresses the concepts of mass, volume, density and (with use of widely available information from NASA, and so forth), black holes. It works well with groups of two to four students.

John writes that you can have the students do the calculations involved individually or as a whole class activity depending on their familiarity with the relationships between circumference, diameter and volume. He indicates that he has had students do all calculations, or has given them most of the calculation and only required them to do easier measurements—depending on their ability level.

The data sheet is set up to complete five measurements including the initial one, this usually works well. However you do need to emphasize that they will "shrink" the sphere slowly until the last step. John suggests that you practice doing the procedure one or two times before doing it with the students to get the feel for the activity.

Making a Black Hole
Materials:
round balloon, aluminum foil, scale (food scale works) reading in grams, calculator, and black hole creation data collection sheet.
Procedure:

1. Students blow up a balloon to around 4" in diameter (size isn't extremely important, but larger is better than smaller) and knot it.
2. They then cover the inflated balloon with aluminum foil. Here the idea is that the whole balloon is covered.
3. Take the mass of the aluminum foil covered balloon, and measure its circumference.
4. Record these results. They can do the calculations of radius, volume, and mass to volume ratio (density) now or wait until all trials are completed.
5. Then pop the balloon, leaving it inside of the aluminum foil sphere, and compress the sphere of aluminum slightly. Here the students need to try to maintain the foil as close to a sphere as possible, but exactness is unlikely.
6. Repeat steps 3 and 4
7. Shrink the sphere again and repeat the process.
8. On the last trial, have the students compress the ball of aluminum as far as possible. They generally do this with *enthusiasm*.
9. Then you can have them look at the data and draw conclusions. These can include:
    a. Density increases as volume gets smaller
    b. The graph of the density isn't a straight line.
    c. If you have them do some more samples as volume gets much smaller (0.1 cm, 0.01 cm, 0.001 cm) the density increases rapidly. This is what happens in a black hole as it collapses to a point.

This activity addresses the following Illinois Goals for Learning: 11.A.2b, 11.A.3c, 12.C.2b, 12.C.3b 12.F.3c, 13.A.2.c, 13.A.3.c.

Black Hole Creation Data Table

Trial	Mass	Circumference (C)	Radius $= C/(2\pi)$	Volume $= (4/3)\pi r^3$	$\frac{\text{Mass}}{\text{Volume}}$
1					
2					
3					
4					
5					

Teach About Research in Antarctica Involving Climate Change

Betty Trummel, a teacher and BaP point of contact at Husmann Elementary School in Crystal Lake, has done extensive work with an educational outreach project called *Antarctica's Secret Climates* flexhibits. The word *flexhibit* simply means *flex*ible ex*hibit*. This informal science education project is funded by the International Polar Year program of the National Science Foundation to increase public understanding of ANDRILL, the multi-national, NSF-funded Antarctic Drilling Project. Betty and Louise Huffman, ANDRILL education and outreach coordinator, are educators who have had the experience of working with scientists for several weeks in Antarctica, and using the flexhibit materials with students in fifth through tenth grades.

Betty writes that all teachers now have an opportunity to get involved and use the materials developed specifically to teach about climate change as it relates to science research taking place in Antarctica using a variety of flexhibit materials available on the *Antarctica's Secret Climates* pages: www.andrill.org/flexhibit. With the materials available on the website, teachers can select the themes and activities that best fit the age and ability level of their students.

Components of the flexhibit package include a digital collection of high resolution images and colorful banners, multi-media files including podcasts and video journals, and a teacher's guide with lessons and hands-on activities. Props built by students during the learning activities are used to demonstrate and explain Antarctic science to flexhibit attendees in a type of flexible science event at a school or alternate venue.

Flexhibit events allow students to take charge and teach others through unique hands-on exhibits and activities. Hosting a flexhibit helps students build knowledge, confidence, and experience. Kids teaching kids is a successful model that has made an impact not only on students, but parents, administrators, and the general public. Museums that have embraced this model and hosted flexhibit events include the Field Museum of Natural History and The Museum of Science and Industry in Chicago.

The five themes of the flexhibit include:
*Antarctica Today***:** Presenting the continent of Antarctica and its unique challenges; comparing the Arctic to the Antarctic.
*Antarctica's Ice on the Move***:** Promoting a deeper understanding of sea ice, ice shelves, ice sheets, and glaciers.
*Reading Antarctica's Rock Cores***:** How do scientists retrieve sediment cores and interpret them?

Tiny Clues to Antarctica's Past: Diatoms – How do these tiny organisms give scientists information? *Decoding Antarctica's Climate History:* Illustrating the changes in temperature in the past, present, and future, and modeling how Antarctica might look in the future.

Based on their experiences, Betty and Louise think the educational meanings and the values of teaching polar science are:

- the opportunity to teach about unique places and changes occurring in the polar regions;
- to keep students excited about learning;
- to share the process of science and research;
- to keep our own learning alive.

Check out this unique educational package at www.andrill.org/flexhibit and host your own flexhibit! In addition, Betty and Louise are available to host teacher workshops on how to use the flexhibit materials.

Betty Trummel
(815) 382-6144
eatrummel@d47.org

Louise Huffman
(630) 460-3688
lhuffman@andrill.org

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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

International Cooperation and Educational Outreach Efforts during The International Polar Year

Betty Trummel[1] and Matteo Cattadori[2]
[1] Husmann Elementary School, Crystal Lake, Illinois
[2]Museum of Natural Science, Trento, Italy

Back in the fall of 2006, we had the opportunity to begin our involvement with the ANDRILL (ANtarctic geologic DRILLing) Project as part of the ANDRILL Research Immersion for Science Educators (ARISE) program. ANDRILL, a multinational scientific collaboration, involves scientists from Germany, Italy, New Zealand, and the United States. The goals of this project are to examine sediment cores drilled from the Ross Sea floor (as witnesses of the history of paleoenvironmental changes) and conduct scientific research in a wide variety of science disciplines within geoscience. This research improves our understanding of the fluctuations of the ice in the Antarctic region. Approximately sixty scientists came together on the ice, to look deeper into Antarctica's climate history. The ANDRILL cores give more detailed windows on the Antarctic Ice Sheet evolution and its relationship to climate changes.

ANDRILLS's ARISE program has been one of the key efforts during the International Polar Year to highlight and share the work of scientists in action.

Involving Teachers in the Education and Outreach Project

Working daily as members of science teams, the six ARISE educators (three from the U.S. and one each from Italy, New Zealand, and Germany) were genuinely immersed in current geological research. We worked side-by-side with the scientists, gathering data to share the array of stories the core had to tell. We contributed by performing a variety of scientific analyses including chemical analyses for the porewater geochemistry team, preparing microscope slides for sedimentologists, counting and classifying stones (clasts), or working as core technicians at the ANDRILL drill site laboratory. In addition, ARISE educators helped the curators scan the core and prepare microfossil samples. Some ARISE educators were able to integrate into two or more different science discipline teams while on the

From left: Tim Naish, Richard Levy, and Ross Powell.

ice, which gave us more opportunities to connect with the process of science and transfer that to classrooms around the world.

In addition to immersion in the science teams, there were on-going opportunities to advance our content knowledge in many areas of geoscience, as ANDRILL scientists gave daily lectures. We were welcomed into the ANDRILL scientific community as an active part of the project, and this was an excellent learning experience for educators and scientists alike. Immersion enabled educators to connect and share the scientific work being accomplished. It benefited ARISE participants and those around the world who learned about ANDRILL as it took place, being able to ask questions, read daily informational blogs, take part in video and teleconferences, and see photographs of scientists at work in Antarctica.

From a science and communication outreach perspective, ANDRILL'S ARISE program has been one of the key efforts during the IPY to highlight and share the work of scientists in action. This includes professional development of educators and outreach to a broader educational community as a fundamental goal of ANDRILL. Positive outcomes from this integration extend far beyond the field season.

This is evidenced by ARISE participants working on individual educational projects targeted to specific audiences. These projects will become part of ANDRILL's contribution to the educational community. Though the ARISE educators come from a wide range of educational scenarios, we each have the goal of communicating the excitement and importance of ANDRILL's science to people beyond Antarctica. The challenge for each of the members of the ARISE team was to capture what they could of the research experience and pass it on in ways that will raise awareness of and build value for geoscience research in Antarctica. As part of the ANDRILL ARISE team, this meaningful professional development improved scientific content knowledge, provided participation in the process of science research, and gave us the tools to carry forth the excitement of science to students and educators around the world.

A Continued Connection: The U.S. and Italian International Cooperation

The experience of immersion triggered the communication projects and the subsequent creation of a system of relations between different entities. The most important point is that the parallel development of our two projects gave us the opportunity to gradually realize that, there is a new dimension of the ANDRILL-ARISE experience, the continual cooperation and growth of our educational relationship. In fact, Matteo and I have observed a very strong and profitable link between our two systems of relations and the interactions between our two different educational settings. Even though thousands of miles separate Italy and Crystal Lake, Illinois, we continue to develop our cooperation, learning from each other and improving our ability as science educators.

Matteo created the phrase "ANDRILL-ARISE education ecosystem" (AAee) to represent the many and varied connections we have developed since meeting in 2006. As ARISE teachers, we have had the opportunity to be connected in what can best be described as a type of educational ecosystem, as shown in the figures s 1 and 2.

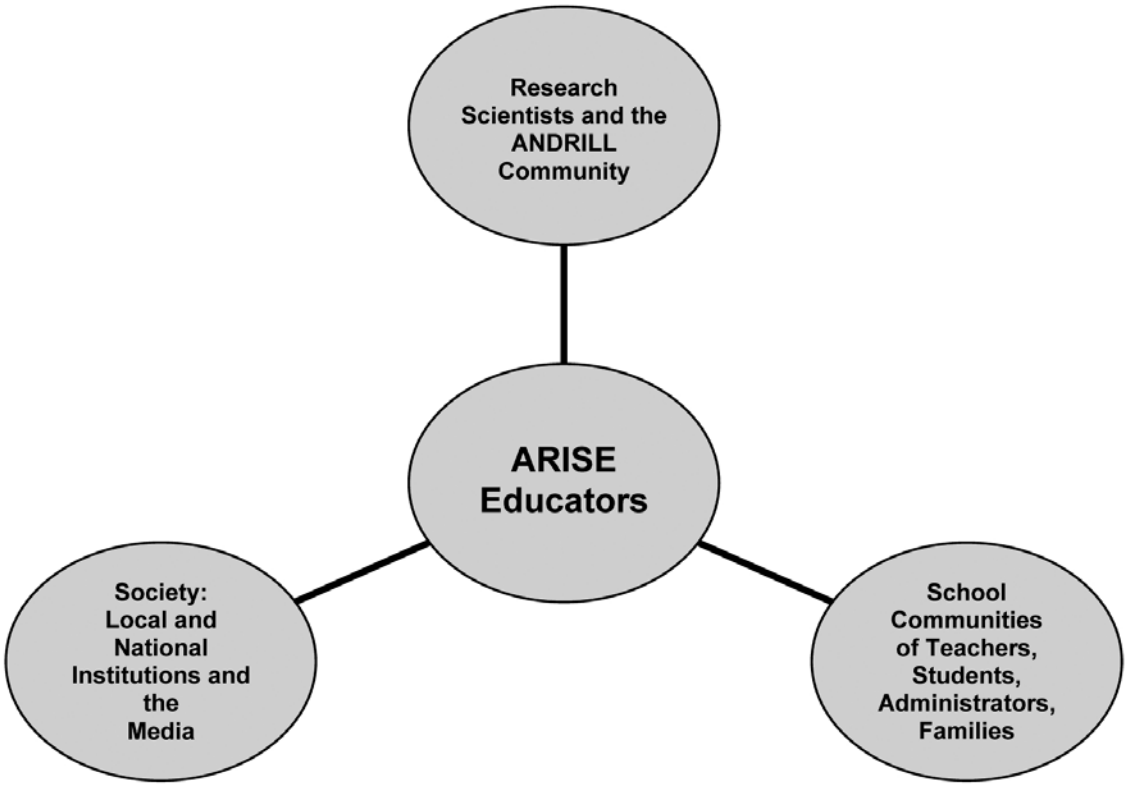


Figure 1. ANDRILL-ARISE Education Ecosystem

An analysis of the benefits derived from the link between the system of relations between the U.S. and Italy has shown benefits in three main categories:

Benefits - ARISE Teacher to ARISE Teacher

- mutual support of our educational outreach initiatives
- adds a multilingual and cultural perspective
- better dissemination techniques
- organization of educational events (with each other and in our own countries)
- significantly enhances our abilities as educators

Benefits - ARISE Teachers to Students/ Teachers

- find international partners for projects and activities (linking other teachers together country to country and classroom to classroom; broadens world perspective and brings classrooms around the world together in a common learning environment)
- connecting scientists to classrooms
- improving and updating of content knowledge
- demonstrating an interest in lifelong learning as a preferred channel for the transfer of information

Benefits - ARISE Teacher to Institutions

- dissemination of activities and work (Betty: Field Museum of Natural History and the Museum of Science and Industry in Chicago; Matteo: his website www.progettosmilla.it , the Museum of Natural Science in Trento, Italy and connection with the Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy)
- research of national and local institutions interested in supporting the participation of an Italian educator to a project not ANDRILL-related (International Ocean Drilling Project's "School of Rock" program in summer, 2009)

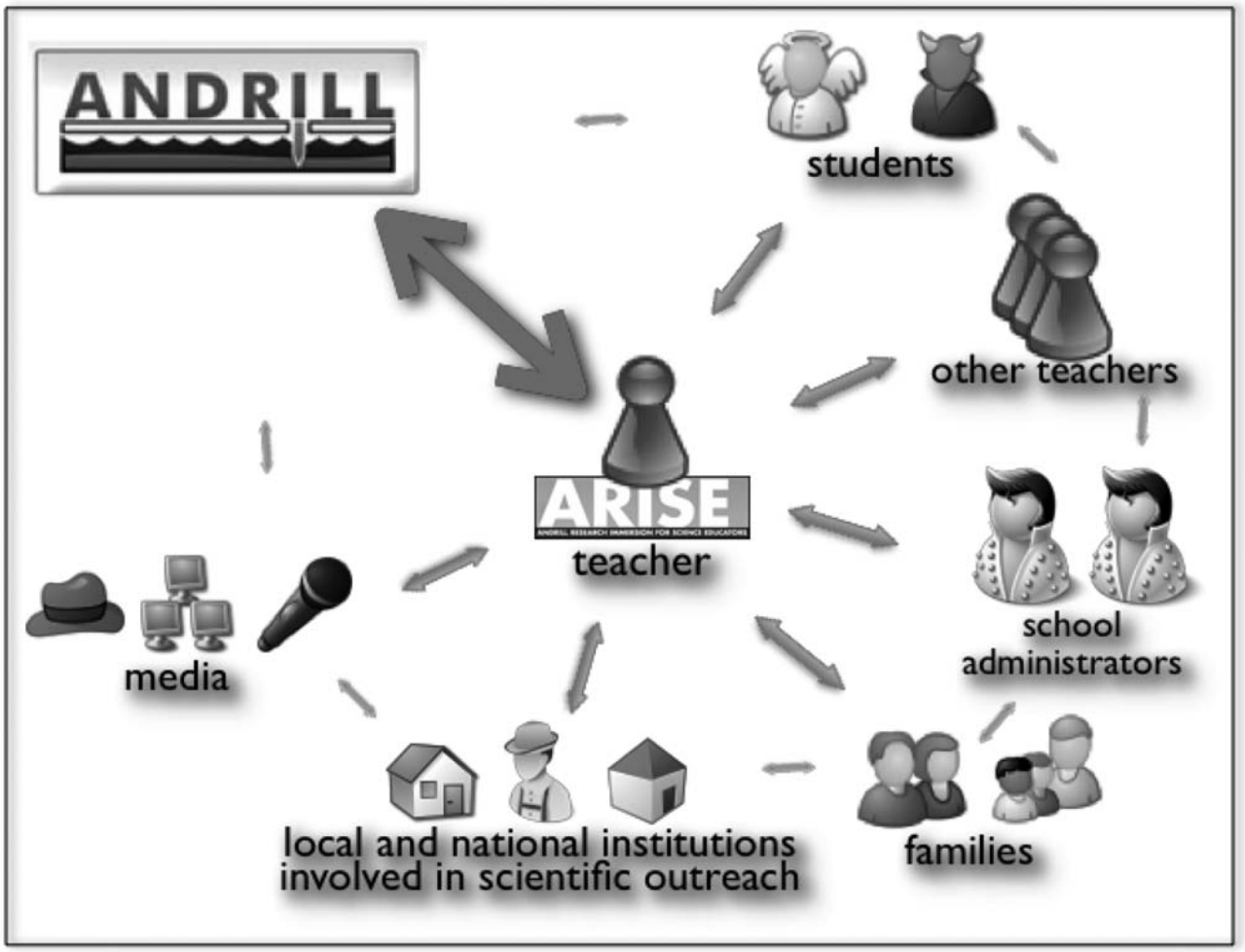


Figure 2. ANDRILL-ARISE Education Ecosystem

Conclusions

We come to the conclusion that the term ARISE fits perfectly to our experience for many reasons:

- *arise* of the impact of the research to education and society
- *arise* of not only our own science content knowledge, but that of colleagues, students, educational communities, the general public through media exposure, and others associated with institutions
- *arise* of innovative approaches
- *arise* of our professional skills

And, hopefully many more *arises i*n the future.

For further information on ANDRILL and ARISE visit http://www.andrill.org/iceberg/

Acknowledgements

Thanks to Richard Levy (formerly at the ANDRILL Science Management Office, Lincoln, Nebraska; currently at the Institute of Geological and Nuclear Sciences, Lower Hutt, New Zealand) for the inspiration behind the ARISE Program. Thanks also to Ross Powell (Northern Illinois University, DeKalb, Illinois) and Tim Naish (Antarctic Research Centre, Victoria University, Wellington, New Zealand), the Co-Chiefs of the ANDRILL McMurdo Ice Shelf Project, for all of their continued support.

The Law and *Bringing Nature In*
An Interview with Valerie Keener of the Illinois Department of Natural Resources

Jean Mendoza
University of Illinois at Urbana-Champaign

Teachers who want to engage children with nature know that nothing gets a child's attention like an authentic specimen – preferably something alive. But too few teachers are aware that state and federal laws may prohibit or limit individuals' possession of live wild animals, plants, or even non-living natural objects. In April 2009, Valerie Keener of the Illinois Department of Natural Resources (IDNR) participated in an e-interview with Spectrum elementary editor Jean Mendoza, focusing on the sometimes intricate, but very important, legal issues that may be involved in bringing nature into the classroom.

Jean Mendoza: What is your position at IDNR and what are some of the things that you do in that capacity?
Valerie Keener: I am the administrator of the Division of Education, and I also do program development. Besides the administrative functions, I coordinate and promote all of our programs and develop supplemental educational resources such as posters, CD-ROMs, activity books, and other items.

JM: The IDNR has a wide array of hands-on materials for teachers to use in classrooms – books, beautiful wildlife posters, CDs, and traveling trunks of resources. Many of them are free to Illinois residents. What has been your role in creating and maintaining those materials?
VK: I am the person in charge of development and maintenance of them. I also work with other IDNR staff to ensure that the online ordering system works properly so that we can get the items to the people who want them. All of our materials are free of charge, but some of them have an associated shipping fee if they are ordered by people who are not teachers in schools registered with the Illinois State Board of Education or the Illinois Board of Higher Education. Our goal is to be able to provide these Illinois-specific resources free of charge to the teachers who will use them to supplement lessons in their classrooms.

Valerie Keener

JM: Most educators who get children involved with science know that students need to interact directly with things from the natural world in order to better understand them. That's part of the role of IDNR resources like the *Illinois Insects and Spiders Trunk* and the *Illinois Tree Trunk*. Of course children and teachers often like collecting things "from the wild" on their own, too. I understand you are now working on something that teachers might not normally expect to see when they visit the IDNR Web site – information about laws that can affect what

teachers and children can collect and keep in the classroom. Can you tell readers a little about that project?

VK: We are in the process of developing a Web page to give educators information about possessing wildlife and wildlife parts in the classroom. We hope to have it posted to our Web site at http://dnr.state.il.us/education very soon. Teachers may not receive much training in this topic, and it is important for them to understand what is legal and what permits they may need. Even if they don't have any intention of possessing wildlife, if a student brings an animal, a plant, an antler, a turtle shell, or other object to school, the teacher is involved. Possessing wildlife and wildlife parts is a complicated topic. The Illinois laws can be accessed at http://www.ilga.gov/legislation/ilcs/ilcs.asp , but educators may not have the time to dedicate to reading all of them and interpretation is often difficult. Some wildlife is under the control of the federal government, and local laws as well as individual landowner rights may also apply. The Web page will give pertinent information in a brief form with examples. If educators have additional questions, they can contact us.

JM: Let's start with feathers, since children find them easily. What laws are related to having feathers in a classroom? To birds' nests and wild bird eggs?

VK: Feathers from migratory bird species cannot be collected without a federal permit. A state salvage permit must be obtained before a federal permit will be issued. Feathers of nonmigratory game birds (wild turkey, ring-necked pheasant, etc.) cannot be collected without a permit, but if a properly licensed hunter would like to donate to a school the inedible parts of these birds, harvested legally, he or she may do so. If the school accepts the items, it must keep the name of the hunter on file. Regarding bird nests, there are two criteria that must be met. First, you must have a scientific collection or salvage permit. Second, it must be legal to remove the nest according to the rules and regulations of the property owner. A person cannot take any inedible parts of nongame birds (including nests and eggs) without a permit. You should never disturb an active nest with eggs and/or young birds. Instructions for obtaining permits can be found at http://dnr.state.il.us/legal/adopted/520.pdf.

JM: When I was a child we often collected toads, frogs, crayfish, insects, and other creatures and took them to school. The ones that survived would be turned loose again. What do today's laws say about having live wild animals in classrooms?

VK: There are laws that apply to aquatic species and laws that apply to other wildlife. As an example, let's say that a student finds a turtle and brings it to school. Is it legal for the student to possess the turtle? Is it legal for the teacher to keep it in the classroom? First, the animal should not be a species that is listed as either endangered or threatened. If it is not an endangered/threatened species, it is legal for the student to possess the turtle as long as he or she is under the age of 15. When a student turns 15, he/she is required to have either a scientific collecting permit, a scientific salvage permit, a current Illinois fishing license or a current Illinois combination sportsman's license in order to possess the turtle. If the turtle is to become the possession of the educator, he or she is required to have one of these same licenses or permits. The organism must have been legally obtained following the guidelines discussed earlier in this article.

Even though it is legal to possess some species, the Illinois Department of Natural Resources does not endorse the collection of live specimens. Before agreeing to host wildlife in your classroom, ensure that you can provide it with the care that it will require to survive, and also that you can keep the students safe from the creature and any diseases it may carry.

JM: Some corporations that specialize in science materials sell kits that allow you to watch caterpillars become butterflies, or tadpoles become frogs. Are there any concerns about these kits?

VK: Yes. Teachers should never purchase to raise and release species that are not native to Illinois. There are also concerns about changing the gene pool or introducing diseases into native populations by releasing individuals that have been bred/raised

in other parts of the country, even if the same species lives in Illinois.

If possible, plant a butterfly garden to attract native species instead of buying a kit to raise butterflies indoors. Students can be involved in the process from selecting and raising plants to observing the life cycle of the species that visit the plants.

We suggest that the teachers only raise tadpoles that have been purchased from a pet store. As long as they are in possession of the tadpoles or frogs/toads, they should keep the purchase receipt. Should any of the frogs/toads reach maturity, they cannot legally be released into the wild without the permission of the Illinois Department of Natural Resources. This law is important because it prevents diseased wildlife and wildlife that is not native to Illinois from being released and harming native populations. Teachers who raise tadpoles should be prepared to keep any resulting frogs or toads, and there could be many of them.

JM: I'm wondering about other items that teachers and children might collect that could be problematic. What about mollusk shells? Deer antlers? Turtle shells? Skulls or other bones of wild animals?

VK: There are laws that cover all wildlife and wildlife parts, and as explained earlier, there can be numerous agencies involved. We cannot address all the issues for every item in this discussion but can give you some ideas about situations that commonly occur.

Inedible parts of white-tailed deer, including bones and shed antlers, may be kept if found on private property, with the landowner's permission, and some state property (State Fish and Wildlife Areas). They may not be taken from Illinois state parks. City parks, nature preserves, forest preserve districts, and other areas may have their own rules.

It is imperative that you talk to site staff before removing any natural object from public land and to the landowner before removing any natural object from private land.

JM: We've talked about the animal kingdom – but what about laws related to the plants that a teacher makes available in his or her classroom?

VK: Plants can be covered by laws, too. No endangered or threatened species should be collected or possessed. Again, you should speak to the landowner/site staff before removing any natural object from public land or private land. No plants should be removed from nature preserves.

JM: What about nonliving things: rocks, fossils; and so on? Are there laws regarding possession of such items?

VK: The laws are mainly about having permission to remove the object from where it is found in nature. Again, you should speak to the landowner/site staff before removing any natural object from public land or private land.

JM: As you have already said, the IDNR has not yet finished its new resource regarding laws about possession of wild animals, animals parts, plants and other materials. How will *Spectrum* readers be able to find this Web page when it is completed?

VK: The best way to find out about the Web page will be to visit http://dnr.state.il.us/education. We'll post a link to it there and will probably post it as a podcast on iTunes, too. If they belong to our list serve or the ISTA list serve, we will also send messages to those lists with the information.

JM: Thank you for your time, Valerie, and for your work on another potentially useful resource for Illinois educators.

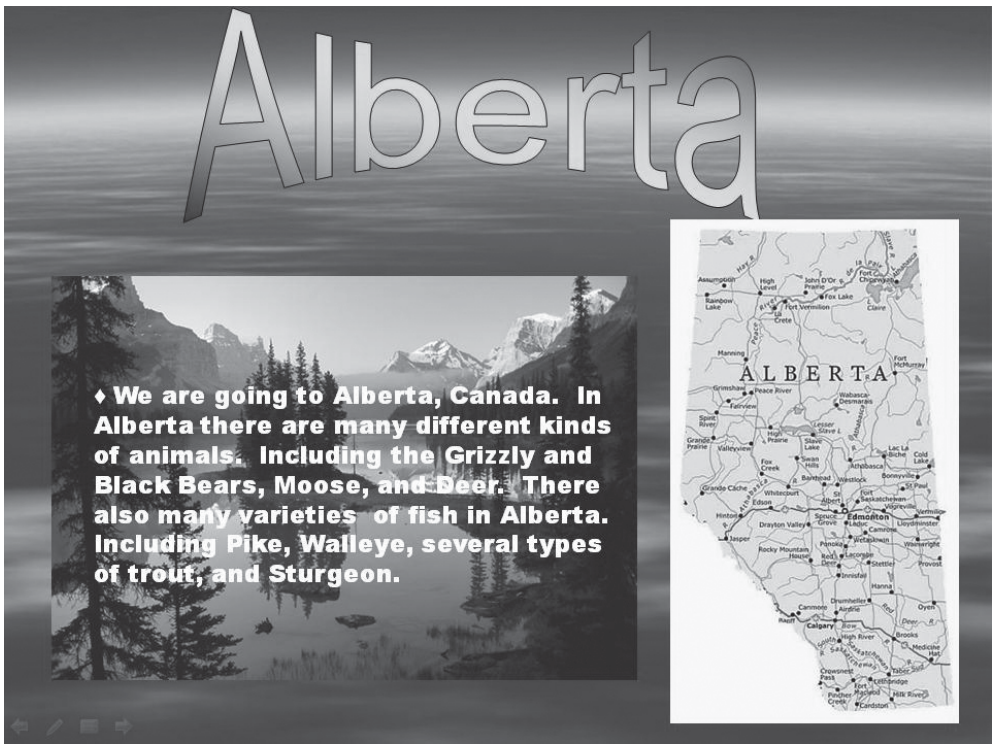
The IDNR now has an online resource about the legalities of possessing wildlife, and so forth. It's called "Wildlife in the Classroom" and teachers can link to it through "Site Features" at http://www.dnr.state.il.us/education/index.htm.

Discovering Electricity and Alternative Fuels Using Project Based Learning

Patty S. Page
Donovan Junior/Senior High School

The principal was in the classroom for a biannual evaluation. The students had just sat down at their desks and begun working on the opening Bell Ringer activity. Why is a desk lamp wired in series? A 2' x 3' post it was on the board with a drawing of a typical desk lamp with the wiring and the switch exposed. About four minutes later, students were discussing answers. It was evident that they were not really sure of all their ideas. A *want-to-know list* was generated. Students got in their groups and decided what they thought parallel and series circuits could do. They created a hypothesis, decided how they might test it and recorded it in their journals. The next twenty minutes was spent at lab stations trying different circuits and recording what worked and what didn't. Coming back together students answered a couple of guided inquiry questions and recapped what they found. Later the principal would write, "…students [were] actively engaged throughout the entire period" and "Everyone was interested and focused…" Why were the students so engaged? These students were immersed in a project based learning unit using a problem platform.

In the fall of 2007, two classes of eighth graders, approximately forty-four students, at a small rural school participated in a unit on Electricity and Alternative Fuels using a problem platform. The required objectives covered the following topics: electric charge, electric current, electrical energy, magnetism, electricity and magnetism, producing electric current, fossil fuels, nuclear energy and renewable energy sources. Student groups demonstrated their knowledge of different topics such as solar energy, circuits, electric motors, and generators and so forth by giving topic specific presentations.



Cover Screen for Alberta

Problem platforms start with a problem that students must discover *how to* solve and, of course, eventually solve. Problem based platforms were inspired by work on problem based learning at the Illinois Mathematics and Science Academy (IMSA).[1] For the purpose of this project, an authentic societal problem was embedded in a fictional scenario to not only add adventure and interest for the students but assure that the entire curriculum was covered. The scenario was created to lead the students through the curriculum topics in a coherent way, so they would all fit together into a big picture:

You and your team of scientists will be studying bears that live along the rivers in Alberta, Canada. You are embarking on a three year study and will need a place to stay not far from the area you are studying. Because bears hibernate in the winter, you will only reside in your building from April 1 through November 30 each year. However Canada can get cold and windy so heat and a substantial shelter are *required*. Besides housing the scientists, your building will shelter scientific equipment including one or more computers that *require* 120 V of electricity that you *must* supply. Your shelter *must* provide a place to cook, to gather and to sleep. Arrangements *must* be made for water usage for the various necessities of life. Your arrangements *must* be healthy and sanitary over an extended period of time (eight months at a time for three years). The building will be built for you by a construction team according to your specifications. You may bring clothing, bedding and appliances, but caution; you *must* state how the appliance will be powered and provide that power. Your university will supply the computers of your choice and scientific equipment.

There are restrictions that the students are given such as:

- Building may not pull more than 3600 Watts at a time.
- No more than two 40 pound propane tanks can be taken.
- There is no natural gas or commercial power lines.
- No more than twenty gallons of gasoline may be brought for emergencies.

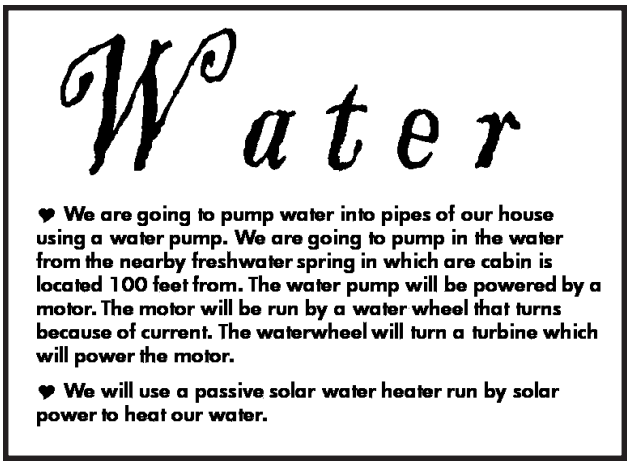
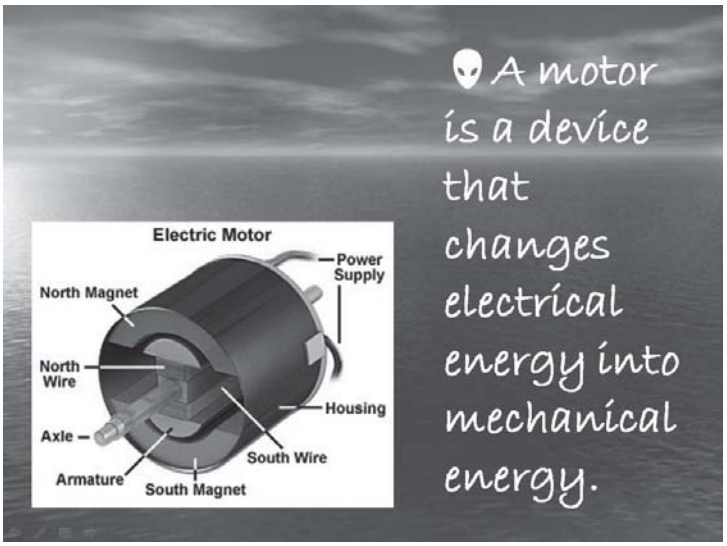


Figure 1. Water delivery.

Students then presented their detailed plan for solving the problem. Figure 1 shows one student group's account of how they would get water to the building. In another example, students talked about where they would obtain power and gave a detailed list of appliances to show that the draw would not exceed 3600 Watts (Figure 2).

The lesson described at the beginning of this article was only one of a group of individual lessons that were planned so students can discover various aspects of electricity or power that give them the tools to solve the problem. For example, one group

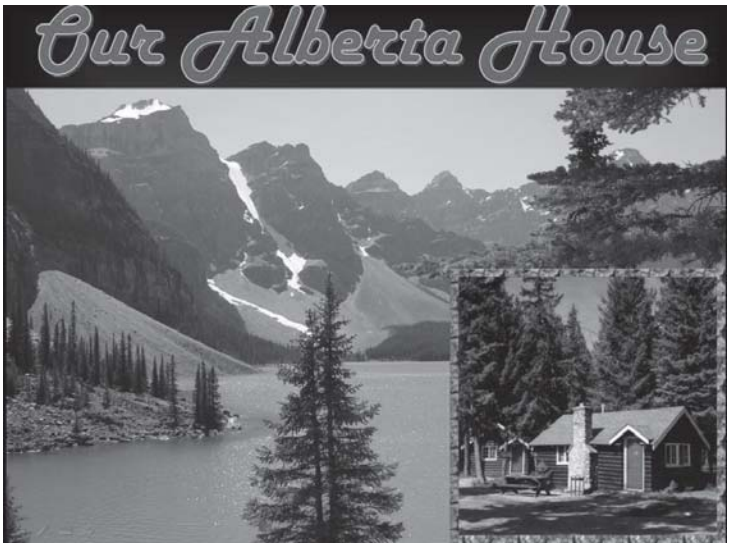
Figure 2. Poser usage by applicances.



Transformation of Energy

did not think of using batteries in their system until after the lesson on voltaic cells.

At least once per week students got together to work on their plans, incorporate new ideas, and solve problems. Lessons were moved or inserted in response to student questions or *need-to-know*. Students were given a pretest at the beginning of the unit and a posttest at the end. However the bulk of their grade was on their presentation of their plan.



Cover Screen for Our Alberta House.

Students were given a chapter test from a Glencoe physical science text as with other units previously studied. The class average grade after the project based unit was comparable to those on other units during the year. However, there were a couple more students above 80%.

Standards under all three state science goals were met at Stage H which lists mid-range descriptors for eighth grade such as "formulate issue-specific hypothesis," "formulate proposals for design investigation," explore electric and magnetic energy fields," "examine Earth's resources quantitatively," "apply scientific habits of mint to curricular investigations in … physical…sciences," and "explore natural resource conservation and management programs."

Students were excited all through the project from Van de Graff generator experiments to testing a solar fan. One student decided he wanted to be an electrician. Another student wrote "I helped my brother with lighting [his] game display…I helped him create a parallel circuit I explained each action…the lights were on in a flash."

The student presentations of the plan showed a lot of imagination and a few were quite impressive. Finally, would I do this again? Absolutely!!

Footnote

1"Problem-based learning is focused…around the investigation and resolution of messy, real-world problems" Problems as Possibilities, 2nd Edition; Torp, Linda and Sage Sara, ASCD (2002)

Author Information

Patty S Page is a secondary school teacher at Donovan Junior/Senior High School. Patty worked in industry with a bachelor's degree in chemistry. She received her teaching certification through Benedictine University where she did clinical work at the Illinois Math and Science Institute. Patty is currently working on a master of arts in education and is a George Hajek Memorial scholar. She is also a fellow of the Institute for Chemistry Literacy through Computational Science centered at the University of Illinois Urbana-Champaign. Patty can be reached at Patty.Page@mchsi.com.

Sexual Misconduct: Students and Teachers

Richard NeSmith[1] and Tammy Hendley[2]
[1]North Greenville University
[2] Treutlen Elementary School, Soperton, Georgia

Science teacher reported having sex with student over a period of the last six months! Ladies' physical education coach carrying high school football player's child! Nearly *every* state and *every* large city is reporting such sexual misconduct on a regular basis. This is terrible and inexcusable when it is said and done by teachers! Yes, we are seeing an epidemic of sexual misconduct between teachers (adults) and students (children) as never before in the history of American education. How could this be happening? Why the rampant and brass nature of such offenses? What happened to the *moral turpitude* that teachers have always represented in our American society? Do you, as a teacher, recognize the signs of sexual abuse *or* the signals of an illicit sexual affair between a fellow teacher and a student? Teachers cannot afford to be labeled as sex offenders and child predators, for it is the innocent professionals who will suffer from such labels. Nor should it have ever reached such pandemic levels as we are presently witnessing among professionals.

We are seeing an epidemic of sexual misconduct between teachers and students.

Sexual misconduct between educators and students has become a serious problem, according to Fitzpatrick (2000), and is increasing at alarming rates. Rarely can a person watch the television news, read the local newspaper, or surf the Internet news pages without seeing a report pertaining to this tragic violation of professional trust and abuse of power. Ten years ago, this type of scandal was thought to be limited to rare groups of clergy. Sexual misconduct, however, is certainly not limited to offending clergy or any other profession. Recent news reports indicate that cases involving educator misconduct have actually surpassed those of priests accused of sexual misconduct (Irvine & Tanner, 2007). "Sexual misconduct is defined as behavior by an educator that is directed at a student and intended to sexually arouse or titillate the educator or the child" (Shakeshaft, 2004, p.1). These behaviors include physical, verbal, or visual ones. Examples include touching of breasts or genitals of students; oral, anal, and vaginal penetration; showing students pictures of a sexual nature; and sexually-related conversations, jokes, or questions directed at students (Sutton, 2004; Hendrie, 1998b). Looney (2004) noted in *Education and the Legal System*, that the courts recognize two critical decisions that affect education; teacher-to-student sexual harassment and student-to-student sexual harassment. Courts take the former very seriously due to the *in locus parentis* nature of education. Sexual misconduct falls within the laws typically addressing sexual harassment. Such offenses are considered criminal and heinous and can range from misdemeanors to felonies (Looney, 2004). Sexual misconduct need not result in actual sexual activity to be considered a crime. The language of a teacher that is considered vulgarity, and addressed toward a student is also a form of sexual misconduct (Valente & Valente, 2005). Conduct involving morality places teachers above most professions. Essex (2006) noted the following: *"Public school teachers serve in highly visible and significant*

positions. In many instances, they exert important influence on the views of students and the formation of their values. Based on their roles, there is an expectation that a teacher's character and personal conduct be elevated above the conduct of the average citizen who does not interact with children on a daily basis (p. 155)."

Courts view that teaching is an *exemplary professional activity* and those who teach should exhibit behavior that is above reproach, and unbecoming conduct considered "grossly inappropriate" can cost a teacher his or her license, or even jail time (Essex, 2006, p. 155).

According to the U.S. Department of Education (2004), approximately 10 percent of the students in the U.S. will become the victim of sexual abuse or assault by an educator during their school years! That percentage translates into approximately 3.4 million students who are in kindergarten through grade 8. When grades 9 through 12 students are included, then the number rises to 4.5 million students. The report further noted that teachers are the most common offenders, followed by coaches, substitute teachers, bus drivers, and teacher aides (Hendrie, 1999).

The National Association of School Psychologists advocated that children who experience abuse sometimes have difficulty concentrating in school and their grades may drop considerably (*Stress school policy*, 2004). They may also experience depression, general fearfulness, frequent nightmares and other sleep disorders, as well as poor self-esteem. Many of these problems could continue throughout the adult years. Victims of school-related sexual abuse often dropped out of school, developed serious medical and psychological conditions, developed dysfunctional sexual behaviors, and have attempted or successfully committed suicide. The impact is far-reaching.

Recent data on victims of educator's sexual misconduct reported that students suffer emotional, educational, and developmental or health effects. At least a third of students report behaviors that would negatively affect academic achievement including, but not limited to, avoiding the teacher or other educators, not wanting to go to school, not talking much in class, having trouble paying attention, staying home from school or cutting classes, and having difficulty studying (*Stress school policy*, 2004). Many victims also reported academic or discipline repercussions that are attributed to the incident, including changing schools, receiving lower grades on tests or assignments, receiving lower grades in class, getting into trouble with school authorities, and feeling less likely to get a good grade. In addition to sleep disorders, sexually abused victims are also known to experience adverse effects on their health, including eating disorders and loss of appetite. Common emotions for these students include negative feelings of self-worth, embarrassment, being overly self-conscious, feeling unsure or less confident, feeling afraid or scared, confusion about their identity, and doubting whether they could ever have a happy romantic relationship. For most children, being the victim of sexual misconduct does damage that lasts well into adulthood. For most victims, the damage is never fully repaired (Kendell-Tackett, 1993). Finkelhor & Browne (1985) noted that sexually abused students lose trust in adults and authority figures, suffer physical ailments, experience lowered immune systems, and perform below their abilities in school. They often drop out of or avoid school altogether. Sexually abused children are more likely than children who are not sexually abused to be substance users as adults and to have difficulty forming intimate relationships (Finkelhor, 2001).

According to Shakeshaft (2004), teachers and coaches seem to receive the most media attention for sexual misconduct; however, such misconduct exists within all categories of educators. Music teachers or coaches, whose job description includes time with individual students, are more likely to sexually abuse. From 1995 to 2003, 25 percent of the Texas educators who were coaches or music teachers were disciplined for sexual infractions involving students. Statistics indicate that teachers who also coach in Washington state are three times more likely to be investigated by the state for sexual misconduct than non-coaching teachers. The Illinois Department of Children and Family Services (DCFS) reported data on substantiated sexual and physical abuse complaints

against educators over the last eight years. DCFS found 323 cases containing credible evidence of abuse by school personnel (Reader, 2008; Russo, 2007).

According to an Associated Press study conducted by Irvine and Tanner, (2007), 2,750 state disciplinary actions against teachers were processed for sexual misconduct from 2001 to 2005. Such misconduct accounted for 26 percent of all disciplinary actions taken against educators during that time. At the current rate, it would appear that sexual misconduct among teachers has become an exponential problem. In the cases where the victim's gender was clear, the largest proportion was female. Approximately 9 out of 10 offenders were male. There were criminal convictions in 1390 cases which equaled approximately 53 percent of the cases. This study revealed that 1636 teaching licenses were revoked, 440 were surrendered, 376 were suspended, and 108 were denied. The remainder of the cases had other punishments assigned. Physical contact was present between the educator and the student victim in 72 percent of the cases.

Sexual misconduct in schools is a problem that can devastate students, parents, school, districts, and entire communities. Acknowledging the problem, educating for it, and following common-sense policies can go far in reducing or eliminating school-based sexual misconduct. One of the worst possible experiences in an educational leader's career is to witness the impact teacher sexual abuse has on a victim, his or her family, the colleagues of the accused teacher, the accused teacher, and his or her family and friends (Hardy, 2002).

One of the most effective ways to avoid improprieties between faculty and students is to seek to stop sexual misconduct before it begins (Lawrence, 2003). According to the U S. Department of Education Office for Civil Rights, all schools are required to have a policy against sex-discrimination and to notify students and elementary and secondary school parents of the policy. The United States Department of Education outlines a plan that assists school administrators in handling situations of this type. This plan informs school districts to consider the following guidelines to assist in preventing, reporting, and handling sexual misconduct cases:

1. Have a definitive policy that clearly addresses the issue;
2. Make certain that faculty, staff, parents, and other stakeholders know the policy;
3. Follow your professional instinct;
4. Listen for rumors and investigate them;
5. Report—in all cases;
6. Provide training for faculty and staff;
7. Discuss any rumors, concerns, suspicions with the district administrators and the accused; and
8. Record all allegations and outcomes.

As accusations and dismissals are always open to litigation, districts must be *proactive* and *fair* in handling the accused and the accuser(s). Regarding measures of avoiding litigation, districts should consult with their attorneys. Essex (2006) provided guidelines for dismissal for cause. Paraphrasing, he reminded to:

1. Avoid any actions regarding evaluations for dismissal that may be viewed as harassment or intimidating the affected teacher.
2. Be knowledgeable of your state's statutory definition of insubordination and document situations in question (p. 156).

Preventing the occurrence of sexual misconduct by educators is the responsibility of schools, districts, administrators, and teachers. There have been many cases where school officials have been cited as being at fault in civil lawsuits and criminal complaints filed for failing to recognize, report, or properly act on misconduct in their midst. The school district's sexual-misconduct policy must be implemented and enforced if it is to have any effect. Zero tolerance is the only defensible policy, according to Looney (2004). Reporting grievances and investigation procedures must be followed up immediately in every single case. Documenting findings and other pertinent data is a must. Prompt, effective action may shield the school district from

legal liability. Under Title IX law, failure to respond to allegations of sexual misconduct, or failure to establish policies for doing so, may constitute *deliberate indifference*, possibly subjecting the school district to civil damages from individuals or from the Department of Education.

When sexual misconduct by an educator occurs, civil liability could be included in the Federal Court suit. This is possible under civil rights anti-discrimination laws (specifically Title IX of the Educational Amendments of 1972[i]), that actually target Boards; or under Section §1983 of a century old 1871 Civil rights law that is used to target boards but could also hold administrators personally liable. These Federal actions claim either the Board or administrator condoned discrimination based on sex that deprived a student of the benefits of a public education program or discrimination based on Fourteenth Amendment violation of due process and equal protection of the laws for sexual violation of a student's bodily integrity, because of a school custom, policy, or practice. Sometimes court suits are filed in state court based on grounds of negligent supervision, hiring, retention, or failure to report the incident under a state mandatory reporting statute. The state court negligence standard of proof is easier to achieve compared to the much higher federal court liability standards. Civil lawsuits against districts and administrators take place generally within two years of a conviction of the accused (Portner, 2000).

Legal experts and the U.S. Department of Education admonish teachers and administrators to pay attention to rumors, whispers, and oblique complaints from students. Principals are in a difficult position for they obviously must protect their students from abuse, and they must also protect the due process rights of faculty and staff members. Their position is made more difficult by the knowledge that they can be held personally responsible if they fail to take prompt and appropriate action when they receive a complaint (Kent, 2006).

Pinar (2008) suggested that practicing and preservice music teachers actually should be taught principles and appropriate behavior to avoid questionable actions. If this is true of music teachers, then maybe such training should be provided for all. We have adapted Pinar's suggestions so as to be applicable to *most* teachers.

1. If the teacher's office or room has no means of viewing in, request that a window be installed in the door. If possible, have a large glass window installed in one of the walls.
2. When giving individual instruction during school hours, teach in an open public area. Outside of school hours, schedule group lessons, instructions, or tutoring.
3. Avoid being alone with a student outside of school hours. For example, if it appears that a student will be left waiting for a parent to pick him or her up, request that another teacher or parent stay with you until the student is picked up.
4. Always bring other adults of both sexes when transporting students to performances or other events.
5. Do not allow students in your home unless a parent is present.
6. When emailing a student, send a copy to your principal and keep a copy in your files.
7. When it is necessary to phone a student, make the phone call from the school office. If not possible, phone, or text message students after notifying the principal. In addition, keep a telephone log sheet.
8. Have parents fit their own child for uniforms or costumes.
9. Correct breathing and improper playing positions (referring to music teachers) without touching students (as in speech or music lessons, or other courses where close contact is common). Modeling the technique oneself may suffice.
10. Sometimes students want to give us a hug for an innocent, emotionally valid reason. Make sure these are appropriate and take place in public (pp 7-8).

The No Child Left Behind Act of 2001 (NCLB) amended the mandate in Section 5414 of the Elementary and Secondary Education Act of 1965 (ESEA) to include that the issue of sexual misconduct be explored. This mandate required the U.S. Department of Education to conduct a literature

review study of sexual abuse in U.S. schools, which became documented in Educator Sexual Misconduct: A Synthesis of Existing Literature (Shakeshaft, 2004).

There are three possible outcomes of an investigation regarding sexual misconduct: the allegation is confirmed, the allegation is refuted, or the allegation cannot be confirmed or refuted. If the allegation is confirmed, the faculty or staff member must be punished. If the allegation is refuted, then the investigators must determine whether the allegation was made because of a misunderstanding or confusion, or was made with malice. In the case of a mistaken allegation, the student should be counseled regarding the harm he or she caused and how to avoid repeating the mistake. If the allegation was made with malice, the accusing student must be punished (Hendrie, 1998a). If the allegation can neither be confirmed nor refuted, then the principal must heighten his or her scrutiny of the accused. The accused should be counseled about questionable practices and behaviors that might be misconstrued. The principal should follow up with the student to determine whether the problem continues.

In conclusion, administrators must err on the side of student safety when faced with any kind of actual notice of substantial risk of abuse by an employee. Prompt, prudent action must be taken to follow district policy, investigate the circumstances, confront the parties, preserve confidentiality, memorialize the incident with a letter to the employee's file and, if necessary, re-emphasize professional conduct and ethical behavior by filing a mandated report (if your state has a reporting law) for further investigation or file with local police or state agencies. Otherwise, liability and loss of credibility can be attached to the district and administrators for failure to act appropriately to protect the safety of children in their charge (Stricherz, 2000). Let us become more concerned, more careful, and more observant so as to protect everyone from such unprofessional and predacious events.

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Author Information

Richard NeSmith is professor of Science and Technology Education and dean of Education at North Greenville University, and is an adjunct professor teaching doctoral students at Jones International University. He is a member of the editorial board of *Science Scope*, the *Science Education Review* (SER), and *Research in Middle Level Education* (NMSA). Richard has served as the ILSTA middle school editor for *The Spectrum* since 2004. He can be reached at richard@nesmith.net.

Tammy Hendley is an assistant principal at Treutlen Elementary School in Soperton, Georgia, and serves as the grant and testing coordinator. She taught middle school for ten years in Swainsboro, Georgia prior to moving into school administration. She is a doctoral student at Jones International University. She can be reached at tamtayhen@yahoo.com.

Footnote

i Further information can be found linking sexual harassment to sexual misconduct from the following legislation. Prevention of discrimination based on sex in public schools that receive federal funds. 20 U.S.C.A. §1681-1688. Title IX of the Educational Amendments of 1972 and Prevention of discrimination based on the equal protection clause of the Fourteenth Amendment that constitutes a violation of bodily integrity. 42 U.S.C.A. Section § 1983 of the Civil Right Act of 1871.

Measurement of Ultimate Speed: A High School Experience

Mark Adams[1], Steve Grosland[2], Hannah Nelson[2] and Albert Kim[2]

[1]University of Illinois at Chicago

[2]Glenbrook South High School

QuarkNet (2007) is a nationwide High Energy Physics (HEP) outreach program that has provided laboratory experiences to high school students. Originally conceived as a program to provide high school teachers with knowledge about HEP research, QuarkNet at the University of Illinois at Chicago (UIC) has also provided students with mentoring on performing cosmic ray experiments at their schools. The program has been supported by funds from the National Science Foundation. UIC has provided apparatus resources and has trained students in physics and astronomy experiments. High school teachers and students have attended summer workshops at UIC in order to gain experience with cosmic ray detectors. They have brought that experience as well as the detectors that they helped build, back to their classrooms in order to carry out further experiments, and in order to encourage participation by other students. These students are part of a nationwide network where they share their cosmic ray data and discuss their findings. In this way, they strengthen science education at their schools, working like scientists to collect, analyze, share, and discuss data and interpretations.

QuarkNet's Evolution at Glenbrook South High School

Since 2001, Mark Adams has been building partnerships with various high schools. In this article, we share how one such partnership, with teacher Steve Grosland at Glenbrook South High School (GBS), has evolved from students attending introductory lectures at UIC to independent research performed by students at their school. Leading students to study cosmic rays at their school has been a gradual process. The project was based on a cosmic ray muon study, where observing muons formed an investigative tool that brought both HEP and astronomy facilities directly into high schools. Local detectors served two agendas. In their default configuration, they made students part of an astronomy collaboration, recording astronomical data from large cosmic ray air showers. Schools were also encouraged to use their detectors to pursue an assortment of individual astronomy research projects, observations of environmental conditions that modify cosmic ray rates, and measurements of the fundamental properties of the muon itself. The goal has been to guide students through a process that follows actual scientific practice in HEP: physics topic selection, experimental design, data taking, analysis and interpretation of results, all leading to new research ideas.

Steve Grosland first explored technical and physics-driven aspects of cosmic rays at the 2006 UIC summer workshop, where he gained familiarity with the detectors and worked with students from other schools. He eventually recruited GBS students to attend additional UIC workshops, where they worked with students from other schools following a problem-based learning approach, learned how to operate the detectors, and carried out basic measurements of the cosmic ray rate and muon lifetime. A week of immersion in this practice allowed students to extend cosmic ray studies into new directions of their choosing. All students were required to give oral reports on their experimental results at the workshop's closing session. Just as in any science venture, progress uncovered more layers of complexity that needed to be explored. To help students see the bigger picture, they took working field trips to Fermilab and to Adler Planetarium.

Student-Designed Research

During the 2007 summer workshop, after learning the basics of detector calibration, GBS students developed a completely new research project. They arranged their detectors in the corners of a square and then enlarged the sides of the square from 0.5m to 20m, measuring the rate of cosmic

ray showers containing multiple muons as a function of detector separation. This was "doing science" in its purest form. They designed a measurement that no one else had done, and postulated that it could provide information on the structure of cosmic ray showers. There was no known answer. The students were explorers. They unexpectedly discovered that the muon rate distribution exhibited different behavior below and above a detector separation of 3 meters, from which the structure of the shower was extracted. It was a beautiful example of students developing their own research questions as part of a scaffolded experience.

The QuarkNet students at GBS have formed a year-round science club and they refer to themselves as "Cozzies." With detectors that are part of a running experiment in place, students (and co-authors) Hannah Nelson and Albert Kim, who performed the experiment that is presented below, were recruited for the summer 2008 workshop. During that workshop, they attended lectures on astronomy, learned about scintillation detectors, and performed several experiments with cosmic rays. They enjoyed that week of research enough to extend their participation into another week in order to explore an idea they had developed. During their extended summer project at UIC, Hannah and Albert measured the rate of cosmic rays over time and correlated it with the local air pressure and temperature. They hypothesized that the muon rate would change with temperature. However after correcting for some change seen due to pressure, no additional temperature effect was observed.

Later in the summer of 2008, Hannah and Albert returned to UIC several times to assist in planning for future projects at GBS during the school year. They tested a new data acquisition (DAQ) card design under cosmic ray conditions, and for the first time across the nation, they proved that two cards could attain relative timing to an accuracy of several nanoseconds rather than the 50ns (50 billionths of a second) of a previous design. This was essential for being able to operate multiple detector systems at one physical site. A second set of detectors from another school was also moved to GBS. Thus, GBS established the first long-term effort at any school to operate multiple detectors, significantly enhancing their cosmic ray capabilities.

Detectors at high schools have served two roles: as detector sites for the nation-wide collaboration, and as a resource for individual student projects. These two roles have been complementary and important for involving students in accessible research projects. Much of the rest of this article will describe details of one of the most sophisticated experiments carried out at QuarkNet high schools. Hannah and Albert used cosmic ray muons to measure the maximum speed allowed in the Universe. The speed of muons was found to be very close to the ultimate speed that is allowed by Einstein's theory of special relativity (Einstein, 1905), as nothing can travel faster than the speed of light in vacuum. The measurement offered an opportunity to consider the shocking fundamental concept of physical reality, that time is not the same for all observers, which is rarely accessible to students. Hannah and Albert advanced from being trained and directly mentored by Mark and Steve to doing independent research supervised by Steve.

As they were setting up the experiment, Hannah and Albert shared that their "motivation for running this experiment was to see how close we could get with our experience to the accepted speed of a muon. We also wanted to run this experiment because the speed of a muon is a fundamental idea in the science of cosmic rays. Therefore, we felt that this experiment would serve as a proper foundation for our future research. This experiment would provide us with experience and a better understanding of how to use our equipment." Below we present the experiment performed by describing the detector components, detailing the experimental technique used, and sharing results and conclusions.

Cosmic ray muons passed through the GBS building and were observed by up to four scintillation counters, each made of a sheet of scintillator, and attached to a photomultiplier tube (PMT). The outputs from the PMTs were sent to a DAQ card that provided the interface to a computer for data collection. When a charged particle traversed the scintillator, light was emitted and reflected internally until it reached the PMT, which converted the light into a small electrical current, as displayed on the oscilloscope in figure 1. The programmable data acquisition card digitized the signals from four PMTs, decided which pattern of

counter hits would be saved, and wrote a file containing the times of hit counters for further analysis.

A side view of the detector geometry for two configurations used in this experiment is shown in figure 2. Muons traversed the counters vertically, intersecting both counter A and counter B. The time difference between signals from counters depended not only on the distance between the counters, but also on the response of the counters, and on the

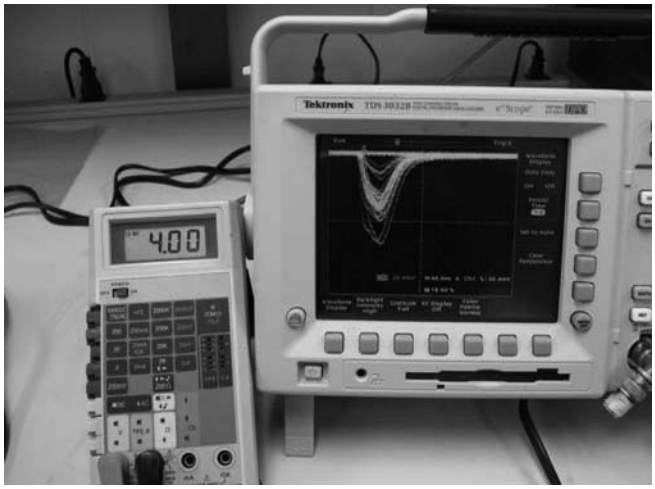

Figure 1. PMT signal versus time on the oscilloscope, with PMT high voltage readout on the digital voltmeter to the left.

various lengths of the signal cables. Students learned that the best way to control all of these extra effects was to explicitly design the experiment to minimize them, by collecting data in two counter configurations (normal and swapped). The position of counter A was changed, including its cables, so that by comparing the time difference between A and B in both configurations, the results were equivalent to measuring the time difference between counter A alone in two positions (AA').

The distributions of the time difference between counters AB and A'B are shown for both configurations in figure 3. The speed of the muon was calculated by dividing the distance (d) between positions of A and A' by the time difference (ΔT) between the two distributions: Speed of muon = d/ ΔT = 2.40m/8.11ns = 2.96 x10^8 m/s = 0.987c.

Understanding the meaning of errors is an essential part of science education, and it is often overlooked. Being able to estimate errors would

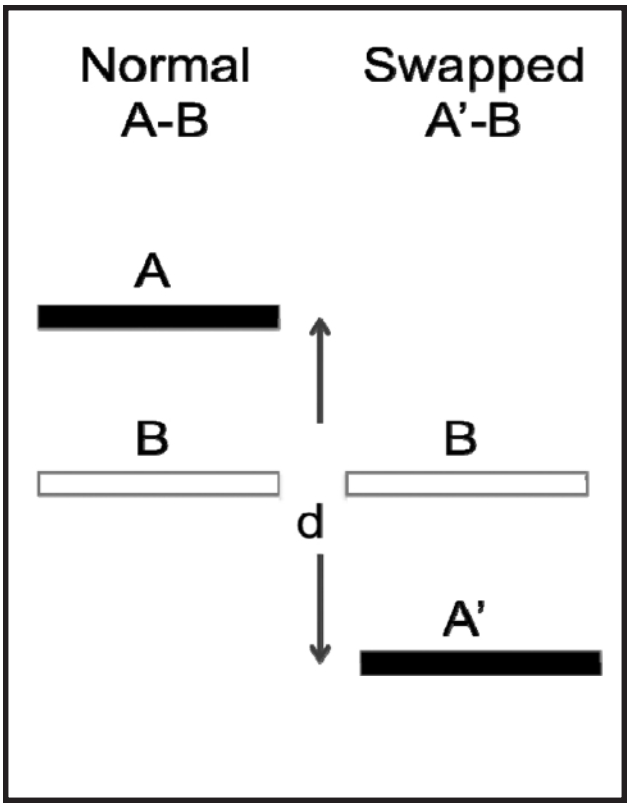

Figure 2. Schematic diagram of two-counter apparatus.

serve students well, and is clearly applicable to concepts in the world outside of science, such as risk assessment and investment strategy. In order to judge the quality of their measurement of the muon speed, students identified sources of two types of errors. First, they learned the critical lesson that error was not calculated from how well the result agreed with the accepted value; it had to be measured independently. The error on the mean of the timing distributions (statistical error) depended on the observed width of the distribution divided by the square root of the number of events in the peak. This resulted in an error of 0.006c on the muon's speed. However, another type of error (systematic error) was not addressed by the swap technique. A method to estimate the bias caused by two muons in the cosmic ray air shower, neither of which hit both counters, was developed. Requiring a muon to miss a third counter that was added between A and B enhanced the two-muon sample, and allowed students to estimate that systematic error contributed a 2% error to the speed. Thus, the final result for the speed of muons was: v = 0.987c +-0.006c (stat) +-0.02c (sys).

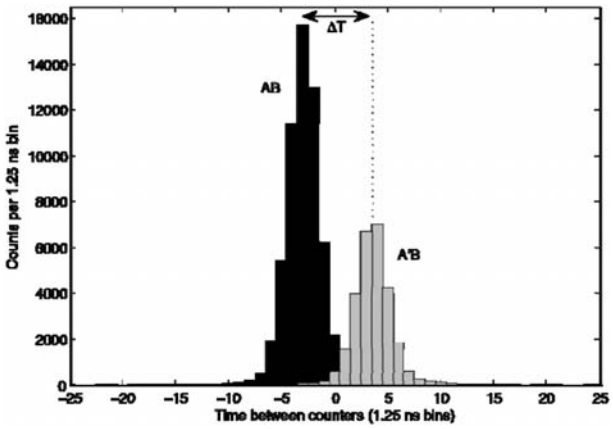

Figure 3. Time difference between AB and A'B counters.

Once the measurement was completed, the research group engaged in a discussion around how to improve the precision of the measurement—a fundamental step in scientific research. Three additional techniques were designed and subsequently implemented: 1) three counters were used to reject events contributing to the two-muon background; 2) the separation distance between counters was increased to reduce the error on the speed; and 3) since larger signals fired the electronics sooner than smaller signals, an improved time was calculated for each event by correcting for the size of the PMT signals. After applying the three techniques above, the data showed the timing distributions in **figure 4,** and the speed of the muon was found to be: $v = 2d/\Delta T = 2*2.40m/16.08ns = 2.985+-0.01 \times 10^8$ m/s = 0.997c+-0.004c.

The systematic error was significantly reduced compared to the original two-counter data, but no attempt was made to measure it directly. The GBS students have plans to continue to improve their experiment. In a future version, the detector will be moved to an atrium at GBS where the separation can be increased to more than six meters, reducing the error on the speed by another factor of three. The systematic error will also be addressed by measuring muon trajectories that are tilted from vertical. One of the fundamental goals of QuarkNet is to enable students to develop methods to improve results of their experiments.

This experiment offered students an opportunity to experience for themselves the value of keeping detailed logbooks, recording each step of the experiment, and organizing equipment and data. This is how Hannah and Albert articulated their learning regarding this dimension of their experience as they reflected on challenges they encountered. "A major obstacle faced at the beginning of our experiment was disorganization. The numerous wires eventually became entangled as we constantly rearranged our counters. As a result, after the first two weeks of collecting data, we realized that the wires were incorrectly connected and all our data was skewed. After this costly mistake, we spent hours reorganizing and labeling the counters and the cables until finally the counters and cables corresponded with each other. The next obstacle we faced was analyzing our raw data in a manner that was meaningful to us. The data we collect are provided to us in a format that would seem foreign to any uneducated reader. As a result, we had our teacher, Mr. Grosland, and our UIC correspondent, Professor Adams, explain how the data was displayed and how it was to be interpreted. Every obstacle after that point seemed trivial to us."

Furthermore, by performing this complex measurement, students engaged in the same steps physicists use in HEP practice. In this way, they came to realize that, in their words, "the scientific process is not simple. While we faced many difficulties, ultimately, we were able to overcome them and successfully complete our experiment." Students had to become proficient using many tools and conducting multiple tasks: a digital oscilloscope, a readout card developed at Fermilab and at the University of Washington (Hansen, et al., 2004), programming an on-board processor, high voltage

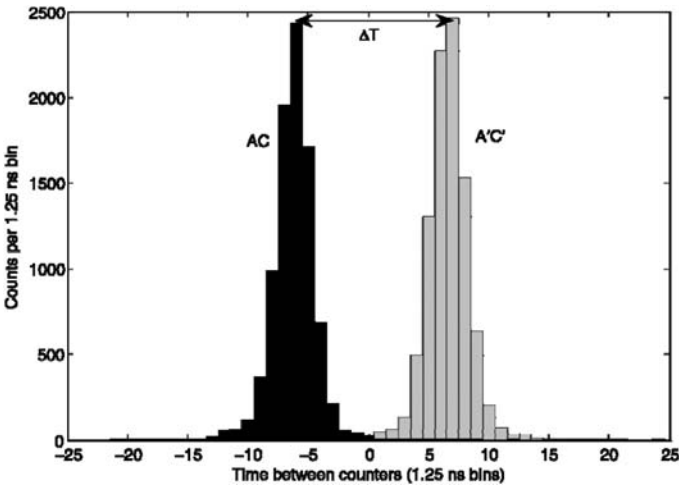

Figure 4. Time difference between outside counters A and C in the three-counter geometry.

supplies, a filter program on a UIC Linux machine, and further analysis using an Excel program. A global positioning satellite receiver was mounted on the roof of the school (figure 5) to provide an accurate time stamp for each recorded muon. Students debugged the electronic readout system, calibrated the counters, collected data over weeks, and analyzed and presented research results. Though shorter in duration than standard HEP experiments, the students' experience closely paralleled experiments performed by HEP scientists.

Figure 5. GBS students install GPS receiver on the school's roof.

Concluding Thoughts

Cosmic ray experiments carried out by Glenbrook South High School students at GBS and UIC have extensively increased the sophistication of scientific study available not only to members of the Cozzies science club, but also to the general physics student population at GBS. Students trained at UIC not only developed their own research directions as they explored more complex scientific measurements, but they recruited other students to join them to perform additional experiments using the same apparatus. In the process of performing these experiments, students have been prepared to do more scientific work on their own.

Students used particle physics counters to measure the speed of high energy cosmic ray muons, finding it consistent with the speed of light within errors (muon speed = 0.997c +- 004c). This result is also consistent with the expected speed of relativistic muons detected at the surface of the Earth. As students engaged with, and understood, the critical role of errors in the scientific process they significantly enhanced their ability to skeptically assess general scientific statements from other venues.

This project required a high level of commitment from the two lead students who have become the school's experts. It also provided a range of activities in which additional students can participate. Students have learned how to develop and study their own research questions, and they are presently designing a lab to investigate whether the muon rate changes as a function of the passage of the Sun. Further cosmic ray efforts at GBS will include the integration of experiments into the physics and astronomy curriculum as well as the development of a broader set of experiments for the science club. We are currently searching for multiple muons in air showers along with a dozen other Chicago area schools, and have become part of a collaboration that correlates similar measurements from other high schools across the nation.

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Author Information

Mark Adams is a professor of physics at the University of Illinois at Chicago. Steve Grosland is a physics teacher at Glenbrook South High School. Hannah Nelson and Albert Kim are students at Glenbrook South High School.

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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.

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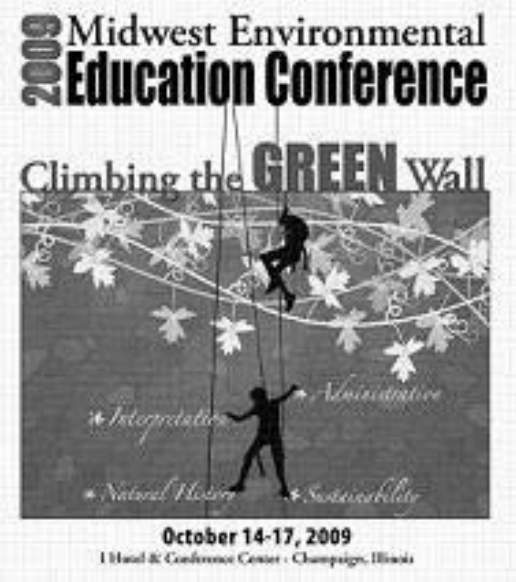

Midwest Environmental Education Conference

coming to Illinois: October 14-17, 2009
Visit www.EEAI.net for more information!

The Environmental Education Association of Illinois (EEAI) is proud to announce the 2009 Midwest Environmental Education Conference, *Climbing the Green Wall*, in Champaign-Urbana, Illinois October 14-17, 2009. Located in the Grand Prairie Region of Illinois, Champaign-Urbana is known for its rich diversity of academics, sports, and culture.

EEAI is a statewide, non-profit, professional organization with the purpose of maintaining a vital network that supports and advances quality environmental education throughout the state. Our membership consists of classroom teachers, non-formal educators, natural resource professionals, professors, university students, and nature enthusiasts. The Midwest Environmental Education Conference is a partnership between the state environmental education associations of Minnesota, Wisconsin, Iowa, and Illinois. Individuals from these as well as other states will attend the conference to learn from you and other knowledgeable professionals.

Our conference theme, "Climbing the Green Wall," was chosen to address the fact that all environmental educators struggle to overcome certain barriers or walls in their career. Four commonly identified limitations within the field of environmental education were selected by the conference committee: Administration, Interpretation, Natural History, and Sustainability. Through concurrent sessions, workshops, and keynote presentations, we will strive to provide conference participants with the knowledge and resources to overcome these walls and maximize their potential.

Invigorating workshops and concurrent sessions will be held each day of the conference, in conjunction with Field Sessions led by Illinois Natural History Survey Scientists. These learning opportunities alone with dynamic and inspirational keynote presentations, fun social activities, and a host of exhibits and networking opportunities will make this conference one that should not be missed!

We look forward to seeing you in Central Illinois October 14-17, 2009 for the 2009 Midwest Environmental Education Conference! For more details about the conference, visit EEAI's website, www.EEAI.net, for monthly updates!

IPRB

Illinois Petroleum Resources Board

Illinois Petroleum Resources Board
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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.

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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!

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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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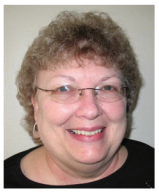

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