SPECTRUM

Spring 2007, Vol. 33, No. 1

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The Journal of the Illinois Science Teachers Association

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Tricks for Tests
NSTA Student Chapters
Scientific Literacy

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ISTA Conference - November 8-10, 2007

Spectrum

The Journal of the Illinois Science Teachers Association
Volume 33, 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).*

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On the cover: IMSA E2K+ teachers at a winter workshop. Photo courtesy IMSA and Susan Bisinger.

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SPECTRUM

The Journal of the Illinois Science Teachers Association

Spring 2007 Volume 33, Number 1

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President's Corner

Jill Carter

Pekin Community High School

Greetings fellow ISTA members!

I took office in March of this year as your new president. I teach freshmen through seniors at Pekin Community High School in Pekin (near Peoria). The subjects I am involved in are biology, AP environmental science, and occasionally Earth science. This is my twenty-fourth year as a classroom teacher. In my spare time I hike with my husband, Bob, read, visit my son and daughter, play with my 7- month-old granddaughter, and oh, yes, pursue a doctorate in education at Northern Illinois University.

As I look at issues that face science educators today, I see we have many challenges ahead. Most of us probably have concerns about No Child Left Behind (NCLB). Many of us have seen a decline in the support for professional development for science teachers. Some of us may see issues with the mentoring (or lack thereof) of new teachers. Others may find the lack of funding for basic laboratory equipment in our classrooms to be particularly frustrating. Student issues such as lack of motivation, grade inflation, and others are of primary concern. All of this impacts the bottom line – we're here to educate kids and we want to do the best job we can.

How can ISTA help? Take a look at our mission statement: To provide proactive leadership that will improve science education by promoting effective classroom practices; supporting sustained professional development opportunities; facilitating communication, collaboration and networking opportunities; and advocating for the needs of science teachers. In order for ISTA to accomplish this enormous task, we need all of us. After all, WE are the organization. We all need to do what we can to improve science education in this state. We need to participate in our organization. How can you do that? Come to the annual conference (November 8, 9, and 10 in Peoria), present a session, volunteer to work at the conference, attend a regional meeting, run for office, contact your regional directors or another board member with questions, concerns, or ideas, write an article or share an idea in the *Spectrum*. The list could go on, but you get the idea. No matter how much or how little, participation is participation, and every little bit helps.

We'd probably all like to see our membership grow. How can we do that? Perhaps we could start with each one of us finding just one other science teacher or teacher of science to join our organization. The larger our membership, the stronger voice we will have. I challenge all of us to find that one new member each. Will you join me in that task? Let's make ISTA the best it can be!

Jill

MEMBERS VOTE!
ELECTION RESULTS FOR 2007-2009

This year we had a tremendous increase in submitted ballots which is another good sign of interest in ISTA. We have a most outstanding organization in our state for science education and we are appreciative of your willingness to be a member of ISTA.

On behalf of the Board of ISTA, I would like to extend well deserved congratulations to all the candidates who participated in this election for they truly represented the high quality of individuals that we have in Illinois. Please note that ISTA has many committees and opportunities for participation beyond the Board of Directors so please let us know if you want to increase your level of involvement with the organization.

The ballots have been counted and from a slate of exceptionally talented, skilled, and gracious individuals, the following results are shared with you:

President Elect - Gwen Pollock

Vice President - Andy Apicella

Secretary - Kendra Carroll

Region 1 - Nicol Christianson

Region 2 - Patrick Schlinder

Region 3 - Coleen Martin

Region 4 - Troy Simpson

Region 5 - Kathy Costello

Region 6 - John Clark

Region 7 - Denise Edelson

ISTA Remembers

Lois Case

Long-time member
and
ISTA leader

ISTA Supports Local Meetings

ISTA will support (not to exceed $500) one meeting each year, in each region. The meeting should promote ISTA and encourage science teachers to join ISTA.

Contact Andy Apicella for more information: aa2100@riverdale.rockis.k12.il.us

2007-09 ISTA Executive Committee

Vice President
Andrew Apicella
Riverdale High School
aa2100@riverdale.rockis.k12.il.us

Secretary
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Shiloh CUSD #1
carrollk@shiloh.k12.il.us

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gpollock@isbe.net

Treasurer
Carl Koch
aecKoch@aol.com

Past President
Raymond Dagenais
Illinois Mathematics
and Science Academy
rjdag@imsa.edu

Marylin Lisowski, Past President 2005-2007

I would like to express my personal gratitude and deep appreciation to all the members of ISTA for it truly was a phenomenal experience to be a Regional Director and President of our wonderful organization. I encourage all to consider this venture of leadership at some point of your career. ISTA is one of the most important organizations that we have in our state and each member's involvement is important. I thank you for the highly memorable years that I have had with ISTA.
Best wishes, Marylin Lisowski.

2007-09 ISTA Committee Chairs

Archives	Maurice Kellogg
Awards	Sher Rockway
Convention	Executive Director
Convention Program	Donna Engel
Finance	Vice President - Andrew Apicella
Membership	Donna Engel
Nominations and Elections	Past President – Ray Dagenais
Public Relations	Tom Kearney
Professional Development/Building a Presence	Mary Lou Lipscomb
Publications Committee	Judith A. Scheppler

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Lederman Science Center
sdahl@fnal.gov

Region 1 Director 07-09
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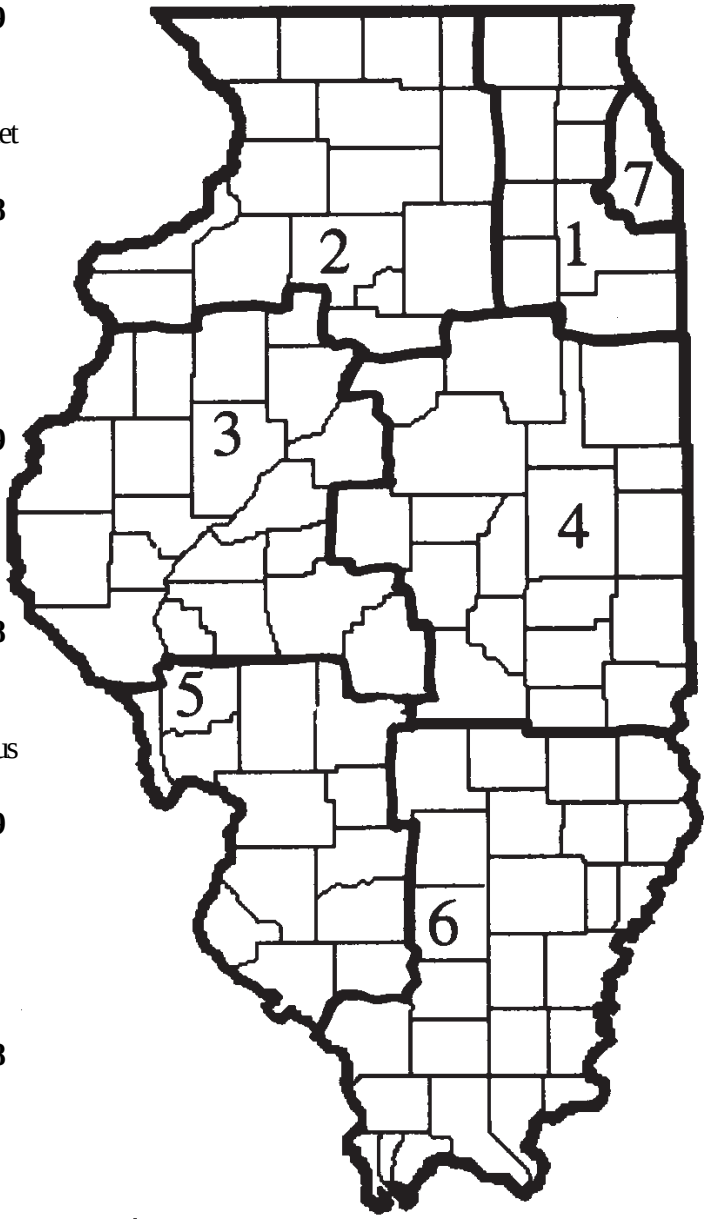

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Region 5 Director 06-08
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tfoster@siue.edu

Region 5 Director 07-09
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Region 7 Director 07-09
Denise Edelson
Hannah G. Solomon School
dnedelson@cps.k12.il.us

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

Illinois Science Teachers Association

2007 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: sjduncan@uiuc.edu), ISTA Membership, College of Education, 51 Gerty Drive, Champaign, IL 61820.

MEMBERSHIP OPTION (see below)_____ 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.

Opiton 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.

Illinois Science Teachers Association
2007 Conference on Science Education
Peoria Civic Center & the Hotel Pere Marquette
November 8 – 10, 2007
Pre-Registration Form

Deadline for Early Bird Pre-Registration: Postmarked by October 6, 2007

Deadline for Advance Registration: Postmarked between October 7, 2007 and October 27, 2007

Registration on or after October 28, 2007: On-site only

Fill out form completely. 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.

Pre-Conference Registration (Thursday only)
(Includes Exhibit Preview and Exhibit Hall Preview Reception)

☐ Registration $75 _____

Conference Registration (Friday and Saturday)
(Includes Thursday Exhibit Preview and Exhibit Hall Preview Reception)

Please circle correct amount.

Registration Fees	**Earlybird** 10/06/07	**Advance** 10/27/07	**Full Rate** After 10/27
☐ Current ISTA member	$100	$115	$125
☐ Nonmember (includes one-year membership)	$135	$150	$160
☐ Institutional members (up to 3 individuals) *	$95/person	$110/person	$120/person
☐ Full-time student	$15	$15	$15
☐ Saturday only (Exhibit Hall not open)	$65	$70	$75
☐ Non-teaching spouse/guest	$15	$15	$15

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 – Hotel Pere Marquette – All are encouraged to attend $15.00 _____

Friday Night Gala (dinner/dance) & Awards Reception at Lakeview Museum – open to anyone attending Thursday, Friday, and/or Saturday $20.00 _____

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 October 29th 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 Thanks Raymond Dagenais!

The Illinois Science Teachers Association thanks Dr. Ray Dagenais for his past two year's service as ISTA president. Previous to this role, he also served ISTA as conference program chair, vice president, and president elect, to name just a few other responsibilites. His ISTA duties are not over, however, as he moves into the role of past-president. And knowing Ray, he will always be an active and valued member and leader of our organization!

2007 ISTA Annual Conference Hotel Information

The 2007 ISTA conference hotel is the Hotel Pere Marquette in Peoria. The Thursday (November 8, 2007) pre-conference session will be held at the Hotel Pere Marquette along with several conference breakout sessions on Friday (November 9, 2007) and Saturday (November 10, 2007). Expect to meet friends and colleagues at one of the many social gathering spots on the premises. The Hotel Pere Marquette is a short walk to the Peoria Civic Center where exhibitors will have all the newest supplies, equipment, and science education resources on display.

The Illinois Science Teachers Association has reserved a limited block of rooms at the Hotel Pere Marquette for conference attendees. Be sure to mention that you are registered for the Illinois Science Teachers Association conference in order to reserve a room at the special conference price of: Single or Double $94.00.

Room rates are per night and are subject to taxes and applicable charges.
Parking is free for registered guests.

To reserve a room at the conference rate you must contact the Hotel Pere Marquette.

Reservations Only:	1-800-447-1676
Information:	1-309-637-6555

Teacher - to - Teacher

Educators Share Information, Lessons, and Tips

Mary Lou Lipscomb
Illinois Mathematics and Science Academy

All teachers have a "bag of tricks" that they use on a regular basis or from time to time to spark or maintain interest, keep things moving, and/or help students understand a concept in a way that is unique or different. They also rely on a variety of valuable resources that are sometimes not widely known. Sharing these activities, ideas, and resources with colleagues provides a professional development opportunity for everyone involved in the sharing.

In this edition of "Teacher to Teacher," a variety of activities or lessons are included that have been submitted by teachers who have used them successfully with their students. Each has been used with specific grade levels, from elementary through high school, but could be adapted for use at other levels. Perhaps you will be able to incorporate one or more of the following ideas into your repertoire. In addition, one resourceful teacher sent a list of sources for supplemental funding for which teachers may apply. A sincere "Thank You" to those who have submitted their ideas and information for this issue.

Managing lab groups…
Trina Metz, eighth-grade teacher and point of contact at Woodland Middle School in Gurnee, writes: "To help manage lab groups, I put a ring stand at each group. On the top of the ring stand three large plastic cups are stacked: one each of red, yellow, and green. The students keep the green cup visible. If they need assistance but not immediately, they put the yellow cup visible. If the group is at a standstill and need my help immediately, the red cup is displayed. This helps me monitor at a quick glance which group needs help."

Creating a "multi-purpose" spreadsheet…
Paula Webb, a junior high teacher and point of contact at Manhattan Junior High School in Manhattan, writes: "When doing labs/experiments that involve averaging class/group data, I often set up a spreadsheet on our class computer. I input the formula for the average row and set it to round the answer as instructed to the students. As students complete their data collection, someone from each group is assigned the task of entering the data for the group. Students like putting real data into the computer and it provides lots of teaching management advantages for me. The spreadsheet can be used to check student computation of averages. It can be modified as a handout for absent students. It serves as a record of discrepancies in data. The data table and the graph generated from it become an answer key for student work."

Organizing the beginning of the class period…
Janet Mandell, from Lincoln Junior High School in Naperville, is a point of contact and sixth grade teacher. She writes that she has all of the hand-outs for the period on a counter "for students to pick up as they enter class. My board has a "DO NOW" section. This tells students what they need to do at the beginning of the period, such as: turn in yesterday's lab; copy the homework; answer a question about the previous day's activity or lesson; and what to have out on their table to start class. So by the time I have dealt with housekeeping issues, such as attending to absentees from the prior day or finding out about missing work, students are ready to begin class."

Leave no child indoors…

Wayne Schimpff, a point of contact and teacher at Von Steuben Metropolitan Science Center in Chicago, has lead experiences in Cook County Forest Preserves with all levels of high school students. But he suggests, "All science teachers looking for a highly motivating experience for the underachievers in your science classes should turn their students on to the unique adventure education experiences that are locked up in the 68,000 acres of the Cook County Forest Preserve District." Wayne also indicates that other County Forest Preserve Districts or Conservation District also offer similar experiences for school students. The land and resources in these districts belong to all of the residents living within the district.

Wayne continues, "Bill Koening, director of volunteer services for the Cook County District, will work with teachers or assign a staff person to plan…outdoor-based educational experiences utilizing resources of the District. Visit the volunteer resource site at www.fpdccvolunteers.org to learn about their basic programs. If you are adventuresome, you can plan a Saturday service learning project or a science research project and then earn the right to camp at the service site the night before and the night after the service learning activity free of charge." If you would like more information, contact Wayne at wschimnpff@aol.com.

In-class field trips for primary students…

Pam Breitberg, a point of contact and science lab teacher for first through eighth grade students at Zapata Academy in Chicago, writes about an activity that she does with her first-graders. "A forty minute class period for first graders needs to be broken into several activities. Their attention span is too short to do one activity in depth for forty minutes and it is difficult for them to sit still for this length of time. But, their curiosity and enthusiasm for learning provides for great science concept building. Hands-on learning is a natural learning style for first graders. To add depth to their hands on experience, I have included an in-class field trip, followed by a class discussion.

"The in-class field trip is used after students observe objects, such as rocks or leaves or seeds. For example, sedimentary rock samples were passed out after learning about the rock cycle. Students were asked to describe their rock and we made a list on the board of characteristics they observed. This built curiosity, because students realized that each group had a different kind of sedimentary rock. We lined up and I told them we were going on a field trip; which increased the level of excitement. The rules were that there was to be no touching this time; their observations were with their eyes only. They were allowed to "oo" and "ahhh," but no touching. I led students through the room in a zig-zag pattern passing by each groups' sedimentary rock samples. After our field trip we discussed similarities and differences amongst the rocks. I made two lists as the students compared and contrasted the sedimentary rocks. The lesson addressed multiple learning styles and integrated language arts, helping me reach all my students' needs and abilities in a short amount of time.

"Getting out of their seat to walk around the room in an orderly manner relieved their restlessness and allowed them to see every single specimen. I could have just passed the samples around the room; but this "field trip" method kept them focused and was the break they needed in order to be able to follow up their observations with a worthwhile discussion reflecting on their learning. All the activities led to more in-depth learning of the science concept being presented."

Light and sound for intermediate students…

Here is an idea for a unit that you can tuck away for next year. Deb Catron, a fourth grade teacher and point of contact at Garfield School in Danville, writes, "I have a wonderful way of teaching light and sound to my fourth grade students. I teach this unit at Christmas-time. I have two tables in my room. On one table is a tree with multi-colored lights, and with ornaments that reflect, that are prisms, and that are different colors. Some ornaments are opaque, some are transparent, and some are translucent. We use the tree each day to discuss a light concept or vocabulary word. On the other table I have different types of bells. We discuss how the sound is transmitted. We talk about the pitch of the bells and what makes the bells make different sounds.

"I call this unit 'The Sights and Sounds of Christmas.' I have been teaching light and sound for many years and this approach to the unit "hit" me just this year. My students really learned the content because it was exciting for them. Recently we had a visitor who was using some of the light and sound vocabulary words and my students could tell the visitor what the words meant. The visitor was impressed!"

Cell analogy collage for middle/junior high students…

Renee Bearak, a former Chicago Public School teacher and key leader, writes about an activity that she has used when teaching about cell structure and function.

Instructions to students start, "Draw a plant or animal cell on a 6"x 8" index card or piece of paper. Include ten of the following structures on your drawing.

- Cell membrane
- Cell wall
- Chloroplast
- Chromosomes
- Cytoplasm
- Endoplasmic reticulum
- Gogli complex
- Lysosome
- Mitochondrion
- Nuclear membrane
- Nucleus
- Ribosome
- Vacuole

"Find out the function of these structures.

"Using a magazine or newspaper, find a picture of an everyday object which has a similar function (use) as each cell structure. Write an analogy to show the similarity between the cell part and the everyday object. Be sure to explain the reasoning behind your analogies. (For example, the nucleus is like a brain, because it controls and coordinates the activities of the whole cell in the same way the brain controls and coordinates the activities of the body.)

"Paste the cell drawing on the index card in the center of a piece of construction paper and paste the cut-out pictures of everyday objects around the edges of the construction paper. Label each picture with the analogy you wrote for it and make a pointer to the correct structure in your cell drawing." If you would like additional information, email Renee at rbearak@comcast.net.

Getting $$ to supplement your science budget…
Bellasanta B. Ferrer, a point of contact and accelerated sixth grade math/science teacher at Patrick Henry Elementary School in Chicago, writes, "Applying for grants is one way to supplement school funds. National (NSTA/NCTM), regional (ISTA/ICTM), and/or local (CMSI) science and math professional organizations are mother lodes for these grants and awards. The official publications, websites, and list serves of these organizations regularly feature invitations for grants and/or awards (for example, $10,000-Toyota TAPESTRY grant; $3000-Vernier/NSTA Technology Awards). Support groups are networks that can also provide leads to available grants and how to write one that gets funded."

The following is a list of web sites that Bellasanta has suggested to check for grants and awards.

Best Buy – te@ch Awards: http://communications.bestbuy.com/communityrelations/teach.asp

Donors Choose: http://www.donorschoose.org/locale0/teachers.php?action=draft

IIT-Research Experience for Teachers Program: http://www.grad.iit.edu/ret/

Chicago Foundation for Education (Chicago Public School Teachers only):
http://www.chgofdneduc.org/

NCTM – Mathematics Education Trust: http://www.nctm.org/about/met/

Teachers Count:
http://www.teacherscount.org/teacher/awards.shtml?gclid=CKu35_n264YCFTorIgodWxfcCw

Teacher Incentive Grant Oppenheimer Family Foundation (Chicago Public School Teachers only):
http://offtig.org/application/index.html

The Jordan Fundamentals Grant Program: http://www.nike.com/jumpman23/features/fundamentals/index.jsp

Toyota TAPESTRY: http://www.nsta.org/programs/tapestry/

Vernier Technology Award: http://www.vernier.com/grants/nsta.html

National Science Teachers Association comprehensive list of Awards, Grants, and Competitions:
http://www.nsta.org/awardscomp

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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.

Building a Presence for Science

Mary Lou Lipscomb
BaP State Coordinator, Illinois

- Are you a member of the Building a Presence for Science (BaP) network?
- Do you receive your monthly "Network News" electronically and other email about professional development opportunities from me (Mary Lou Lipscomb)?

If the answer to the first question is "yes" and the second is "no," perhaps you have changed your email address since you signed-up. Please contact me at lipscomb@imsa.edu and I will send you your login and password so that you can update your contact information. Include your full name and indicate that you need your password in the body of the email message.

If your answer to the first question is "no" then check out the updated Building a Presence for Science web page on the Illinois Science Teachers Association (ISTA) web site (www.ista-il.org) to find out more. Click on the NSTA/BaP logo and it will take you to the page where you can volunteer to be a point of contact in the BaP-Illinois network.

In addition to the direct link to the national BaP web site, the updated BaP-Illinois web page now includes a list of all of the current BaP state partners and links to their websites. Since the last issue of *Spectrum* the Illinois Department of Natural Resources, Experiencia, the iBio Institute, and the University of Illinois STEM team have become BaP state partners.

Any organization or institution interested in being a part of the Building a Presence for Science network in Illinois may check out the opportunities and responsibilities of BaP state partnership by going to www.ista-il.org and clicking on the link to Building a Presence for Science in Illinois and then state partners

Building a Presence for Science (BaP) is an electronic network initiated by the National Science Teachers Association and implemented in Illinois by ISTA to foster communication, collaboration, and leadership among science educators. Through the network, teachers and other science educators are provided with information about professional development opportunities and science teaching resources. Network participants also have the ability to share ideas and information with each other by using the BaP web site www.nsta.org/bap to send email or by posting ideas or questions on the Illinois message board.

The BaP network is growing in Illinois and if you are not member, you are encouraged to participate. Our ultimate goal is to have a point of contact in every school in Illinois. Points of contact are seen as communicators, leaders, and advocates for standards-based science education. As each school joins the network with a point of contact, Building a Presence becomes a more powerful means of communication among science educators. For more information about BaP-Illinois go to www.ista-il.org and click on the link for Building a Presence for Science.

BaP website: http://nsta.org.bap

Contact Mary Lou Lipscomb
email: lipscomb@imsa.edu
phone: 630-907-5892
mail: Illinois Mathematics and Science Academy
1500 W. Sullivan Road, Aurora, IL 60506

Book Review

Women Scientists in America, Before Affirmative Action 1940-1972: How Far Have we Come?

Meredith Beilfuss[1] and Orvil White[2]

[1]Butler University, [2] Indiana University

Introduction

Having role models is critical to the success of women choosing careers in science. Women scientists visiting the K-12 classroom would be wonderful, but not always possible. Role models may also be drawn from history and seen as part of a rich tradition of women in science. Margaret Rossiter's book, *Women Scientists in America: Struggles and Strategies to 1940*, written in 1982 and Rossiter's book, *Women Scientists in America: Before Affirmative Action, 1940-1970*, are now considered standard references (5,6). This more recent book discusses the various support systems that have existed throughout the period between the 1800s and 1970s that were instrumental in encouraging women to survive in higher education, and specifically in the sciences. According to Rossiter, this support came in different forms for different women, such as women's organizations or through political and legal reforms.

Women's Organizations

Women in higher education provided emotional, psychological, and financial support for one another. In the late 1800's female undergraduates and alumni often formed societies, such as the Massachusetts Society for the University Education of Women (8), to raise money to support those college classmates who were struggling financially. Another organization, the Association of Collegiate Alumnae (ACA), founded in 1882, also established a graduate fellowship for a woman who wished to study science abroad. The ACA sought to create an *entering wedge* in opening foreign universities to women through its fellows, and in so doing, was broadening opportunities for women everywhere. "The ACA was thus an early pressure group on behalf of educated women" in the United States and in Germany (5).

A new group was formed in 1898, calling itself the "Naples Table Association (NTA) for Promoting Laboratory Research by Women (4). The NTA supported women zoologists, eventually raising enough money to offer the "Ellen Richards Research Prize," $1,000, for the best thesis, written by a woman, on a scientific subject. "The ACA and the NTA were pioneers in the creation of new honors and forms of recognition that, they sensed correctly, were becoming essential features of science in the twentieth century (5)."

Women continued to support one another in their pursuit of scientific knowledge through the creation and participation in women's clubs. Starting in the 1840's and continuing through the 1900s, these clubs were very effective in building bonds among women outside the women's colleges in the decades before such women could join scientific organizations (4). Male-dominated scientific organizations responded to

women's interest in joining by instituting new requirements for membership that excluded women who had not made "professional contributions to science (5)." When women finally gained membership to such organizations, such as the Association of American Geographers, they were often excluded from meetings that were organized as *smokers* where important discussions often took place. Prior to the 1920s, properly bred women did not smoke or enter rooms where men were smoking and thus could not participate (4). In response, women organized their own professional groups such as the Woman's National Science Club (WNSC). Often reports, such as the one written by an Indiana University ichthyologist, Rosa Eigenmann's 1895 *Women in Science*, were published to comment on the dissatisfaction of the patronizing attitude toward women in science. This was "a good sign that some women were in the 1890s demanding to be taken seriously and have their work evaluated realistically (5)."

Political and Legal Reform

Emma Willard's 1819 proposal to the New York State Legislature is a poignant example of how one woman sought legal reform to support women in higher education. Willard used a gender-specific argument to argue for publicly-supported women's education. "If then women were properly fitted by instruction, they would be likely to teach children better than the other sex; they could afford to do it cheaper; and those men who would otherwise be engaged in this employment, might be at liberty to add to the wealth of the nation, by any of those thousand occupations, from which women are necessarily debarred (9)." Although this was a conservative step in women's higher education, Willard was making legal precedence.

The doors to education opened wide for women by the 1920s. Of the women who did go on to graduate school, they were accepted at fewer institutions, fewer fields were open to them, and fewer professors were willing to accept them. In a time when most positions open to women did not require a doctorate, many women chose to attain the degree regardless of obstacles in their paths. "Officially 'encouraged' to earn degrees in order to be ready to meet pressing national shortages, many bright women students were unable to fulfill their academic and scientific potential. Institutional attitudes and practices discouraged all but the most determined and persistent at even this lowest level of access to the academic world (6)."

For instance, our own Indiana University (IU) began to admit women in 1867 and these college women were encouraged not to take science or engineering coursework. "Women took the established curricula, but in 1869 the faculty permitted one coed to postpone surveying and navigation, and the next year passed a resolution permitting ladies who so desired to be excused from civil engineering and take English synonyms instead (1)". It wasn't until the class of 1887 that IU graduated a woman biologist and not until 1891 that another woman major in science received a degree (1).

Although women earned degrees in science they were largely limited to faculty positions at the women's colleges and instructorships and jobs in home economics, as well as other classical *women's work* (5). Many began to criticize "what seemed to them pernicious employment practices (5)." In the 1920s, academic women still held the optimistic faith of the Progressive Era that once unfair employment practices became documented, deans and department chairs would take voluntary steps to change their ways. Influencing employers in other ways, such as through statistical studies that demonstrated inequalities was the only strategy that the women of the 1920s were able to use.

Upon graduation, women scientists would find it difficult to attain faculty positions. By the 1950s most major universities had anti-nepotism rules that were designed to prohibit the employment of any two members of the same family by the same department, or institution. This anti-nepotism rule affected women faculty through 1972. A 1972 study of married women chemists with Ph.D.'s reported that 42% had been adversely affected by anti-nepotism rules at some point during their careers. "But the true figures may never be known, for others were so sure that marriage to a fellow faculty member would end a professional

woman's career that, like Madeline Kneberg and Thomas Lewis of the University of Tennessee, a famous team in southeastern archaeology, they chose not to marry until they had both retired (6)." If an institution found a way around the rule, often to the detriment of the female scientist, it was through the creation of *voluntary positions*, or lower ranked positions.

The acute manpower shortages brought on by WWII seemed to hold out new hope for women professionals, especially in the sciences. Women scientists made significant contributions to the war effort, ranging from engineering and nutrition to metallurgy and the Manhattan Project. Nevertheless, the public attitude of welcoming women into the scientific professions masked opposition to change. Most scientific jobs for women were entry level, and promotions to higher positions were reserved for men. By 1945 women scientists seemed in demand, but regardless of how well they performed, they were not promoted, and could expect to lose their temporary positions. The years 1946-1947 saw men returning from the war. Aided by quotas, male veterans displaced female applicants to universities and female staff and faculty. Women were expected to make a *postwar adjustment*, be realistic, accept their situation and were told to accept demotion 'cheerfully.'

Rossiter reports the increasing number of women going into science, showing the fourfold increase of women earning scientific degrees between 1951 and 1957. This may be, in part, due to the National Education Association (NEA) which published K-12 educational objectives in 1944, entitled *Education for all American Youth* (10). It stated, "schools should be dedicated to the proposition that every youth, regardless of sex, economic status, geographic location, or race, should experience a broad and balanced education (10)." In 1952, the NEA revised their objectives to specifically include the sciences. "*All* youth need to know how to understand the methods of science, the influence of science on human life, and the main scientific facts concerning the nature of the world and man (10)." The increase in *scientific womanpower* reported by Rossiter was expected to be channeled into acceptable teaching positions in elementary and secondary school science (6).

Members of the NEA were not the only people concerned about science education in the 1950s. The Soviet advance in space was the impetus that led the United States to invest large amounts of money in science curricula that would enable the United States to compete. After the launch of Sputnik, parents became increasingly aware that their children should be receiving the kind of science education that would allow them to compete, both scientifically and technologically, in a global society (2). However, this was a period in which women scientists could not even apply for a grant unless a fully appointed faculty member, often male, made the application for them. According to a 1954-1955 NEA survey, if a woman scientist joined the faculty of a university it was most often a poorer and less prestigious institution. Job vacancies were explicit in specifying a preferred sex, usually male, for a position.

Many women scientists of the time found a welcome in the nonprofit sector or in government. For example, Barbara McClintock, a geneticist who later won the Nobel prize for medicine in 1983, came to work for the Carnegie Institution at Cold Spring Harbor when the University of Missouri denied her tenure in 1941. Large numbers of women scientists worked for federal, state, and local governments in the 1950s and 1960s performing crucial and prize-winning research, but few were promoted into the higher ranks of better-paying managerial positions.

Rossiter concludes that the period from 1940 to 1972 was a time when American women were encouraged to pursue an education in science in order to participate in the great professional opportunities that science promised. Yet the patriarchal structure and values of universities, government, and industry confronted women with obstacles that continued to frustrate and subordinate them. Nevertheless, women scientists made genuine contributions to their fields, grew in professional stature, and laid the foundation for the period after 1972, which saw real breakthroughs on the status of women scientists in America. By 1967, President Lyndon B. Johnson amended Executive Order 11246 to include affirmative action for

women, thereby requiring federal contractors to make good-faith efforts to expand employment opportunities for women and minorities (6).

Executive Order 11246 extended the clause of the 1964 Civil Rights Act prohibiting discrimination in employment (Title VII) to cover institutions of higher education, which were previously excluded. Four years later, the Office of Civil Rights issued its *Guidelines for Affirmative Action in Higher Education* to implement Title VII. In 1972, Title IX of the Higher Education Amendments specifically addressed the provisions for educational equity at all levels (4). From the years 1973 to 1979 the growth of women scientists on faculties across the nation had been minimal, with the 1979 Committee on the Education and Employment of Women in Science and Engineering report stating that the "absolute gain in numbers is so small as to produce only a minimal effect on the total (4)." However, given the long history of underutilization of women scientists in the academe, it is conceivable that without this legislation, no change would have occurred whatsoever.

Conclusion

In conclusion, Rossiter's book focuses' on the various support systems that existed throughout the time period between the 1800s and 1970s and were instrumental in encouraging women to survive in higher education, specifically in the sciences. This support came in different forms for different women, such as women's organizations or through political and legal reforms. Current intervention efforts include those that are more focused on moving women through the 'educational pipeline' toward a scientific degree.

"While interventions are essential stopgaps, they alone cannot solve the fundamental problems distancing women from careers in science. Intervention programs address problems piecemeal- attempting to provide mentors in an atmosphere of isolation, introduce maternity leave to institutions modeled on men's life cycles, hold girls' interest in math classrooms designed around boys, reform hiring and promotion practices through affirmative action- and as such cannot change deep and structural patterns of discrimination. The pipeline model, built on the assumption that women and minorities should assimilate to the current practices of science, does not provide insight into how the structure of institutions or the current practices of science need to change before women can comfortably join the ranks of scientists (7)."

While this may be the case, Rossiter's book helps us understand where we have been so that we can better understand where we are going.

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Articles

Preparing for School with the Three R's: Rest, Relaxation, and Renewal

Dr. Richard A. NeSmith
North Greenville University

Summer vacation is the time I get to recharge my batteries.

Another busy year has passed? As I "mature" I find that there are three things that never change: 1) rent never decreases, 2) taxes always increase, and 3) there is always more work than time to complete it. And uh, a fourth is needed; 4) every year becomes busier and busier. Having said that, it has occurred to me that most of you are now in the midst of enjoying down time. What you do not want to read at this minute is some deep issue-concept being reeled and railed…so I have considered what I thought might be of use to all.

For me, summer vacation, (unpaid, granted), is the time I get to recharge my batteries. I get the knots out of my back, and in many cases the "pains out of my side." *Punny*, I know. But in this time of rest, relaxation, and renewal I do seek to become more recharged, so as to be reminded why I am a teacher and why I still want to be a teacher. It is, or can be, a time where you get to feed the mind and soul, rather than spending 24/7 trying to motivate and feed the mind and soul of students. Harry Wong (1998) refers to the middle school student as *psycho-sexual hormones on feet*. As middle level teachers we know there are days when that is a gross understatement. From that we rest, relax, and renew ourselves.

The traditional summer vacation may be archaic in context of the old Agrarian society where schooling was something that occurred before or after planting and before or after harvest, but it sure does help those educators who give all they have to teaching adolescents and preadolescent students for 180 full days. By the way, the next time some critic reminds you that you only work 190 days per year, just remind them that they only work about 220 on average. Of course, you and I know that we generally do *not* stop working. Whether it is grading papers until 11 PM or attending seminars in the off season, or taking summer courses to keep our certification updated. Truth of the matter is those working 220 days would refuse to work for 180 if the balance of their time was unpaid, as is ours.

Since time is precious and you want to sit on the back porch with your feet dangling in the children's plastic swimming pool, I wondered how I could be encouraging and part of your attempt to revitalize and chill at the same time, without wasting your time on an article that you would prefer to put in that corner stack along with your "other" shop-talk items. So, I will simply keep this short and sweet, and share with you some resources, books, and movies that you might find useful in your recovery periods from those wonderful middle schoolers. If nothing else, at least you will find some useful suggestions, that is, if you do not already have four or five books started and on your night stand. I would hope that every teacher reads at least one good, motivating, and passionate book on education before returning to school in the fall. Wong (1998) stated, "If you dare to teach then you must dare to learn." This article will present some books, articles, and entertainment videos for those who *dare to teach*. I trust that you will be challenged to check some of these out as you continue to chill during the hot summer.

Books

There are so many books published and available today one can almost get lost in the library. My wife and I have to limit our trips to the library and bookstores for we can spend hours just browsing, not to mention the tab which usually accompanies such a visit. There are many good publishers for educators. There are *practical books*, which provide teachers with strategies, methods, and are easily read and remembered. There are *inspirational books* which act to re-ignite the fires that were there back when you and I decided to enter education to begin with, and then, there are the more in depth *conceptualizing texts* which give you and I a foundation upon which to build our repertoire of classroom practices and strategies. These tend to go beyond the simple or practical aspects.

Practical Published Works

In the area of practical works are several written by, or co-authored by Bob Marzano. These include the following with a brief annotation.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*. Alexandria, VA: Association for Supervision and Curriculum Development.

If you have not discovered this book, or it has been a few years since you read it, then read or revisit it. It is practical, easy to read, and research-based. Many good and easy concepts are shared that can be applied to your classroom teaching strategies that have shown to improve student achievement. It is a treasure trove that every teacher should read frequently.

King, K. P. (2007). *Integrating the national science education standards into classroom practice*. Upper Saddle River, NJ: Pearson.

This is another good source, written by one of our very own (ILSTA), Kenneth King. He has published this useful text at a time when NSES Standards are now included in the NCLB testing requirements. He discusses teaching for science literacy, how to implement the standards into your lessons, the changes that have occurred within the standards, and how to assess standards. He has some insightful suggestions and some very useful classroom scenarios he labels "classroom snapshots." Rookie or veteran teacher, this text is a valuable tool as a spotlight shedding valuable light and suggestions for middle school science teachers for improving student achievement.

Another useful work coming from the *What Works* series is Marzano's translation of research into best practices.

Marzano, R. J. (2003). *What Works in Schools: Translating Research into Action*. Alexandria, VA: Association for Supervision and Curriculum Development.

The quality you expect from this publisher and this author precedes this book. Concepts about how to improve schools and student achievement include viable curriculum, factors at the teacher-level, and an arsenal of teaching strategies, classroom management (so needed in many classrooms and schools). Topics also include intelligence and background knowledge of students, and the critical role that you, as the classroom leader, play in successful schools. The concepts can be valuable, but the level in which they are presented is great for summer reading. Another "classic" to mention here for all teachers is Wong's text. Even seasoned veterans can still benefit from reviewing this work.

Wong, H. K. & Wong, R. T. (1998, 2004). *How to be an Effective Teacher: The First Day of School*. Mountain View, CA: Harry K. Wong Publications, Inc.

If you have not read these three recently, I recommend you do so.

Practical books provide strategies easily read and remembered.

Inspirational books re-ignite fires.

Inspirational Works

Inspirational media always motivates, encourages, acknowledges our struggles, and gives each of us hope and assurance that we can, and we are, making a difference…the number one reason pre-service teachers list for wanting to become teachers. A few of these inspirational works caught my attention the last few months as I devoured about a dozen of them. What I found was that whether I agreed with their actions (or results) or not was unimportant, but that I always walked away inspired and proud to be a teacher…and felt renewed in my commitment to continue to trying to "make a difference."

Similar useful but light reading includes the works by Clark. The most recent is the "Ron Clark Story" produced by Granada America and MAGNA Global. This premiered in 2006 and is now available in most video stores. Granted, these often have "Hollywood twists" in the storylines, but it is moving to see one person try to reach all the students he or she can reach. Consider reading Clark's recent writings. They are very simple, easy to read, but provide seed thoughts that will help you to reconsider what you do in the classroom and why you do it. These include, *The Essential 55: An Award-winning Educator's Rules for Discovering the Successful Student in Every Child*, (2004), and *The Excellent 11* (2004). Clark has many motivating epigrams, such as"you only live today once, so don't waste it. Life is made up of special moments, many of which happen when caution is thrown to the wind and people take action and seize the day" (Clark, 2003, p. 156).

Clark, R. (2003). *The Essential 55*. New York: Hyperion.

Clark, R. (2004). *The Excellent 11: Qualities Teachers and Parents Use to Motivate, Inspire, and Educate Children*. New York: Hyperion.

Most of the books thus far mentioned here are available *free* to read online (either through a Google book search or on the ASCD website) if one does not mind reading from a screen. Another inspirational film/book is that of Dennis Littky and includes the following works published by ASCD:

Kammeraad-Campbell, S. (2005). *Doc: The Story of Dennis Littky and His Fight for a Better School*. Alexandria, VA: Association for Supervision and Curriculum Development.

Littky, D. & Grabelle, S. (2004). *The Big Picture: Education is Everyone's Business*. Alexandria, VA: Association for Supervision and Curriculum Development.

These books tell the story that has since been filmed, entitled, *A Town Torn Apart* (1992) by NBC. Littky, progressive and proactive, tried to mold a school program to become more authentic, more student-oriented, and more research-based in scope and practice. The results were students being transformed learners but parents vehemently rejecting the concepts as too non-traditional and radical. Thinking outside the box is becoming more valuable than ever and in truth we need such discussions. Someone once said, "Drastic conditions require drastic measures." Some of you teach under drastic conditions and you need to tap into this source of encouragement.

Another book/media production includes Rafe Esquith, an educator who transforms inner-city Los Angeles elementary students in the second largest elementary school in the nation using Shakespearean drama as a means. His students leave his class and have established his legacy by their own success. His inspirational books include, *There are no Shortcuts* (2002) and *Teach Like Your Hair's on Fire* (2007). The inspirational drama-based video is entitled, *The Hobart Shakespeareans*. More can be seen at their website: http://hobartshakespeareans.org.

In-depth works:

Finally, there are other works for teachers that need to be mentioned here. Many of these

provide more in-depth that those already mentioned, but are well written. They inspire, but more with content than behavior or emotions. These texts often provide the foundations for action. A few which this author has found useful include:

Bigge, M. L., and Shermis, S. S. (2004). *Learning Theories for Teachers*. (6th Ed.). Boston: Pearson.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How People Learn*: *Brain, Mind, Experience, and School*. Washington, DC: National Academy Press.

Stronge, J. H. (2007). *Qualities of Effective Teachers*. (2nd Ed.). Arlington, VA: Association for Supervision and Curriculum Development.

The anomaly in this list is the following which should be read by every school leader and anyone that has influence in bringing about change or acting as a change-agent. It is not an educators' text as the others, but stems from the corporate world.

Collins, J. (2001). *Good to Great: Why Some Companies Make the Leap…and Others Don't*. New York: HarperCollins Publishers.

There are so many principles in this book that an educator could not read it without thinking of how to improve education and why we do not. And, as a final point, there is one book that stood out for me this year and has provided me with practical knowledge, inspiration, and some in-depth concepts that I realized needed to be revisited, redebated, and reconsidered by those of us who are teachers.

Sullo, B. (2007). *Activating the Desire to Learn*. Alexandria, VA: Association of Supervision and Curriculum Development.

Some times as educators we begin to feel that "full-circle syndrome" where we tend to see where our growth meets up with our experience and training. This book is revisiting the idea of what is motivation (of learning), where does it originate, and why are our students not motivated to succeed academically? The answers may be simpler than we think. What can we do, as educators, to help our students become life-long learners? I believe Mr. Sullo has touched on an area that gets to the bottom line of education and motivation and how the two should be complementary, not antagonistic. This book is a must. Read it!

Conceptualizing texts give you a foundation upon which to build your repertoire of classroom practices and strategies.

In a few more weeks we return to what we do and who we really are: teachers. Our clientele are possibly the most difficult, complex, and probably experience the greatest number of changes in life in such a short span of time than all other students. But, they need us. They need us to be rested, relaxed, renewed, and *resourceful*. You only live today once, so don't waste it. What you do now prepares you for later. So enjoy. Prepare for school with the Three R's formua: *rest + relaxation + renewal = resourcefulness*. Have a great summer!

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Tricks for Tests:
Millstadt's Method for Preparing for Science ISAT

Kathy Costello
Southern Illinois University Edwardsville

Was your school ready for the change in the enhanced science ISAT given in 2006?

Was your school ready for the change in the enhanced science ISAT given in 2006? Sixty percent of the items in the 2005 test were process skill questions that checked understanding of experimental design, data interpretation, and engineering techniques as listed under Illinois Learning Standard 11. Thirty percent of the remaining questions focused on students' mastery of the science content outlined under standard 12.

The percentages flipped in the 2006 enhanced test: only 30% covered process skills, with the bulk of the test composed of content questions. (The remaining questions on both tests covered lab safety and other items covered under standard 13.) To prepare students for the test, teachers needed to concentrate less class time on science process skills and more on science content.

Teachers at Millstadt Consolidated School wanted to make sure that students in fourth and seventh grade were ready for the new test. We knew that the more often facts are studied, the better the knowledge is retained. We also knew that science skills aren't repeated and scaffolded like math and reading skills, making it necessary to review those first grade facts before the fourth grade test. Then came the idea: an all-school, year long, science trivia contest. What better way to make students *want* to remember science facts than with an exciting weekly review game?

Preparing for the Competition

Teachers enthusiastically tackled the trivia project. First, teams at each grade level reviewed the Illinois Learning Standards and descriptors for science at their grade level. The focus was on standard 12, where most of the science content goals are listed, but standards 11 and 13 were also included in the hunt for good trivia questions.

Next, content questions were written in formats that were appropriate for each age group: questions written for younger grades might include recall of basic facts with true/false or multiple choice questions, for example, while questions for middle level students were more open-ended and checked for their understanding of complex relationships. Question writing took place over much of the year as content was covered in the classroom. An effort was made to have several questions for each descriptor.

Questions were then organized into subject categories and subcategories. There may have been a "Space Science" category in third grade, but by eighth grade it was subdivided into "Planets Plus," "Stars in Your Eyes," and "Deep in Space." As questions were generated, they were saved on the school's server so that all teachers would have access to all the questions. Primary grade teachers could dip into the intermediate questions for the fifty-point challenge questions. Fourth and seventh grade teachers could pull up review questions from any grade to use in their trivia games – an important feature for pre-ISAT review.

Finally, school science funds were used to purchase trivia kits set up in the style of the

"Jeopardy" television game show. The kits included some question sets with the vinyl pocket wall hangings. (See resource list at the end of the article.) When playing the game, questions were arranged by category and level of difficulty.

Let's Play the Game!

Flexibility and creativity were the hallmark of the project. Teachers designed formats to meet the needs of their own teaching styles as well as the learning styles of their students. Many classrooms chose to hold weekly trivia games throughout the school year. Some teachers formed students into teams to meet the trivia challenge, some allowed students to choose partners, and some let students play as individuals. In some classes, winners were rewarded with tokens or classroom privileges; in others the bragging rights were all that it took to motivate students. Teachers decided what the best fit was for their students.

Each week's game was a practically painless way to review science content. Opportunities for re-teaching of important facts were an added benefit of the game. If students had forgotten that a sepal was the leaf-like structure below the flower, explaining with a quick sketch at the board gave the teacher a chance to review pistil, stamen, petals, and other flower parts the students might have forgotten.

Of course, the questions included in the trivia game didn't cover every fact that might show up on ISAT, but oh, the teachable moments! Students were ready to listen and learn if a question had gone all the way around the room and no one had been able to answer. At that point of mild frustration, telling them "The *xyphoid process* is the cartilage at the end of your sternum" has a better chance of sinking in than if they had read that fact in a textbook.

Competition Heats Up

As preparations for ISAT intensified, so did interest in the trivia games. To the teachers, the months of practice meant the students were prepared to do well on the tests. To the students, it meant that it was almost time for the all-school competition. When the tests were over, everyone was ready to play.

We knew that the more often facts are studied, the better the knowledge is retained.

Each participating grade level chose their best team, using whatever method worked for the teacher and students. In third grade, for example, each class picked one best student; those students made up the members of the third grade team. At the seventh grade level, students chose their own teams, then competed against the other teams in science class to determine best-in-class. Then they matched wits with the other seventh grade class teams to see which group earned the privilege of representing the seventh grade in the final round.

Since it would be unfair to pit a first grade team against an eighth grade team, (or really embarrassing for the eighth graders if the first graders won), the championship rounds were inter-grade competitions. In the primary division, kindergarten, first grade, and second grade teams were scheduled to compete against each other in the final round. The intermediate level included grades three through five while grades six through eight competed at the middle level.

Everyone was invited to the Science Trivia Assemblies. Some students even made posters for their favorite teams and cheered (or groaned) as the points started to add up. There were some close matches and nervous moments. The triumphant winning teams were awarded trophies, medals, and bags of science goodies donated by the local science center and other area businesses.

What about Technology?

The trivia game took care of most of the standards, but it wasn't the best format for practicing the standards and descriptors pertaining to technology and design. The solution was to build

The months of practice meant the students were prepared to do well on the tests.

our own technology competition. There are lots of suggestions for design events that captivate student interest. Of all those things that snap, speed, or splat, the teachers chose an egg drop contest for the Millstadt design challenge.

As in the trivia competition, students were allowed to enter as individuals or teams. Design parameters were included in the contest rules: egg crates could be no bigger than fifty centimeters in any direction, including a fully extended parachute; no metal or glass could be used in construction; and crates with the lighter mass would win over heavier crates.

There were more teachable moments as engineering terms such as mock-up and prototype were introduced. Teachers led classroom discussions on the advantages and disadvantages of various design strategies. Students were encouraged to test one variable at a time, make performance tables and graphs, and research basic construction ideas. As the time for the contest approached, students designed, tested, and redesigned their egg crates. They were eagerly (and unknowingly!) practicing the skills covered in the Illinois standards for technology.

Building a Technology Competition

The first round of the egg drop competition was held in classrooms without endangering a single egg. This round was a simple measuring up: which students had built egg crates that met the design parameters? Those that qualified moved on to round two.

Round two took place as part of the trivia contest assembly. After the trivia winners were determined, it was time to scramble some eggs. Intrepid teachers climbed to the top of a ladder set up on the stage and dropped the crates one by one. Nothing is more satisfying to a student than the sound of an egg shattering on impact. Before long, the dozens of contestants had been reduced to a small number of survivors.

For the final round, we needed more height. Eggs that were still intact in their crates were dropped from an airplane! A parent who owned a small aircraft agreed to lend his services for the final round. The whole school turned out to watch the plane circle over a nearby field as one of the teachers dropped the crates out of the window. It was great publicity for the school when the winner posed with her crate and trophy for picture that appeared on the front page of the local newspaper.

Preliminary Test Results

Did the Millstadt Method for raising test scores work? The preliminary results are finally in: 96% of Millstadt 7th grade students and 98% of 4th grade students scored in the meets or exceeds categories on the 2006 science ISAT. Given the fact that the test was different than the 2005 ISAT and comparisons are not yet valid, it's still too soon to tell if these results are a reliable measure. We can't claim that the game method was the deciding factor in helping raise science ISAT scores. But it didn't hurt!

Resources

"Science Quiz Game Show" kit available from Lakeshore Learning at http://www.lakeshorelearning.com

For information about egg drop, bridge building, and other technology competitions National Science Olympiad http://soinc.org/

Joan Berger's Egg Drop site with links http://users.adelphia.net/~jberger5/eggdrop.html

Illinois Institute of Technology Bridge Building Contest page http://www.iit.edu

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Historical Perspectives of Scientific Literacy

Li-Ling Yang[1] and Meredith L. Beilfuss[2]

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What the general public ought to know about science

Introduction

The term *scientific literacy* was first used in the 1950's. Over time, the concept has been defined in many ways, from simple explanations like "what the general public ought to know about science," to the more complex definitions we see in literature today. This definition is important because it provides the basis for which educators answer questions such as: "What content is most important to teach in schools?" and "How should science be taught?" This paper provides an historical perspective of the concept of scientific literacy. It is first placed in an historical context, within a framework for the basic goals for science curriculum, followed by a discussion of the various current interpretations for scientific literacy. Finally, the question of why scientific literacy is important is addressed.

Historical Context

Where we are now is a result of our past, with the priority and structure of the goals for science education changing over time. Several European educators and scientists brought unique perspectives to what and how science should be taught in the classroom. For instance, John Comenius, was the first person to bring the study of science into the classroom (circa 1658) (1). And a second European, Pestalozzi, encouraged the development of *object lessons* as an early form of science education in the nineteenth century (2).

Early American influence on the study of science began through the writings of Rice and Eliot in the 1800's. Both men lived in a time when the belief was that rigorous study of difficult materials would strengthen the will of the student. The dominant goal of science education was personal development. Eliot specifically advocated the processes of observation and drawing inferences (3).

At the same time, elementary science was predominately based on the object lesson, which de-emphasized the acquisition of knowledge. However, with the advent of industrialization, the goal of knowledge became more important. The development of the nature study began during the depression of 1891. The use of the nature study was a deliberate attempt to slow the migration from the agricultural community to the city. Later, in the early twentieth century, the nature study began to lose favor among educators.

In December 1892, eighteen men, including Charles Eliot, met at the University of Chicago to advise the Committee of Ten on science preparation needed for college admission. These teachers and faculty of private and public colleges and universities decided that at least one year of biology, followed by one year of chemistry, and one year of quantitative physics, would best prepare young people to grow up to be 'just like them.' This committee made these recommendations based on the idea that those students in high school would best be served by a curriculum that would prepare them for college, even though only a small percentage of high school students actually made it there (4).

This idea gradually began to change as more and more students entered high school without the intention of going on to college. In 1918, the Commission on Reorganization of Secondary Education published a report under the title *Cardinal Principles of Secondary Education*. The Committee on Science was established by the Commission to justify the presence of science courses in the high school curriculum. It was becoming more important for students to take science courses not only to develop thinking skills, but also more importantly, to later make contributions to society. Four subcommittees made recommendations for the goals of science education.

These goals included: improve the general welfare of society; develop science-related vocational interests; develop an enjoyment of nature; develop the student's ability to observe, to make careful measurements of phenomena, to classify observations, and to reason clearly from what they observed. A definition of scientific literacy, with the idea of teaching science for all students, began to emerge in these goals (4).

Later, the goals for science education became heavily influenced by the Craig's model, which included the developmental needs of children and experience with scientific methods. Another influential educator at this time was John Dewey, who believed in the personal-social development of children as the aim of education. Dewey's philosophy was such that the science curriculum must include socially functional topics, such as water supply or health. He also advocated the belief that the methods of science were at least as important as scientific knowledge. But, textbooks that dominated this time period emphasized scientific knowledge more than scientific methods (5).

In 1944, during the Progressive Era in education, the National Education Association (NEA) published a set of educational objectives entitled *Education for all American Youth*. It stated that schools should be dedicated to the proposition that every youth, regardless of sex, economic status, geographic location, or race, should experience a broad and balanced education. In 1952, the NEA revised their objectives to specifically include the sciences. All youth need to know how to understand the methods of science, the influence of science on human life, and the main scientific facts concerning the nature of the world and man (6).

The impetus for interest in scientific literacy during the late 1950's was probably due to the concern of the American science community about public support for science in order to respond to the Soviet launch of Sputnik. Parents became concerned about whether their children were receiving the kind of education that would allow them to compete in a society of increasing scientific and technological innovation. This Soviet advance in space led the United States to invest large amounts of money in the science curriculum that would allow us to compete. Many of the curriculum programs were

Observation and drawing inferences

aimed at elite students for whom science was to become a career. Other aspects of the science curriculum in the 1960s that are interesting include a spiral curriculum, and an emphasis on the structure of a discipline. However, by the late 1960s, Bruner's influence on personal development was not that strong, leaving a curriculum focused on structured knowledge with scientific inquiry (7).

In the early 1970's there was one person who stressed developmental psychology and its place in education- that person was Jean Piaget. This was a time of renewed focus on social relevance of the science curriculum, a New Progressivism. The term *science literacy* was used to describe science education for all students that focused on personally relevant and socially important issues. However, events were about to occur in America's history that would place more emphasis on technology (4).

The period of the late 1970's and early 1980's was a time when Americans were facing two important challenges. The first was the emergence of Japan as an economic power and a belief that America's international economic competitiveness and industrial leadership was on the decline. The second was America's poor standing in international comparisons of science achievement. A crisis in science education was believed to exist because science and technology were seen as the fundamental basis for economic progress. The National Commission on Excellence in Education report, A Nation At Risk, particularly raised concerns about the adequacy of science education. This report revived an interest in scientific literacy as necessary for all students, with a new focus on science, technology, and society (STS). Also during this time there was a new-found interest in the

Prepare young people to be "just like them"

environment. Gas shortages in the late 1970s and ozone depletion were two issues that were related to STS in science education. However, there was a debate over the idea of organizing science education around STS issues. A new idea of scientific literacy was forming and its name was *Project 2061* (4).

Overview of the Current Definitions of Scientific Literacy

In current literature, the concept of scientific literacy has different meanings and interpretations, some based on research, and others based on personal perceptions. We would like to present how others have defined scientific literacy and propose a definition.

Initiated in 1985, a year in which Haley's Comet came close to Earth, and named for the year in which the comet will return, Project 2061 created by the American Association for the Advancement of Science delineates the science that people whose lives span those years will need to achieve scientific literacy. The project has a three-phase plan of action that will contribute to the reform of education in science, math, and technology. A product of phase I of the project is the book, *Science for All Americans* (8), which uses the definition in general terms of what it means to be scientifically literate:

1. Being familiar with the natural world and recognizing both its diversity and its unity.
2. Understanding key concepts and principles of science.
3. Being aware of some of the important ways in which science, mathematics, and technology depend upon one another.
4. Knowing that science, mathematics, and technology are human enterprises and knowing what that implies about their strengths and limitations.
5. Having a capacity for scientific ways of thinking.
6. Using scientific knowledge and ways of thinking for individual and social purposes (8).

Develop thinking skills ... make contributions to society

The National Science Education Standards make a similar definition: having the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity (9). Rodger Bybee, a recognized critic of scientific literacy, makes the observation that there is a 90% overlap between the National Science Education Standards and Project 2061 Benchmarks, and concluded that there is no lack of a definition of scientific literacy. Bybee went on to identify several levels of scientific literacy.

1. *Nominal* – people can identify terms but misunderstand them, have misconceptions of scientific concepts and processes, and give inadequate explanations of scientific phenomena.
2. *Functional* – people can use scientific vocabulary correctly, and memorize technical words.
3. *Conceptual and Procedural* – people understand conceptual schemes of science, procedural knowledge and skills, and relationships among parts of a science discipline.
4. *Multidimensional* – people can understand the unique qualities of science, can differentiate science from other disciplines, knows the history and nature of scientific disciplines, and understands science in a social context (7).

Bybee also makes the point that scientific literacy should be represented as a continuum along which one develops, for a lifetime. He believes this definition to be fairly inclusive, accommodates all students, give direction to curriculum developers, and provide direction to researchers and educators (7). Other definitions are not as inclusive.

For instance, Robert Hazen and James Trefil define scientific literacy as knowledge you need to know to understand public issues. Hazen and Trefil believe that it is a mix of facts, vocabulary, concepts, history, and philosophy. It is not specialized stuff of the experts, but the more general, less precise knowledge used in political discourse. If you can

take articles with headlines about genetic engineering and the ozone hole and put them in a meaningful context - in short, if you can treat news about science in the same way you treat everything else that comes over your horizon - then you are scientifically literate (10).

It is interesting to note that the aim of Bybee and Hazen/Trefil is subtly presented as personal/social development, which was a major historical goal of science education.

Why Promote Scientific Literacy?

There are many arguments for promoting scientific literacy. *Science for All Americans* argues that education has no higher purpose than preparing people to lead personally fulfilling and responsible lives. Therefore, science education should help students develop the understandings and *habits of the mind* that help them to think for themselves and to face life head on. The authors also point out that with a scientifically literate populace, the United States will sustain its economic power and will be prepared to confront global problems. Project 2061 makes a good point that people who are literate in science may not necessarily be able to *do* science, "but can observe events perceptively, reflect on them thoughtfully, and comprehend explanations offered for them." The scientific issues surrounding environmental problems epitomize why teaching scientific literacy is so important. Understanding these issues, such as global warming, is expected of today's citizens. Knowing science enables people to make better decisions by taking into account the predictable consequences of our actions.

Another argument suggests that higher levels of scientific literacy among the populace will translate into greater support for science itself….unless the general public values what scientists are attempting to achieve, science is unlikely to be supported from public funds. At the very least, scientifically literate people should know the differences between astrology and astronomy, for instance. We live in a world that operates according to a few general laws of nature. "Everything you do from the moment you get up to the moment you go to bed happens because of the working of one of these laws (10)." Scientific knowledge will discourage students from accepting superstition as an answer to the questions they may have in going about their everyday lives. Through the promotion of scientific literacy "we contribute to the intellectual culture itself (10)." And, let's not forget that scientifically literate individuals will have an edge in today's workforce when applying for jobs, especially individuals who are both scientifically and technologically literate.

Understand the methods of science, the influence of science on human life, and the main scientific facts

Conclusion

Given the definitions above, it may be that *Science for All Americans,* which uses the definition in general terms of what it means to be scientifically literate, provides the best overall definition. Being familiar with the natural world and recognizing both its diversity and its unity is an important part of being scientifically literate, which was even recognized by the Committee on Science in 1918. If you look closely at Bybee's definition of scientific literacy, you will see the three goals of science education as described in an historical context at the beginning of this paper. So, it appears we haven't come very far, have we?

Yes, we have. Science education has often responded to the economic and social issues of the times and future research in the area of science curriculum may focus more on how and why these changes are made. It will also be interesting to see what future research has to say about the changing definition of scientific literacy. What students need to know and be able to do will change somewhat through time. Future research may need to look at areas of the curriculum that should be resistant to change, as well as those areas that may need revision.

Knowledge and understanding of scientific concepts and processes

For instance, the importance of using scientific knowledge and ways of thinking to understanding current and future environmental issues may not change too much in the foreseeable future. However, research may need to explore how students acquire the ability to evaluate the credibility of sides making scientific or political claims concerning environmental or ethical issues such as the dilemma of stem cell research. If students are only exposed to a collection of facts, instead of understanding key concepts and principles, it will not prepare them to evaluate issues. Students should be able to fashion judgments based on evidence, and not beliefs. As part of scientific literacy, students begin to see connections between basic science and real-world dilemmas, and acquire skills necessary to propel them into lifelong learning (11). The benefits of a scientifically literate society are enormous and far-reaching, both in the past and in the present. A goal we will all continue to strive for.

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NSTA Student Chapters: Introducing Beginning Teachers to the Profession of Teaching

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> "Becoming an effective science teacher is a continuous process that stretches from pre-service experiences in undergraduate years to the end of a professional career."
>
> National Research Council, 1996, p. 55.

In regard to professional development, the National Science Education Standards (NSES) provide teachers of science with a two prong challenge: "[be] responsible for their own professional development and for the maintenance of the teaching profession" (NRC, 1996, p. 55). In this article, I offer insights into National Science Teachers Association (NSTA) student chapters as a strategy for pre-service teacher development that addresses both challenges. As a chapter advisor, I outline why professional organization involvement is important in addressing the vision of professional development set forth by the NSES, what NSTA student chapters are, the benefits of having a local chapter, and I give a glimpse of some of the obstacles encountered when trying to develop and sustain a local chapter. The purpose of this article is not to provide a precise step by step how-to manual, rather to share my motivations for student chapter development and the lessons I have learned as an advisor since having the Southern Illinois University Edwardsville (SIUE) student chapter of NSTA officially recognized in October of 2004. Although higher education faculty are the primary audience, classroom teachers at any level may find it useful in helping to define and articulate what it means to be a professional.

Professionally, I am a science educator in the Department of Curriculum and Instruction at SIUE. I teach both graduate and undergraduate level science education courses. In preparing for this article, I asked two student-chapter members to share with me, in writing, their ideas regarding their involvement, and I include their comments where appropriate. The first is a second-year middle school science teacher from Mt. Olive, Illinois, Julia Heyen, a charter member and former chapter officer. The second is a pre-service teacher Laura Owca, current chapter president, who is student teaching at Grant Middle School, Fairview Heights, Illinois. They are referenced as Julia and Laura respectively.

The Importance of Professional Organization Involvement

Professional organizations provide outlets for teachers to gain both professional support and opportunity to shape the profession – the two key elements found in the NSES directive at the beginning of this article. Royce and Hechtman (2001) give insights into how they accomplish this by pointing out they provide such things as: mailings and list serves to help teachers stay abreast of information; conference opportunities where teachers can upgrade their knowledge and skills; journal publications that facilitate the exchange of ideas; outlets for teachers to share ideas; and

leadership opportunities. In addition, Weld & McNew (1999) found a positive correlation between professional membership and teachers' abilities to provide accurate representations of certain science concepts. In a later study, they also found a positive correlation between professional membership and teachers' use of selected reformed based teaching practices (McNew, Weld & Blake, 2001).

However, over the years, I have come to realize that too few teachers of science are intentional about their career development path and neglect one or both elements of the challenge. Perhaps this is one reason why the National Science Teachers Association (NSTAa) strongly recommends in their teacher preparation program position statement the need to help teacher candidates "develop a sense of responsibility to students and the community and dedication to the need to continually grow" (p. 3). The Illinois State Board of Education (n.d) is even more direct about teacher preparation expectations in the Illinois Professional Teaching Standards:

Standard 10 - Reflection and Professional Growth

The teacher is a reflective practitioner who continually evaluates how choices and actions affect students, parents, and other professionals in the learning community and actively seeks opportunities to grow professionally.

Performance Indicators. The competent teacher:

10G. Participates in professional dialogue and continuous learning to support his/her own development as a learner and a teacher.

10H. Actively seeks and collaboratively shares a variety of instructional resources with colleagues.

Standard 11 - Professional Conduct and Leadership

The teacher understands education as a profession, maintains standards of professional conduct, and provides leadership to improve student learning and well-being.

Performance Indicators. The competent teacher:

11I. Contributes knowledge and expertise about teaching and learning to the profession.

11M. Actively participates in or leads in such activities as curriculum development, staff development, and student organizations.

11N. Participates, as appropriate, in policy design and development at the local level, with professional organizations, and/or with community organizations.

Embedded in the standards above, one can clearly see both elements of the NSES directive. Teacher preparation programs can address these elements in a number of ways. From personal experience, I have found student organizations, like the NSTA student chapter program, to be effective vehicles for providing opportunities for pre-service teachers to accomplish these tasks.

What is a Student Chapter?

The student chapter program was initiated by NSTA in 2001 to reach teachers just entering the profession. Chapters are separate organizations from NSTA; dual membership is not required. Forming a chapter is not complicated and is open to any two- or four- year institution. Currently, there are about one hundred chapters. The Procedures Guide (NSTAb) outlines four purposes of this program that include: " … promot[ing] the mission

Promote the missions of NSTA, acquaint with the resources available from NSTA, provide professional development, create a network of pre-service teachers, ...

of NSTA, acquaint[ing] pre-service teachers of science with the support resources available from NSTA, provid[ing] additional professional development in science education to pre-service teachers, and creat[ing] a network of pre-service teachers of science at universities or colleges across the world (p. 2)." With these broad directives, possibilities for chapter activities are almost limitless.

Through investigation, I have found some chapters elect to schedule regular bi-monthly meetings throughout a semester and seem to have established a regular membership role. During these times, pre-service teachers share activities, listen to special speakers, or work on projects. This regularity has not yet occurred with the chapter on my campus. The frequency and level of activity varies depending on the members' interest and availability during any given semester. For the most part, chapter members have elected to meet less regularly. While we have had occasional speakers, members have tended to focus on attending events or developing projects. These are determined and organized by four or five elected officers. Attendance at events has varied from as little as three to as many as thirty five. The following two examples will provide a flavor of the kinds of activities and events that have been the core of this chapter.

Julia recalled, "As a member of the SIUE chapter of NSTA, I was able to attend both an ISTA and NSTA convention. At the ISTA event each attending member brought a lesson idea to share with other science teachers from around the state (personal communication, December 15, 2006)." Establishing the chapter (Figure 1) and attending these two conferences with the five elected officers were the highlights for me of that particular year and the chapter's major accomplishments. A picture on my desk of the chapter officers at the 2004, NSTA National Convention in Atlanta, Georgia, serves as a fond memory of this adventure. However, I do not travel with student chapter officers to a state and national conferences every year.

This year's chapter members have focused their meetings around developing and coordinating a Family Science Night for a local elementary school with a high percentage of English language learners. For this event, they solicited local businesses to provide door prizes and invited presenters from the

Figure 1. Certificate of recognition from NSTA

SIUE School of Dentistry, Agriculture in the Classroom, the National Great Rivers Museum (Alton, Illinois), and Pfizer Corporation. They supplemented these presentations by setting up ten stations with a variety of engaging science activities. Each station was staffed by a pre-service teacher (Figure 2). Although there was some nail biting, including presenter cancellations at the last minute, the student organizers were elated and felt the event was a complete success. Each chapter participant left with a letter of thanks from the principal for their professional portfolio.

Each of these chapter activities was very different, but each was a valuable part of their preparation for the profession of teaching and demonstrated in a concrete way how continuous learning and giving back to the profession are an important part of teaching. There is no one "correct" model for a student chapter or limits to the kinds of goals and activities possible. Like an instructor learning to facilitate student investigations, as an advisor I let interests and motivations of the pre-service teachers each year drive activities.

Benefits for Teacher Candidates

To eliminate financial barriers for college students, NSTA generously provides each new student chapter member with a one-year free NSTA e-student membership that is valid for twelve months. This allows them to access all four of the

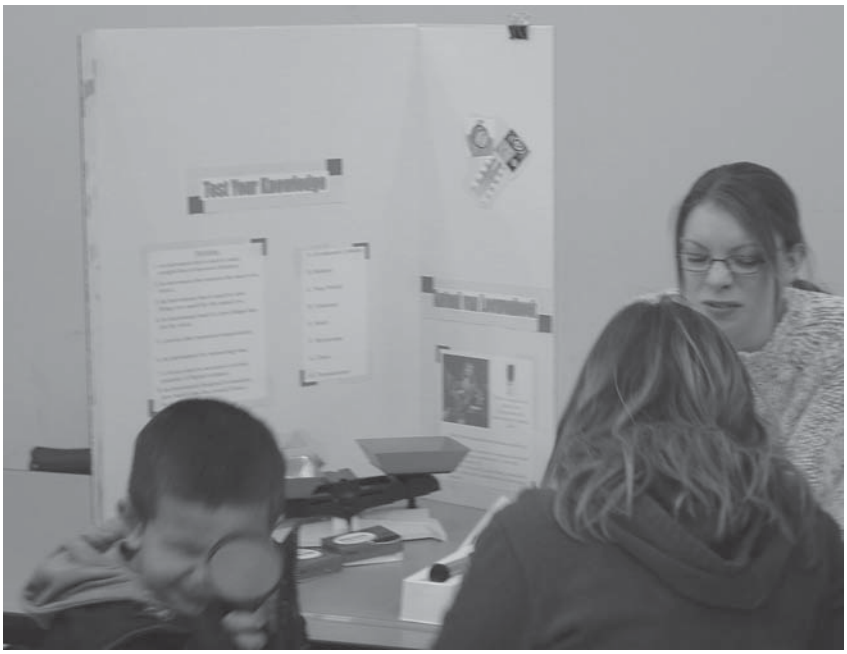

Figure 2. A pre-service teacher allows students to examine tools that scientists use during the Family Science Night.

NSTA grade-specific journals. With this, teacher candidates can search the archives of past journals to locate high-quality information from professionals across the globe. When entry-level membership expires, students can renew their membership at the student rate of $32.

Pre-service teachers do not become involved with student chapters out of a conscious decision to contribute to the profession of teaching. Since helping to initiate the chapter in 2003, I have had new members complete a survey that asks them, "What is your primary reason for considering membership in SIUE student chapter of NSTA?" Those completing the survey have been largely elementary-school teacher candidates with only an occasional secondary-school teacher candidate. Their responses tend to fall into the following categories:

- Resume building and advancing job opportunities;
- Developing relationships with others and meeting new people;
- Expanding curriculum by providing lesson ideas and resources;
- Professional growth and deepening understanding of science.

The remaining paragraphs of this section use comments from Julia and Laura to illustrate how student chapter involvement has provided members with opportunities in each of these areas. In addition to addressing these needs, the examples also illustrate how chapter activities can help members realize the rewards of active involvement and understand the difference it can make to others.

The student chapter has provided some pre-service teachers with a head start in their job search. Julia stated, "The greatest benefit of NSTA was the ability to tell the hiring administrator in a district that I am active in a professional organization. I was fortunate to receive a job in March of my senior year. Knowing that I had a job was very comforting (personal communication, December 15, 2006)."

Student chapter activities do promote relationships. I have been fortunate to maintain contact with Julia during her first two years of teaching and occasionally I have been able to rally current chapter members for support. "NSTA has been invaluable to me as a new teacher. I have been able to meet teachers from around the country, work with other pre-service teachers and also bring pre-service teachers into my classroom. Last year, Dr. Marlette was able to bring several SIUE chapter members to Mt. Olive to judge the local science fair (personal communication, December 15, 2006)." During this time, Julia was able to show her new science lab to the pre-service teachers and convey how grateful she was to have their support.

Introducing pre-service teachers to NSTA resources such as *SciLinks* and *Science and Children* is an invaluable service that will serve them well throughout their entire teaching career. Chapter activities can also help them grow in their abilities. As chapter president, Laura located presenters for several meetings. By taking the initiative to organize these meetings, she realized an unanticipated outcome. Laura stated, "… [Our] chapter's theme has been that of locating local establishments that offer materials for teachers. In the process of communicating with community members, I have created a network as well as a bank of ideas for science enrichment. This process has also allowed me to increase my content knowledge from both an informational and pedagogical

standpoint (personal communication, December 10, 2006)."

Laura went on to state, "Since being an active member and officer in SIUE's student chapter of NSTA, I have come to see education as a fluid entity requiring the support of a community of professionals who can share their ideas and insights. This philosophy has stemmed directly from experiences in our student chapter of NSTA, which have proven instrumental as I prepare to enter the job market (personal communication, December 10, 2006)." These comments suggest that, like other members, Laura is beginning to understand the importance of participating in and contributing to the professional community.

Challenges

While student chapters have many benefits, there are also difficulties that need to be considered. One area that can be a strain is maintaining momentum between graduation and the start of a new year. It is important to remind student chapter members of their need to keep a continual stream of new pre-service teachers involved. Graduation can leave a huge void in your chapter membership. Recruitment of students prior to their acceptance into your program will be very profitable. Laura provides some insights: "I first became interested in SIUE's student chapter of NSTA upon hearing that it was one of the few professional student organizations directed towards education majors at the university. A friend and I attended a meeting during my sophomore year of college, before I had even declared my major (personal communication, December 10, 2006)." Because of her involvement early in her academic career, the chapter benefited from her contributions for three years.

This constant ebb and flow of new members also makes my job as an advisor less clearly defined. The degree of my involvement changes depending on the student make up of the organization. The students are more active in some years than others and seek my assistance more frequently. I have to balance what I think the chapter should do and the desires of the new membership.

Competition is another challenge. This can affect an organization at several levels. First, you are competing with students' busy schedules. This

Let interests and motivations of the pre-service teachers each year drive activities

is especially true during their final semester of student teaching. Interest and attendance are directly related to the officers' abilities to establish meeting dates and times early in the semester. One also has to consider the other organizations that are vying for students' time such as Kappa Delta Pi, Illinois Education Association, and other science organizations such as Chemistry Club, Biology Club, and Physics Club.

Concluding Thoughts

In spite of these complications, I remain committed to supporting the SIUE Student Chapter of NSTA because I believe it is a crucial element in transitioning future teachers of science into the profession of teaching. After studying support systems for new teachers of science in five different countries, Britton and Raizen (2003) made recommendations for supporting United States teachers of science that mirror many of the ideas discussed in this article. Among them, they suggested that beginners need help with planning courses and lessons, and they need support in locating instructional resources to guide them in implementing inquiry-based teaching strategies. If such teaching is to occur, textbooks cannot continue to be the sole source of support in these areas. Those more experienced have to be willing to share their resources and ideas. Thus, the importance of the NSES two prong directive mentioned at the beginning of this paper. Organizations like ISTA and NSTA are made up of science educators at all levels, willing to give of themselves for the benefit of the profession. Introducing pre-service teachers to this community of support and helping them to

understand that their involvement makes a difference is an important lesson. Laura summarizes this by stating, "I feel safe entering my first classroom because I know that my role in SIUE's student chapter of NSTA is not finished. Other leaders and members who have graduated before me have modeled how to continue involvement in the organization as a means of keeping abreast of the latest developments in science education (personal communication, December 10, 2006)."

Note

For more information visit the NSTA Pre-service and New Teacher Headquarters at http://www.nsta.org/newandpreservice or look for a student chapter event at the next regional or national NSTA meeting.

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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),

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

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

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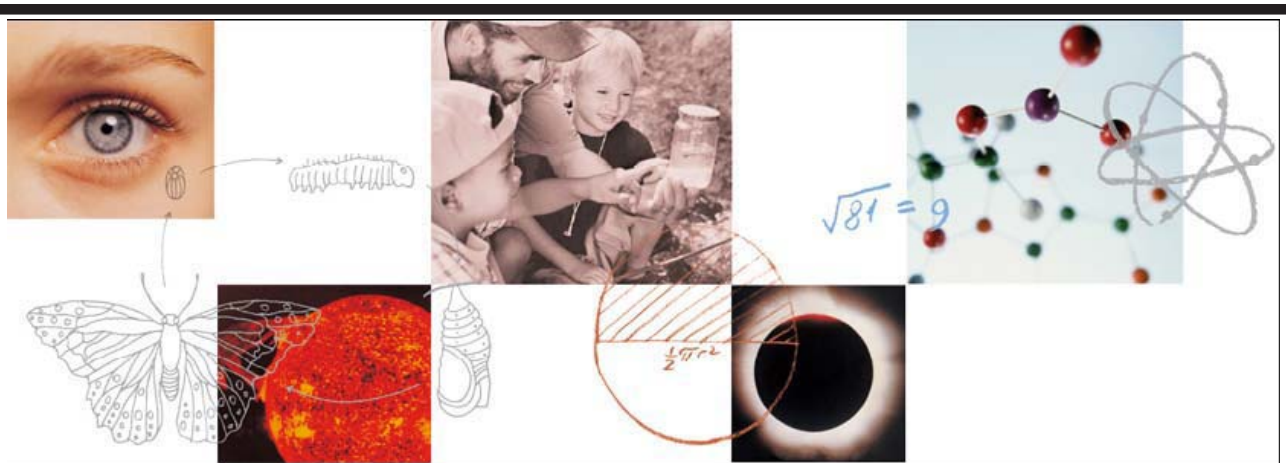
Index to advertisers:



Presidential Awards for Excellence in Mathematics and Science Teaching

www.paemst.org

YOU could be the next Illinois Presidential Awardee for Excellence in Mathematics and Science Teaching!

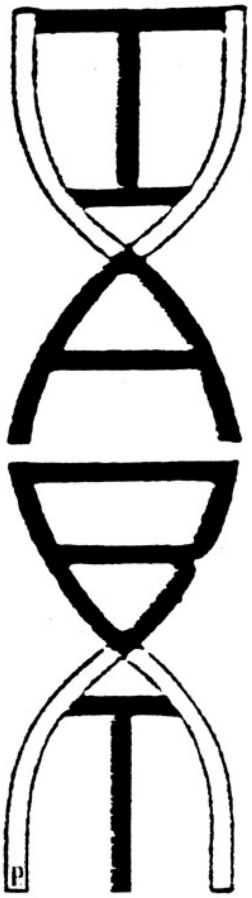
How do I learn more?

- **Nominate an excellent K-6 teacher at www.paemst.org (7-12 will be in 2008)**
- **Contact State Coordinator Diana Dummitt at ddummitt@uiuc.edu**
- **Access information and resources at the Illinois ISTA website: http://www.ista-il.org/**
- **Attend the PAEMST awards luncheon and mentoring session at the Illinois Science Teachers Association Conference, November 8-10, 2007.**
  Register today at: http://www.ista-il.org/conference/index.htm

Environmental Education Association of Illinois

The Environmental Education Association of Illinois (EEAI) *serves* the classroom teacher; the naturalist; the 4-H leader; the home school parent and dozens of additional professionals that have an impact on the environmental literacy of our citizens. In order to address member-driven needs for all of Illinois, EEAI has divided the state into five distinct regions (North-East, North-West, East-Central, West-Central and South). Within each region exists two (three in the North-East) membership-elected Regional Directors whose sole-responsibility is to evaluate the needs of their communities and make available professional development opportunities and/ or educational resources to best *serve* these needs. To ensure the continued *service* to the regions, each director creates an annual plan of workshops, inservices, and field trips to occur within their region; on most occasions these events have little or no cost to the participant. EEAI's status as an ISBE certified professional development provider allows educators to receive hands-on environmental training while earning recertification units.

www.eeai.net



The Illinois Association of Biology Teachers Wants You!

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

The web: www.iabt.net/
Email: iabtnews@earthlink.net
Executive secretary and state sponsor: Philip J. McCrea
(mccreap@newtrier.k12.il.us)

It's a Biology Thing!

IPRB

Illinois Petroleum Resources Board

Illinois Petroleum Resources Board
Restoring the Land—Increasing Awareness

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

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

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

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

Charles Williams, Executive Director
Nancy Karch, Executive Assistant
Phone: 618-242-2861 Fax: 618-242-3418
Website: www.iprb.org

IPRB
P.O. Box 941
Mt. Vernon, IL 62864

Science Education: Providing a Pathway for Inspiration and Imagination

ISTA 2007 Conference on Science Education

Friday and Saturday, November 9 and 10, 2007
Preconference: Thursday November 8, 2007

Deadline for Submissions: April 16, 2007

Location:
Peoria Civic Center
and
The Hotel Pere Marquette

Earlybird Registration Deadline 10/6/07
ISTA Member - $100
Nonmember (includes membership) - $135
Advance Registration Deadline 10/27/07
ISTA Member - $115
Nonmember (includes membership) - $150
Full Rate Registration After 10/27/07
ISTA Member - $125
Nonmember (includes membership) - $160

ILLINOIS SCIENCE TEACHERS ASSOCIATION
ISTA
www.ista-il.org

See conference information in the front of this issue for further details and registration form.

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