SPECTRUM

Winter 2007, Vol. 32, No. 3

ista

The Journal of the Illinois Science Teachers Association

In this Issue: ***International Science!***
Thailand Ties
Science in Antarctica

Plan Ahead: ISTA 2007-2009 election ballot deadline *postmarked* by January 17

Spectrum

The Journal of the Illinois Science Teachers Association
Volume 32, Number 3

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

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

On the cover: Images from the 2006 ISTA Conference on Science Education. Cover photos and interior journal photos of the conference were taken by Larry McPheron, region 2 director.

The *Spectrum* is printed on recycled/recyclable paper

SPECTRUM

The Journal of the Illinois Science Teachers Association

Winter 2007 Volume 32, Number 3

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President's Corner

Raymond J. Dagenais, Ed.D.

Illinois Mathematics and Science Academy

In March 2007 my term as president of the Illinois Science Teachers Association will come to an end. The past two years have flown by very quickly and this will be my last letter from the President's Corner. As incoming president I outlined three goals. The goals were to:

1. Uncover the talents and experiences of Illinois science teachers to improve science education in Illinois;
2. Leverage the benefits of partnering with other professional educational organizations; and
3. Identify and promote ways to make the teaching and learning of science meaningful for Illinois science teachers and their students.

I am pleased to report that ISTA rose to the challenge and took action to make the goals a reality. Uncovering the talents and experiences of Illinois science teachers amounted to extending the invitation to become involved and supplying the support to allow it to happen. The chairs of our various ISTA committees have produced remarkable results. The *Spectrum* is recognized as a valued professional journal through the efforts of Dr. Judith Scheppler and the contributions of the many individuals who have submitted material for inclusion in each issue. Mary Lou Lipscomb, the ISTA Professional Development Chair and the Coordinator of the Building a Presence Program in Illinois, has streamlined and expanded the program into a critical information sharing tool for Illinois educators.

ISTA is exploring an initiative with the Illinois Section of the American Association of Physics Teachers regarding science teacher recruitment and the Illinois Association of Biology Teachers has supported ISTA through attendance and presentation at the annual conference. These partnerships are joined by partnerships with "Friends of Science Education." ExxonMobil has provided funding to support the ISTA/ExxonMobil Outstanding Teachers of Science Award Program and the Illinois Petroleum Resources Board has provided financial support for the ISTA/IPRB Outstanding Student Award Program.

The *Spectrum*, the ISTA Science Education Conference, and the Illinois Building a Presence Network have all offered venues to identify and promote ways to make the teaching and learning of science meaningful for Illinois science teachers and their students. The 2006 ISTA Science Education Conference included over one hundred presentations and ninety-three vendors booths. A great deal of sharing of ideas took place during the Exhibition Hall Opening Reception and the Gala event hosted by the Lakeview Museum of Arts and Sciences.

In retrospect, I am deeply grateful to all those individuals who stepped forward and volunteered their efforts to make the past two years a success. I want to thank the regional directors who served diligently throughout their terms and especially the ISTA Executive Committee for their unwavering dedication and support.

The Illinois Science Teachers Association is on solid footing in terms of finances and future leadership. Our president-elect, Jill Carter, has been deeply involved with the operation of our organization and has the energy, ideas, and foresight to lead ISTA into the future. I have had a wonderful time meeting people, learning new things, and serving as your president. I look forward to my continuing involvement with ISTA and to assuming the duties of Election Chair as the immediate past president of the Illinois Science Teachers Association.

Yours truly,
Ray Dagenais, Ed.D.

Ray and conferene co-workers prepare for the ISTA 2006 conference. Behind-the-scenes conference preparation was key for a smoothly executed convention.

President Ray addresses ISTA members at the 2006 general memberhips meeting. This membership meeting was the last which Ray will preside over; making way for President-elect Jill Carter.

Ray, as vendor committee chair, checks out the exhibit hall prior to the conference opening. The vendor exhibits were an extremely infomrative and important part of the convention.

2005-07 ISTA Executive Committee

Vice President
Donna Engel
Minooka Community HS
dengel@mchs.net

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

President-Elect
Jill Carter
Pekin Community
High School
jcarter@pekinhigh.net

Treasurer
Carl Koch
aecKoch@aol.com

Past President
Marylin Lisowski
Eastern Illinois
University
mlisowski@eiu.edu

2007-2009 Elections are now open!

Be sure to vote for your 2007-2009 ISTA executive committee and your 2007-2009 regional directors. The candidate slate can be found on pages 7-9, along with the candidates' position statements.

2005-07 ISTA Committee Chairs

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

Regional Directors

Region 1 Director 06-08
Susan Dahl
Fermilab
Lederman Science Center
sdahl@fnal.gov

Region 1 Director 05-07
Tom Kearney
Andrew High School
TKearney@d230.org

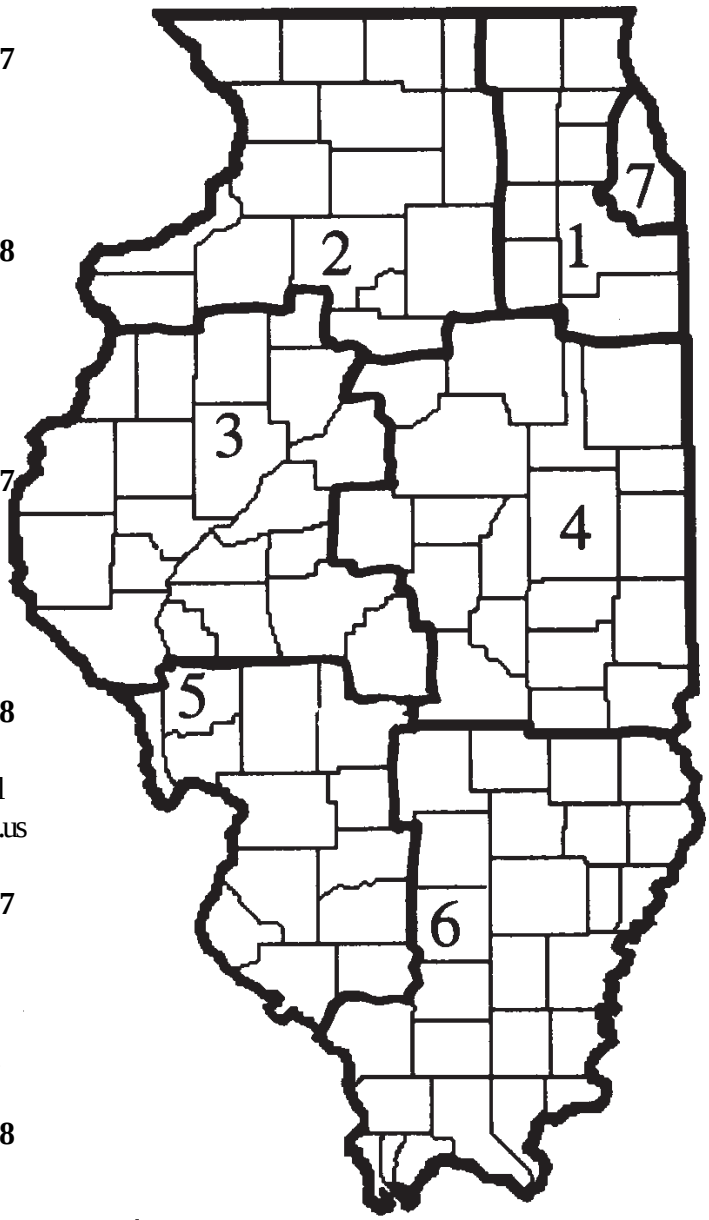
Region 2 Director 06-08
Donald Terasaki
Rockford Boylan High School
dsaki@hotmail.com

Region 2 Director 05-07
Larry McPheron
Rockford Boylan High School
lamcp@hotmail.com

Region 3 Director 06-08
Randal Musch
Jacksonville High School
rmusch@jac117.morgan.k12.il.us

Region 3 Director 05-07
Coleen Martin
Wilder-Waite Grade School
cmartin@dunlapcusd.net

Region 4 Director 06-08
Linda Shadwick
Villa Grove High School
l.shadwick@mchsi.com



Region 4 Director 05-07
Susan E. Golden
Professional Development Institute
sgolden@dps61.org

Region 5 Director 06-08
Tom Foster
Southern Illinois University
tfoster@siue.edu

Region 5 Director 05-07
Kathy Costello
MillstadtSchool
kjcostel@stclair.k12.il.us

Region 6 Director 06-08
John Giffen
Vienna High School
jgiffin74@hotmail.com

Region 6 Director 05-07
Vicki L. Tripp
Buncombe Grade School
ctripp@bgs.johnsn.k12.il.us

Region 7 Director 06-08
J. Brent Hanchey
Nancy B. Jefferson High School
jbhanchey@cps.k12.il.us

Region 7 Director 05-07
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.

2007-2009 Elections

Dear Dedicated ISTA Members,

Your input, views and now your votes are being requested for the 2007 Board of Directors for ISTA. A ballot was sent to your mailing address and the ballot and candidate information are posted on our website at http://www.ista-il.org/. We truly have many talented members and you will be able to select those who you think will best represent you and our membership. In addition to offices listed on the ballot, there are numerous opportunities for you to participate in ISTA. Our committees are also listed on the website and we welcome your expert involvement. Please know that this is your organization and you have a voice.

Have a fantastic December and a joyful Holiday season and thanks for your dedication to science education and to ISTA.

Marylin Lisowski

Immedidate Past President of ISTA and Elections Chair

Executive Board

Larry McPheron (candidate for president-elect)

- BS in Education, Major in Zoology and Botany from Eastern Illinois University in 1972
- MS in Education in Biological Sciences from Eastern Illinois University in 1992
- 48 additional hours past Masters as a part of continuing education requirements
- Current position (since 1984) at Boylan Catholic High School teaching biology, botany/zoology, environmental science
- Two consecutive terms as Region 2 Director

Rationale for Serving: To provide the ISTA membership a choice of candidates who would be leading from a vantage point of similar experiences and insights in the science classroom as many members deal with everyday.

Gwen Pollock (candidate for president-elect)

- BS in Science Education from Louisiana College (1974)
- MA from Sangamon State University (1992)
- 17 years as high school science teacher in Louisiana, Texas, and Illinois in biology, chemistry, physics, physical science, gifted, traditional and challenged classes;
- Current position (since 1993) as Illinois State Board of Education Science Consultant with responsibilities for K-12 science supervision,

Rationale for Serving: I feel that my experiences in Illinois have broadened and deepened my own perspectives for the best of what science teaching and learning can be and become for colleagues in the K-12 science classrooms throughout the state. My optimism is growing for the revitalization of ISTA in the new chances of STEM efforts nationally and in state opportunities from and for our networks. The possibilities for replication of national projects in the state, as well as extending opportunities for Illinois teachers to reach out to the nation, will be a prime focus for the organization. To be able to access the fabulous resources of NSTA, encourage and build up vital relationships new, current and former partners, and make membership in ISTA worth far more than ever imagined will be goals for me.

Andrew Apicella (candidate for vice president)

- BA Rutgers College, Rutgers University, New Brunswick, NJ
- BS Western Illinois University, Macomb, IL
- 26 years as a science teacher at Riverdale High School in Port Byron, Illinois
- ISTA director Region 2 2001-2003
- ISTA Secretary 2003-2005

Rationale for Serving: The ISTA is an organization that offers many opportunities to the community of science educators in Illinois. As a member of the ISTA board I would like to help in the continuing efforts of the ISTA as it works to provide quality opportunities for the professional development of the teachers involved in science education across the state of Illinois.

Donna Engel (candidate for vice president)

- BS in Chemistry 1988 Elmhurst College
- MA in Educational Leadership 2003 Aurora University
- 19 years of experience as a science teacher at the high school level
- 4 years of experience as Science Department Chair Minooka Community High School

Rationale for Serving: One of my favorite quotes attributed to Catherine Muther is: "If you have a passion, then you have something to contribute. It's not about asking, "What should I do?" It's about asking, "What is my passion?" A second favorite quote is by Helen Keller: "I am only one, but still I am one. I cannot do everything, but still I can do something". My passion is and has always been science education. Knowing my passion and having been so richly served by the opportunities granted to my school through the ISTA, I now believe it is time to contribute back. As the membership chair for ISTA, I have been able to travel to various regions of our state meeting and listening to our science teachers. Though the regions are varied, it is apparent that the strength of our association is dependent upon individuals willing to work together to strengthen science education in our state. It would be a privilege to serve these teachers as vice-president and to continue to strive for excellence in science education in our state.

Kendra Carroll (candidate for secretary)

- BS in Botany from Eastern Illinois University
- Currently enrolled in the Masters of Science in Natural Science program at Eastern Illinois University
- Teaching experience: I have been teaching in Illinois public schools for seventeen years. I just finished my eleventh year in the Shiloh CUSD #1 in Edgar County. I have taught both life and physical science at the junior high and high school levels.
- Online instructor for Illinois Virtual High School. I find this experience to be a challenge that enhances my "face-to-face" instruction.

Rationale for Serving: I began my involvement with ISTA as a Region 4 Director and have been serving as secretary for the past two years. On the professional level, I believe it is important to be involved in the organization that is the representative for instructors of science throughout the state. I have been committed to my roles with the organization and have attended all board and executive board meetings throughout my tenure. Since becoming secretary, I have done my best to provide accurate and thorough minutes in a timely manner.

Regional Directors

Nicol A. Christianson (candidate for region 1 director)

- Elementary Education degree (minor in biology) from Benedictine University.
- Currently a science teacher(6th and 7th grades) at Rotolo Middle School in Batavia
- Fermilab advisory group for their implementation of a U. S. Department of Energy (DOE) teacher development program called Laboratory Science Teacher Professional Development Program (LSTPD).

Rationale for Serving: My creativity and enthusiasm for quality science education is evident in my teaching and among the professionals with whom I interact. I also am striving to advocate for changes in curriculum that reflect best practices in science. My rationale for serving is not only to enrich my teaching experience, but by helping others see the benefits of reaching out to organizations like Fermilab, ISTA and NSTA to better serve science teachers in the classroom.

Pat Schlinder (candidate for region 2 director)

- BA Loyola University, 1973
- Founder & President of The Scope Shoppe, Inc. 1974 to present
- Trade mark holder of 'Scope Cam'': Video/digital microscopy since 1985
- Flinn Scientific Midwest(IL.-WI.-MN.) Sales Manager/Safety Trainer, 1985 to present
- Treasurer (elected 9/06) of West Suburban Science Supervisors

Rationale for Serving: To serve the Science Teachers of Illinois by helping make the ISTA the organization every Illinois Science Teacher should belong.

Coleen M. Martin (candidate for region 3 director)

- B. S. Elementary Education – Illinois State University 1974
- M.A. Elementary Education – Bradley University 1983
- 5th grade teacher 1974-present at Wilder Waite Grade School, Dunlap District #323

Rationale for Serving: As a second term region 3 director, I would like to encourage more teachers to become actively involved in ISTA. Science instruction needs to be taught by teachers who are excited about instructing students for the challenges of the future. As a director, I hope to help ISTA offer more professional development opportunities to our members.

Sherry Spurlock (candidate for region 3 director)

- Associate in Arts and Science (1995) Illinois Central College
- BS (1997) Bradley University
- Currently enrolled in MS program at Illinois State University
- Chemistry and physics teacher at Pekin Community High School

Rationale for Serving: I believe that learning is a life-long process and continually view myself as a student. I search for better and/or more effective ways of accomplishing goals and often incorporate those into my actions to support my learning style. I also view learning as a cooperative process where the more others are involved the more learning takes place. Most take a more vested interest in any goal when they see the benefit to themselves and I attempt to encourage them to find that benefit. As a leader, I believe that everyone has a voice and should be encouraged to use it. As a learner, I understand that there are times when I must allow others to take the initiative and lead in order for me to internalize the learning. I am a strong proponent of organizational skills and continuously work on improving them. Seeing how all the parts fit together to make the whole is one benefit of this.

A leader must understand the culture of the area he/she serves. The key word here is serve. The job of a leader is to work collaboratively and facilitate the staff and faculty to serve the students' interests and needs. When all parties are treated equally and as valuable sources of input, cooperation and coordination become relative.
Students, and the education they receive, are our future. In order to succeed, we must give them what, not only society demands they have, but what will best suit their talents and strengths. Faculty and parents alike should be involved in the process of training students to become productive citizens and informed and involved members of their community.

Troy J. Simpson (candidate for region 4 director)

- BS geology and geography (1994) University of Illinois
- MS elementary education (1997) Olivet Nazarene University
- Illinois State Geological Survey (1994-1995)
- Currently teach 8th grade Earth Science/7th grade Life Science at Glenn Raymond School ISTA Point of Contact the last 2 years

Rationale for Serving: I hope to better promote the advantages of being a part of the Illinois Science Teachers' Association and National Science Teacher's Association. The key to this is to communicate the value of membership to science educators. This includes not only conventions, but through workshops, message boards, and most importantly members within the schools themselves. I also believe that as science educators, we need to continue to further ourselves professionally in the fields of science in order to make what we teach more applicable in the classroom.

Kathy Costello (candidate for region 5 director)

- BS Biology, Northern Illinois University
- MS Forest Ecology, Southern Illinois University, Carbondale
- 21 years as a middle level science educator in both public and private schools.
- Currently serving as a student teacher supervisor for Southern Illinois University, Edwardsville

Rationale for Serving: ISTA has done so much for me as a science educator. Serving on the board is the best way that I can repay the organization. If elected, my goals for the next two years are to expand the Building a Presence network in region 5 and to create more opportunities for science educators in southern Illinois to meet, learn, and share ideas.

Denise Edelson (candidate for region 7 director)

- B.A. and M.S. Ed. from Northern Illinois University
- Attended Loyola University as a member of a Boeing/Loyola science cohort
- Chicago Public Schools teacher (first to fourth grades) for 31 years
- Currently third grade teacher at Hannah G. Solomon School.
- ISTA Region 7 Director 2005-2007

Rationale for Serving: I would like to keep teachers in Region 7 connected to and aware of the wide selection of resources that are available to science teachers in Illinois. We focus on attempting to meet the diverse needs of our students, and attempt to fulfill the needs of our districts, but don't always put the same effort into meeting our own needs as teachers. We need to be able to communicate with each other on shared topics of concern, to grow as scientists by reaching out toward new experiences, and we need to continually rediscover that fresh spark of wonder and joy in science that serves to fuel us toward professional excellence.

ISTA Ballot for 2007

Ballot Instructions

1. Review each candidate's qualifications at http://www.ista-il.org/.
2. Vote for ONE candidate in each category. Mark you choice in the "O"
3. Fold this ballot and return it to:

   Dr. Marylin Lisowski, Elections Chairperson
   Eastern Illinois University
   600 Lincoln Avenue
   Charleston, IL 61920

4. **Ballots are to be <u>postmarked</u> no later than <u>January 17, 2007.</u> Thanks so much.**

BALLOT

REGION 1
○ Nicol Christianson

REGION 2
O Patrick Schlinder

REGION 3
○ Coleen Martin
○ Sherry Spurlock

REGION 4
○ Troy Simpson

REGION 5
○ Kathy Costello

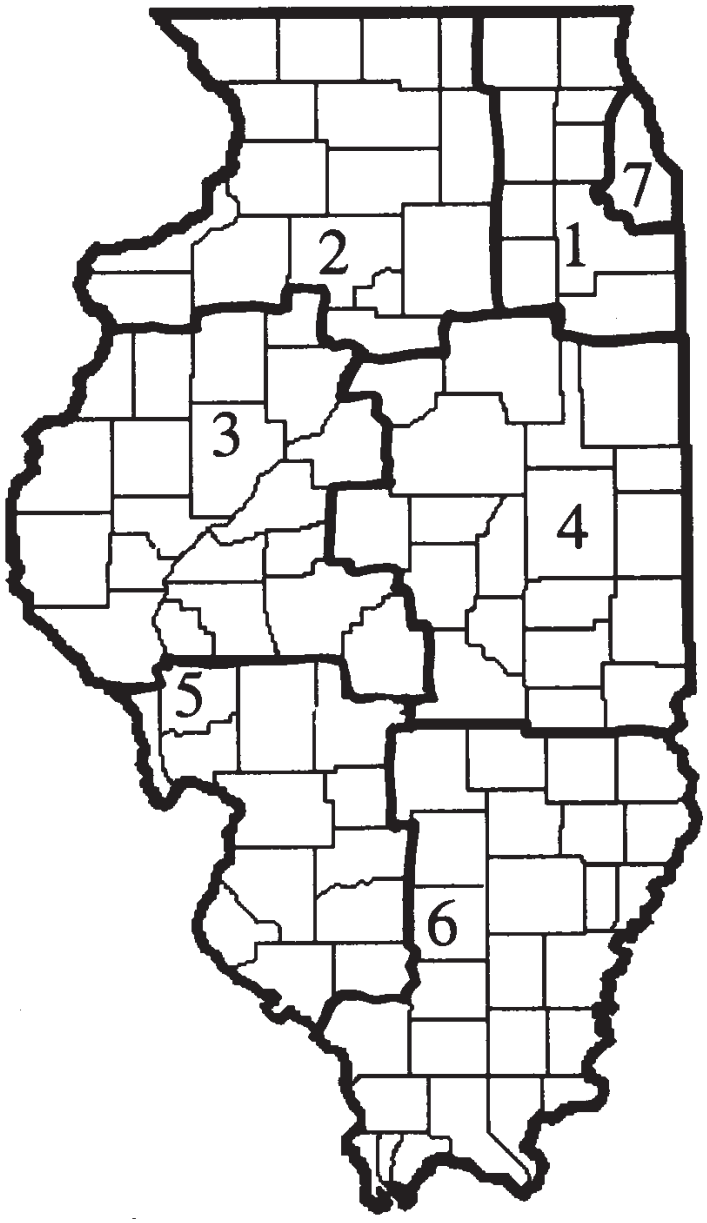
REGION 6
○ _____

REGION 7
○Denise Edelson

VICE PRESIDENT
○Andy Apicella
○Donna Engel

PRESIDENT ELECT
○Gwen Pollock
○Larry McPheron

SECRETARY
○Kendra Carroll



ISTA / ExxonMobil Outstanding Teacher of Science Awards Program

The Illinois Science Teachers Association with the generous support of ExxonMobil announces the 2006 - 2007 ISTA / ExxonMobil Outstanding Teacher of Science Awards Program. Applications will be accepted from K – 8 teachers of science who have demonstrated "extraordinary accomplishment" in the field of science teaching. These accomplishments are intended to be something that goes beyond the classroom and enriches the lives of students. Examples include personal or community-wide achievement which is science related (grants for the school, working on environmental projects, etc). It could be working with other teachers or community members to develop a product or process related to science education. It could also be the creation of a science group at the school which enriches and extends beyond the school day. *Previous winners are not eligible.*

The 2006 – 2007 program consists of seven one thousand dollar prizes. One $1000 award will be presented to one K – 8 teacher of science from each of the seven ISTA regions in the state of Illinois.

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

Criteria for consideration include:

1. Current ISTA membership
2. Full time teaching assignment
3. Teaching assignment in the ISTA Region for which application is submitted
4. Written narrative (maximum of 500 words) describing the teacher's "extraordinary accomplishments" in the field of science teaching
5. Evidence that supports the teacher's description of "extraordinary accomplishments" in the field of science teaching
6. Two letters of support from individuals who can attest to the impact of the "extraordinary accomplishments" in the field of science teaching
7. A completed application form with required supplementary materials submitted by March 1, 2007 to:

Dr. Sher Rockway
ISTA Awards Chair
34136 N. Lavender Circle
Grayslake, IL 60030

Winners will be notified by April 15, 2007.
For more information contact Dr. Rockway at sher_rockway@comcast.net.

2006-2007 ISTA/ExxonMobil Outstanding Teacher of Science
Awards Application Form
Application Due Date March 1, 2007

ISTA Region:_____

Name:_____

Position (grade and subject taught):_____

School Name/Address:_____

_____

School Phone Number:_____

Email address:_____

Home Address:_____

_____

Home Phone Number:_____

I hold 2007 calendar year membership in ISTA: _____

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

Signed:_____ Date: _____
(Applicant)

A Vision of Excellence: Building the Future Through Science Education
2006 ISTA Science Education Conference

With about 125 presentations, nearly seventy-five vendors, thousands of dollars in door prizes, and hundreds and hundreds of satisfied conference participants, this year's ISTA conference on science education, *A Vision of Excellence: Building the Future Through Science Education*, was one of the best held in recent years. Participants could browse through the vendor exhibits picking up hints and tips for new curriculum and valuable products. Presentations by both experienced and novice teachers and from industry and museum representatives, all ran the gamut of disciplines and grades, and provided attendees with new inspirations for the classroom. Whether you were an experienced educator, a newbie, or a pre-service soon-to-be teacher, the conference offered loads of stimulating ideas.

Please thank conference volunteers for their thousands and thousands of hours spent putting this conference together. Also, consider presenting a session at next year's conference, if you didn't present this year. Sharing your expertise in a friendly environment and obtaining new advice and direction is the mark of a true professional!

Illinois teachers Peggy Deichstetter, Sherry Humphries, Georgia Deep, and Jim O'Malley, who were nomnated for the Presidential Award for Excellence in Mathematics and Science Teaching, were treated to lunch at the conference.

Kudos from a Conference Participant!

I found the conference more enjoyable and beneficial than I had expected. It is always nice to talk with the fellow cohorts from the summer as well as others in the teaching profession. I knew there would not be a lot of information directed towards use with students such as I work with. I was, however, able to come away with several ideas that I could utilize in my classroom.

The conference also gave me an idea of how I may want to get involved. I am sure there are other teachers of students with behavioral or emotional problems, learning disorders, in both alternative settings and inclusive settings, that would like to have a more full science experience. Very little attention is given to teaching science to this group. It must be remembered that students can change a lot from middle school to adulthood, and the student who is the behavior problem at thirteen or fourteen years of age may be the creative scientist as a senior in high school. I think it is important that these students be exposed to interesting science as much as possible. I think I would like to explore how to do this and share with others and exchange ideas with others. I am very sure there are many teachers like me who are looking for ways to engage this group of students, but not finding many resources that directly relate.

Catherine Page

Conference Committees

Be sure to thank these great members who have volunteered many hours to make our 2006 science educaiton conference a success!

Conference Chair - Jill Carter

Logistics: Ray Dagenais, chair

Off-site Sessions: Jo Crow, chair
Sheldon Schafer

Program: Jill Carter, chair
Pete Miller
Sherry Spurlock

Promotions: Kathy Costello, chair
Larry McPheron
Judy Scheppler
Karen Zuckerman

Registration: Coleen Martin, chair
Susan Golden
Mary Lou Lipscomb
Marylin Lisowski
Randal Musch
Don Terasaki

Special Events: Julie Gianessi, chair
Randal Musch
Sheldon Schafer

Volunteers: Sherry Spurlock, chair

Vendors: Ray Dagenais, chair
Renee Bearak

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

Like Bonomo
Kendra Carroll
Susan Dahl
Denise Edelson
Donna Engel
Kevin Finson
Susan Golden
John Giffin
Brent Hanchey
Tom Kearney
Carl Koch
Ray Liskowski
Robert Malerk
Denny Moore
Tammy Pullen
Stephanie Ramsey
Holly Rogers
Linda Shadrick
Vicki Tripp

Conference volunteers are found behind the scenes and out talking with convention attendees. Whatever their role, the ISTA members and friends who gave generously of their time deserve our greatful thanks!

Thank You!

2006 ISTA Conference Vendors

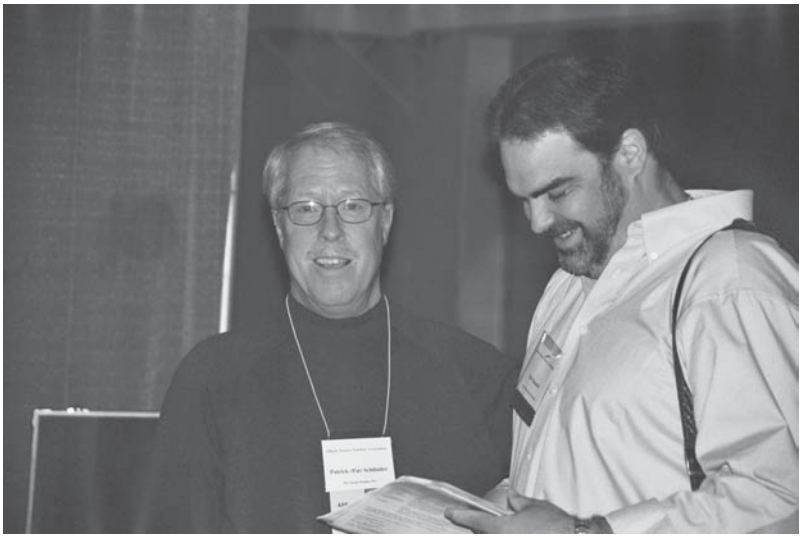
ISTA thanks our conference vendors for their participation in our 2006 Science Education Conference. Their support of ISTA is greatly valued and they are a tremoundous recource for science teachers in Illinois and beyond. Please show your support by patronizing them.

500 Tours, Inc.
Ag in the Classroom / Illinois Farm Bureau
Amsco School Publications, Inc.
AIDEX
American Nuclear
American Society for Clinical Laboratory Science-IL
Bedford, Freeman & Worth Publishing
Bio-Rad Laboratories
Carolina Biological Supply Company
Caterpillar
CPO Science
Daigger (Sci-Ed Warehouse)
DCEO Office of Coal Development
Delta Education/FOSS
Eastern Illinois University
ECIA-The Educated Choice Insurance Agency
EduSuccess, Inc.
Environmental Education Association of Illinois
Earth Foundation
Element Collection
Explore Learning
Facilitating Coordination in Ag. Education
Fermi National Accelerator Lab Education
Fisher Science Education-Fisher Scientific
Flinn Scientific, Inc.
Frey Scientific
Glencoe/McGraw-Hill
Glen Oak Zoo-Peoria
Great Source Education Group
Harcourt School Publishers
Holt, Rinehart, & Winston
Houghton Mifflin
Illinois Association of Aggregate Producers
Illinois Association of Biology Teachers
Illinois Department of Natural Resources
IL Emergency Management Agency
Illinois Geological Society
Illinois Petroleum Resources Board
Illinois Rivers Project
Illinois State Museum
It's About Time-Herff Jones
Kendall/Hunt Publishing Company
Lab-Aids, Inc.
Lakeview Museum of Arts & Sciences
Lego Education (Pitsco)
McDougal Littell
MicroTech Microscope Sales and Service
Mid-America Earthquake Center-UIUC
Museum of Science and Industry
Modern Biology, Inc.
National Energy Foundation
NASCO
Ohaus Corporation
Pasco Scientific
Peoria Co. Recycling & Resource Conservation
Perfection Learning
Pitsco Systems
PITTCON
Prentice Hall
Qwizdom, Inc.
Rigby & Steck Vaughn Publishing
Safe-T Classroom Products
Science Kit and Boreal Laboratories
Scott Foresman (Pearson) Publishing
The Scope Shoppe, Inc.
SEELA - The Science Connection
Trees Forever
UIUC Dept of Crop Sciences
UIUC College of Veterinary Medicine
Usborne Books
USDA Natural Resources Conservation
Vernier Software and Technology

ISTA Conference Door Prize Donations

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

Bedford, Freeman and Worth Publishing
Caterpillar
CPO Science
Daigger (Sci-Ed Warehouse)
Element Collection
Explore Learning
Fermi National Accelerator Laboratory
Fischer Science Education/Fisher Scientific
Flinn Scientific, Inc.
Frey Scientific
Holt, Rinehart, and Winston
Illinois Association of Aggregate Producers
Illinois Department of Natural Resources
Illinois Mathematics & Science Academy
Illinois Petroleum Resources Board
Illinois State Geological Society
Illinois State Museum
It's About Time
Kendall/Hunt Publishing Company
Lakeview Museum of Arts & Sciences
Marylin Lisowski
McDougal Littell
National Association of Biology Teachers
NASCO
Pasco Scientific
Perfection Learning
Prentice Hall
Qwizdom, Inc.
Sargent Welch
Science Naturally
The Scope Shoppe, Inc.
Team/Star cyRiers
Vernier Software and Technology
VWR Science Education
Wards



Thank you to Pat Schlinder (Scope Shoppe) and Flinn Scientific for donating new teacher packets for our new teacher session. The Scope Shoppe also donated much needed and appreciated microscopes for our door prize drawings.

Thailand Ties

Raymond J. Dagenais, Ed. D.

One of the resolutions I witnessed moving forward at the Summer 2006 National Congress on Science Education in Toronto, Canada involved expanding our learning through international collaborations. The Congress encouraged National Science Teacher Association affiliates to make an effort to connect with educators in other countries in order to both learn and share ideas and issues facing the science education community. With the already large numbers of students from other cultures in many school systems in the United States and the increasing quality of students coming out of science programs in other countries, it has become imperative that we better understand other approaches to science education as well as share our best practices with others striving to improve their science education programs.

So, as president of the Illinois Science Teachers Association, in August 2006, at the invitation of the U.S. Department of State, I agreed to travel to Thailand to learn about Thai culture and their educational system, and to share some ideas and approaches that are proving worthwhile here in the United States. The trip was coordinated through the U.S. Embassy in Bangkok. While it was an exciting proposal, I also wanted to know what was expected of me. My first questions were:

- What is the length of stay in Thailand?
- What does the agenda look like?
- What do you expect me to do during this trip?

The plan was for me to arrive in Bangkok on Sunday, August 20, 2006 and to return to the United States on Sunday, August 27. After a 20 hour plus airplane flight that included a stop in Anchorage, Alaska to take on more fuel because of a heavier than expected load and stronger than expected headwinds, and a change of planes in Hong Kong, I arrived at the hotel in Bangkok at 12:30 AM on Sunday morning. Trying to sleep on an airplane during such a long flight proved difficult, but I must have gotten enough rest to sustain me because I was able to see a bit of Bangkok later that day before going over my presentations for the upcoming week.

Ray with his interpreter after one of his talks in Bangkok.

The agenda for the trip included presentations at three universities/ schools across Thailand and meal functions with science educators and government ministry of education officials. My guides and travel planners were Dr. Anne Cunningham and Ann Preeyawan Sakornyen of the U.S. Embassy in Bangkok. They graciously informed me of cultural

proprieties, accompanied me on my travels throughout the country, acted as interpreters, and insured my psychological comfort during my stay in Thailand.

Early Monday morning, accompanied by my embassy colleagues, I flew out of Bangkok to Chiang Mai in northern Thailand. The agenda for the day included three different ninety minute presentations to university professors of science and science education, administrators, and some graduate students at Chiang Mai University. The first two presentations, "How to identify gifted students in science and math" and "Assessment of student performance in science and mathematics," were delivered in the morning to the audience of seventy-five respectful listeners. Questions posed included:

- What criteria does the Illinois Mathematics and Science Academy use to admit its student body?
- What are some examples of performance demonstrations of student understanding?

Ray and a US Embassy colleague pose in front of one of the beautiful and historic Thai sites.

During the morning break and a special luncheon, I had the chance to talk with university participants. They shared the history and background of Chiang Mai University and stories of dedication and persistence of their students. The afternoon presentation focused on "Science and mathematics curriculum: structures and development."

A short plane ride back to Bangkok allowed me to prepare for the two days of similar presentations on Tuesday and Wednesday to audiences of 200-plus attendees at the Mahidol Wittayanusorn School in Bangkok. These presentations also included, "The big pictures of science and math education of gifted students both at the national and state (Illinois) levels and administration and support from federal and state governments," "Academic standards for science and mathematics," and " Professional development in science and mathematics."

That Wednesday evening we flew to southern Thailand to Prince of Songkla University in Hat Yai where I once again made three ninety minute presentations on Thursday to one hundred participants on some of the previous topics. As much of the week was filled with preparation and presentation, I took full advantage of peering out of the airplane window to view the long stretch of eastern coastline on the Thailand peninsula along the Gulf of Thailand on the way to Hat Yai. I was pretty well exhausted upon returning to Bangkok on Thursday evening. Thankfully, recognizing that I had to catch a plane back to the US on Saturday morning, the only event scheduled for me was a two hour interview with some local journalists on Friday. This respite provided me the time to do a little souvenir shopping before packing for the trip home.

The people that I got to know best, besides my embassy colleagues, were the individuals who interpreted my presentations for the participants. It did not take very long before we were able to communicate in subtle ways to convey meaning across the languages. At one point during a presentation, my interpreter, Dr. Thanit Pewnim, gave me a quizzical look as he attempted to rephrase my comments to the audience. Upon rewording my statements to him, along with what I hoped to be useful hand and arm gestures and facial contortions, he relayed his interpretation to the participants. His response drew a chorus of laughter. I'm not exactly sure he had extracted the meaning of my words as I didn't think I had said anything funny. But generally, communication was not a problem.

The issues that appeared to be of most interest to the Thai educators and officials with whom I spoke involved providing a quality science and mathematics education for more than just the children of the most affluent families in the country. Limited resources restrict the number of students who might benefit from exposure to high quality science and math experiences. There was also interest in inquiry teaching and learning approaches. There was great interest in the Illinois Mathematics and Science Academy's Excellence 2000 + program. This after-school program offers such experiences to middle school students through units taught by teachers from their own schools. Students are invited to be accepted into the program. Teachers take part in professional development sessions that support the teacher's explorations into inquiry teaching and learning in problem-centered contexts that incorporate integrated subject matter led by Illinois Mathematics and Science Academy professional development specialists

The cooperation and understandings that were born on this trip have fostered further collaborations between Thailand and the United States. Preliminary plans are underway to host Dr. Pewnim and two colleagues for a visit to the Illinois Mathematics and Science Academy during the spring of 2007. This visit has spawned new ideas and promise for both educational communities. It is now time to move forward using what we share with and learn from other cultures.

Even though Ray was kept very busy giving numerous presentations about science education in the US and Illinois, he still found time to take in some of the local Thai sites and to enjoy the trip as a tourist.

Teacher - to - Teacher

Educators Share Information, Lessons, and Tips

Mary Lou Lipscomb
Illinois Mathematics and Science Academy

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. Sharing these activities or ideas with colleagues provides a professional development opportunity for everyone involved in the sharing.

In this issue, teachers have submitted an activity or lesson that they have used successfully at the beginning of the year to acclimate their students to rules and procedures in their schools or classrooms. Each has been used at specific grade levels, from elementary through high school, but I think each 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 A sincere "Thank You" to those who submitted their ideas and information for this issue.

Great Classroom Management Tips…

Paula Mueller a chemistry and honors chemistry teacher and assistant to the department chair at Neuqua Valley High School in Naperville writes about some tips that have helped her out in the past.

A Time Saver

On test days, if all students are present, I award two extra credit points. This has eliminated hours of make up time before and after school. Students are prepared for tests and the number of absences on testing days has significantly decreased!

Dynamic Group Work

After teaching a topic such as stoichiometry in chemistry, I hand out a worksheet with three involved problems. I set the class up into three different groups. Students find the people in the first assigned group and I allow five to seven minutes for them to work on the first problem. After time is up, students must find the next group to which they are assigned and work on the next problem. If time permits they compare the answers that they got for the first problem as well. When the time is up they move to their third group and work on the third problem. After the last group meets, we "whiteboard" the best way to do each problem, as voted on by the members of the group. This allows kids to see that there may be many different ways to get to the same answer. Some students will even be able to combine steps in the problem solving process.

Classroom Organization

In my high school chemistry classroom there is place for everything! There is a student work station that is a small shelving unit that has a hole punch, stapler, pencil sharpener, tape, and extra pens and pencils. A milk crate with file folders in the corner of the room holds all extra handouts. Finally, there is an "in" box (this is where students place their work at the beginning of class) and "out" box (where students pick up graded work at their convenience). Extra supplies such as dry erase markers, colored pencils,

graph paper, and Kleenex are available to students at all times in a corner cabinet. There is even a closet where the kids can keep closed-toe shoes for lab days. Class runs smoothly when everyone has what they need and knows where to find it!

Sub Plans
Our school requires every teacher to have a substitute binder containing the most recent attendance rosters/seating charts, a bell schedule, the teacher's schedule, code red, fire and tornado drill procedures, and an overview of pertinent school policies. In addition to these required materials, I also prepare general lessons that would coincide with each unit that is taught. These assignments are composed of puzzles, worksheets, science riddles, or conceptual problems and can be done at both the honors and regular levels. I copy each lesson on an overhead so that photocopying is not necessary. Kids just copy the information, do the work on loose-leaf paper, and turn in the assignment at the end of class. If I am absent unexpectedly, there is always a plan in my sub binder that will last the whole period!

Electromagnetic Spectrum Assessment…

Christina Soldan, academic chemistry teacher and point of contact at Carl Sandburg High School in Orland Park writes that she has her academic juniors "write an expository piece of work describing the chemical characteristics of a color of choice within the spectrum. The students must explain a variety of background information such as the color's wavelength, frequency, and physiological and emotional connections. The students also write about two personal connections that they have experienced that relate to the color's frequency or energy of the photons. They must relate the photoelectric effect to their personal lives." She has created a rubric to grade the chemical and English components of the assignment and to guide the students as they work.

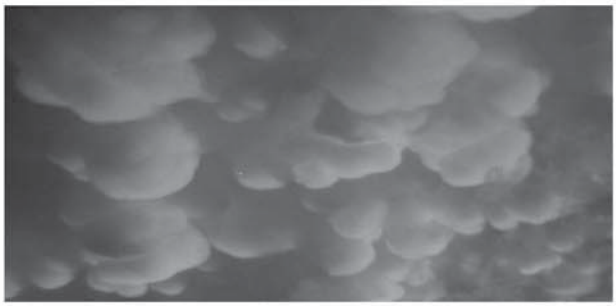
Christina states that she enjoys this activity because she can assess the students' comprehension and understanding of the differences between a color's wavelength, frequency and energy; and because they integrate the color's properties to their personal experiences. She says, "I learn if they understand the chemistry and I learn about them personally." The written assignment follows along with an example of a teacher written poem. Christina will share the rubric for the assignment if you email her at CSoldan@D230.org.

Written Assignment: Begin thinking of what color to choose within the visible spectrum. The color should have a personal relationship or connection to you. You will need two different personal experiences to connect with the chemical characteristics of the chosen color. Some background chemical information on your color is needed. You should know your color's frequency and wavelength. You should know what your wavelength looks like. How much energy does your color emit? How does your color behave when it is placed under stress (photoelectric effect)? Is it like you?
Stage 1: Get to know your color's chemical background.
Stage 2: Dive into your personal memories/experiences that relate to the color's chemistry.
Stage 3: Presentation - Piece together your experiences and the chemical elements into a presentation.
Remember you will be sharing these with your classmates.
Stage 4: When typing your presentation use the given rubric to guide your written expository.
Stage 5: Photograph - A colored photograph must be added to your written text.

Personal selection: Your presentation can be as unique as you are. You can perform a song, recite a poem, or tell a story. You must present a part or whole of your project. If you need to use technology, email the presentation to Mrs. Soldan.

$$c = \lambda * \nu \qquad E = h * \nu$$

TEACHER EXAMPLE: Personal poem written by Christina Soldan, academic chemistry teacher at Carl Sandburg High School, Orland Park.



700 nm
Red Spectra
Low frequency
Long wavelength

Red lights seem to last forever, sometimes.
The wavelength lingers as I wait for the signal.
Spots of red, cold and lost, where could my father be?
Searching for the red lights to come and rescue me.
My mother lies before me, her heart's frequency is clear.

"Christina, do you have a vein yet?" "I can't find one."
The long needle searched for the lost line, his pulse weakened
Step back, clear! Clear! We need to crack his chest".
A blood bank nightmare I wish I did not have to see.
So much blood all over and his heart exposed to me.

So much red, so much blood, a scream of new life-
What a long wavelength till birth, a new spectrum of life.
My frequency was an unfamiliar calm, for I am now a mother.

What will I do when my child comes to me dripping of red?
Hopefully, not, an unpleasant thought, instead.
Oh, I how linger to view the long wavelengths of red clouds
on my jogs through the peaks and troughs.
The glorious spectrum of color is
displayed through the refracted, bent light
of single photons, that's "quanta," right.
What an excited presentation, just as glimmering fireworks.
Strontium shines and emits red umbrellas that marvel us all.
My energy might be quanta, but my radiance shines.
You are mere spectators of my energy decline. Mrs. Soldan.

Mini-Grant Opportunity for High School Teachers…

Tom Tramm a nuclear engineer and a member of the American Nuclear Society would like more Illinois science teachers to participate in the Big Ten Mini-Grant Program for nuclear science. The mini-grant program seeks to broaden the participation of educators and students in the field of nuclear science and technology by providing access to six Big-10 facilities, including university research and training reactors (URTR). Grant amounts are between $1,000 and $25,000 and the funding is provided by the U.S. Department of Energy. Proposals for 2007 will be accepted between December 11, 2006 and February 28, 2007.

For guidelines, application forms, and information on previously funded projects visit: http://www.mne.psu.edu/minigrant. The on-line proposal guidelines document identifies contact people at each university so that those proposing a grant may discuss and refine their project ideas.

The Big-10 consortium includes University of Illinois at Urbana-Champaign, University of Wisconsin - Madison, Purdue University, University of Michigan, Ohio State University, and Penn State University. Illinois high school teachers may work with the faculty at any of these schools.

The primary point of contact for any questions is Traci Schimmel, tks1@engr.psu.edu (814-863-6383).

Check Out the Scientific Living Web Site and Provide Input…

Carol Van De Walle, retired educator and super key leader in the Quad Cities area, and Jeff Moore, executive director of the Rock River Foundation, are asking teachers to evaluate a new concept. Because many teachers no longer have time to show a twenty or thirty minute video, yet would like to expose their students to multimedia experiences, Jeff created the *Scientific Living* web site http://www.scientificliving.org/ . The site provides short-form media/visualizations; in this case short digital movies about space exploration. Each episode of *Scientific Living* is less than two minutes in length, something like a miniature version of the *Discovery Channel*. The idea is to use short science stories as a multimedia hook to capture interest, while leaving the teacher¹s regular lesson plan intact. The short episodes can be used as a lesson-opening activity, a bell work activity or a discussion-starter.

The concept is innovative in several other respects:

- The program is a test module for "PBS-style" underwriting of classroom media. Our thanks to the Verizon Foundation for supporting the pilot project in Illinois, at no cost, and making it equally accessible to every child in the state, rich or poor, rural or urban. If this model works, it can open the door to funding support for all kinds of digital media.
  The media is locally hosted, which should provide faster downloads. The media is loaded on the conference server at the Area 3 Learning Technology Center in Peoria, which is tied into the Illinois Century Network (ICN), providing universal access to schools in Illinois. If your classroom connection is good, the media should travel fast.
- The program offers the teacher options for presenting the material, including a teacher's guide, options for whole class or individual student work, and worksheets. The demo materials were produced by the non-profit Rock River Foundation, here in Illinois, in conjunction with NASA, and reviewed as a supplemental resource by the Division of Curriculum and Instruction at ISBE. Because they are closer to a visual aid than to curriculum, they can be used across a wider range of K-12 grade levels. In particular, they align with units on Earth and space science, beginning in fourth grade.

Carol, an advisor for the project, tells us, "During an earlier pilot version, my fifth and sixth grade students loved to see these."

Jeff and Carol ask you to "take a few minutes to explore the selections and find the ones useful to you. The program site is http://www.scientificliving.org/. It's clearly a test module, but we can't perform an experiment if nobody knows about it. If lots of people explore and utilize the site, we'll get feedback. Pro or con, we want to know! Thanks very much for your help."

Great Web Sites to Explore…

Tom Kearney, a super key leader and teacher at Andrew High School in Tinley Park, has sent an annotated list of websites that he finds useful.

- Biodidac (http://biodidac.bio.uottawa.ca/). This website has microscopic views and images of a variety biological organisms and human cellular biology
- Electronic Naturalist (http://www.enaturalist.org/). This site is a project of the Roger Tory Peterson Institute of Natural History; it is a very good site that provides great lessons on a wide variety of natural and environmental topics.
- Mad Science Network (http://www.madsci.org/). If you like to challenge your students with "thinking" kinds of science questions—then this is the site to get you started. Great questions and answers for ideas to make the students think and wonder.
- Education Index (http://www.educationindex.com/). I ran across this site when I was searching for some ideas on current events in science. This site provides some very good teacher resources for all science subject areas and also provides links to areas of current events in science.

Tom would also like to share websites created by Illinois science teachers that are not just very good, but show the great talent and dedication of the teachers.

- Tracy Trimpe, an eighth-grade teacher at Havana Junior High in Havana, has developed the site http://sciencespot.net/index.html. This is truly a great site, filled with a lot of very good lessons/ projects and ideas. Tracy is apart of the BaP program and truly a very creative and outstanding teacher. This is a must see site.
- Tim McCollum, a middle school teacher at Charleston Middle School in Charleston, has developed his site at http://ux1.eiu.edu/~cxtdm/macsci.html. If you need to find out anything related to Earth and Space—this is the site to see. Among a variety of awards and accomplishments that Tim has earned, he is also a 2004 Presidential Award Winner in Math and Science.
- Jackie Naughton, a biology teacher at Niles North High School in Skokie, has her site at http:// www.niles-hs.k12.il.us/jacnau/. Besides being a great teacher, Jackie is also very involved in a variety of Illinois science organizations and especially with the Illinois Junior Academy of Science. For some ideas to really challenge your students—visit this site.

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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 , fax them to 630-907-5893, or mail them to me at 1500 West Sullivan Road, Aurora, IL 60506-1000.

Educators Immersed in Science Research in Antarctica

Betty Trummel[1] and LuAnn Dahlman[2]
[1]School District 47, Crystal Lake, IL; [2]TERC, Cambridge, MA

ANDRILL (ANtarctic geological DRILLing) is a multinational collaboration involving Germany, Italy, New Zealand, and the United States. Funding support for ANDRILL comes from the U.S. National Science Foundation; New Zealand Foundation of Research, Science, and Technology; Royal Society of New Zealand Marsden Fund; Antarctica New Zealand; the Italian National Program for Research in Antarctica-PRNA; the German Science Foundation; and the Alfred Wegener Institute for Polar and Marine Research Science. The total project, including logistics, had been funded internationally at $30 million USD. The operator for the ANDRILL Program is Antarctica New Zealand.

The ANDRILL team arrived in Antarctica in October for the McMurdo Ice Shelf Project (MIS). Their goal: to examine sediment cores drilled from the Ross Sea floor and conduct scientific research in a wide variety of science disciplines within geoscience. Approximately sixty scientists came together to look deeper into Antarctica's climate history. Six science educators from four countries were involved in this year's ANDRILL MIS Project. Working alongside scientists in Crary Lab at McMurdo Station, Antarctica, they participated in the research and shared their experiences with a range of audiences across the globe. That sharing is far from over!

Their program is called ARISE—**A**NDRILL **R**esearch **I**mmersion for **S**cience **E**ducators. Working daily as members of science teams, the ARISE educators were genuinely immersed in current geological research. They worked side-by-side with the scientists, gathering data to coax out the array of stories the core had to tell. They contributed by performing chemical analyses, preparing microscope slides, counting and classifying stones (clasts), working as core technicians, helping the curators scan the core and prepare samples, and by searching core material for microfossils. They even got to do exciting tasks like using the rock saw to split the meter-long sections of core into two halves. It was great to be the first one to have a look inside!

In addition to participating on science teams, ARISE participants have been working on individual educational projects targeted to specific audiences. These projects will become part of ANDRILL's contribution to the educational community. Along with video journals and instructional multimedia produced by ANDRILL's media master, Megan Berg, ARISE participants' blogs/journals, websites, presentations, and activities will be available for classroom use and informal learning through the Project Iceberg website http://www.andrill.org/iceberg. When the International Polar Year (IPY) kicks off in March of 2007, there will be educational content available to inform and inspire students of all ages about Antarctica and geologic drilling.

Though the ARISE educators come from a wide range of educational situations, they each have the goal of communicating the excitement and importance of ANDRILL's science to people beyond Antarctica. The challenge for each of the members of the ARISE team was to capture what they could of the research experience and pass it on in ways that will raise awareness of and build value for geoscience research in Antarctica.

See photographs of the ANDRILL project on the rear cover of this issue.

ARISE Participants

LuAnn Dahlman lives in Mesa, Arizona and works for TERC (Technical Education Research Center), a non-profit educational research and development firm. She develops Earth science curriculum materials and teaches technology-based professional development programs for teachers. LuAnn is developing computer-based activities for geology students and a book of hands-on learning activities. She is a co-PI on an IPY project that will produce a NOVA documentary on ANDRILL plus an innovative outreach package called the Flexhibit. The web-accessible Flexhibit content will prepare youth groups to host IPY science events in their communities.

Betty Trummel teaches fourth graders at Husmann Elementary School in Crystal Lake, Illinois. She participated as a TEA (Teachers Experiencing Antarctica and the Arctic) in the Cape Roberts drilling project in 1998. She was the most prolific blogger, who posted daily explanations and photos of ANDRILL science processes. She also posted descriptions and photos featuring the work of various departments around McMurdo, as well as other science researchers in the McMurdo area. Betty is developing a series of presentations, polar workshops, and a short course proposal to share the ARISE experience with an international audience of teachers. She is also producing two books that describe ANDRILL and Antarctica for elementary school children using an ABC format.

Vanessa Miller teaches fourth and fifth grade students at Central Park East 2 in New York City. Her school occupies the fourth story of a five-story building in east Harlem. As the playground is made of concrete, she and her class walk the short distance to Central Park in order to learn about the natural world. Vanessa is preparing a series of professional development seminars on polar science and geology for elementary school teachers in New York. She is also cultivating opportunities to involve her students in authentic science research.

Julian Thomson teaches Earth science and outdoor activities at a Steiner School in Lower Hutt, New Zealand. He worked as a field assistant on the 2005 ANDRILL project to map the drill site target with seismic surveys. Julian made it a priority to hike one or more of the trails around McMurdo almost every day—he was often seen with a strange-looking camera above his head, recording the view in 360 degrees. He is working on a curriculum book about Antarctica and collecting interviews and other audio files to be used in podcasts.

Matteo Cattadori teaches thirteen through 16-year-old students in Trento, Italy. He is working with thirty-one schools, building a website to provide them with content and challenges that students can use for their end-of-year projects. He has produced photo galleries, audio files, and videos to document his work with ANDRILL. Matteo's website (http://progettosmilla.it) is called ProgettoSMILLA after the book *Smilla's Sense of Snow*.

Alexander Siegmund is a professor of geography teaching pre-service teachers in Heidelberg, Germany. He is working with television, radio, and newspaper companies to tell the story of ANDRILL to a broad audience. His descriptions, photographs, and video footage will be used to publicize the importance of scientific research on climate history. His media contacts are writing articles and producing documentaries that will be aired nationally on German television and radio.

For more information on ARISE, please contact Betty Trummel at TrummelANDRILL@aol.com. For further information regarding science, contact ANDRILL MIS project co-chief scientists: Dr. Tim Naish (NZ): t.naish@gns.cri.nz, Dr. Ross Powell (US): ross@geol.niu.edu, or Dr. Richard Levy (Staff Scientist): rlevy2@unl.edu, or the ANDRILL Science Management Office (SMO) at the University of Nebraska-Lincoln (www.andrill.org).

Building a Presence for Science

Mary Lou Lipscomb
BaP State Coordinator, Illinois

Building a Presence for Science (BaP) is an electronic network initiated by the National Science Teachers Association and implemented 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.

A meeting for key leaders and points of contact was held at the ISTA Conference on Science Education in November. At the meeting several state partners were recognized. BaP state partners may be formal or informal educational organizations, professional organizations, foundations, businesses, or government organizations. Currently BaP state partners include:

Adler Planetarium
Fermilab
Flinn Scientific, Inc.
Illinois State Museum
Illinois Mathematics and Science Academy
National Center for Supercomputing Applications
Sargent-Welch
Science Kit and Boreal Laboratories
The Scope Shoppe, Inc.
Ward's Natural Science
Various Regional Offices of Education throughout the state

State partners are supporters of the BaP goals, including high quality science teaching and learning opportunities for all. They also have the opportunity to work with and support science educators and broaden the awareness of their organization or institution throughout the network. Door prizes for the BaP meeting participants at the ISTA conference were provided by representatives from Fermilab, Flinn Scientific, Illinois State Museum, Science Kit and Boreal Laboratories, and The Scope Shoppe. Thank you, state partners!

If you are a member of an organization or institution that is interested in being a part of the Building a Presence for Science network in Illinois, please contact the state coordinator, Mary Lou Lipscomb at lipscomb@imsa.edu .

Starting this fall, members of the BaP network have begun to receive a regular Illinois e-blast with information that has been compiled from a variety of sources. The e-blast is an alternative to the multiple emails that had been sent in the past. Kathy Costello (super key leader region 5) and Linda Shadwick (super key leader, region 4) compile information and provide me with one "blast" which I send to all of the network members. If you have information about professional development opportunities that you would like to share with the BaP network, please send them to me (lipscomb@imsa.edu), Kathy (costello@htc.net) or Linda (l.shadwick@mchsi.com).

If you are currently a key leader or point of contact you are encouraged to go to the BaP web site www.nsta.org/bap to update your contact information. If you don't know your password, click the "Lost your password?" link. If your email address has changed since you became a member of the network you will need to contact me at lipscomb@imsa.edu. Include your full name and that you need your password in the body of the email message.

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. As a participant you will be seen as a communicator, leader and advocate for standards-based science education. You will have access to a variety of information to share with colleagues, as well as opportunities to learn and grow both professionally and personally. As each school joins the network with a point of contact, BaP become a more powerful means of communication.

To volunteer to become a point of contact go to the Building a Presence web site at www.nsta.org/bap.

- Find the box that states "Become a Point of Contact" on the right side of the page.
- Select "Illinois" from the pull-down menu and then click "Submit".
- Enter your school's city and/or zip code and click "Submit".
- Click on your school's name from the list.
- Fill in all required information and click "Submit". If your school already has a PoC, his or her name will be listed as well as his or her Key Leader.

Are you interested in taking more of a leadership role in your school district, county or area of Illinois? If you are currently a point of contact and would like to become more actively involved in the Building a Presence for Science Program, consider stepping-up to Key Leader. To do so please contact me at lipscomb@imsa.edu and include the following information:

Your first and last name
Your e-mail address
The name and address of your school
The county in which your school (district) is located
Your current teaching assignment
A short paragraph indicating why you would like to become a Key Leader.

All members of BaP-Illinois network are invited to attend an awareness session at Science in the South on March 9, 2007 at SIU Carbondale. Check the conference program for the time and place. The session will provide information about the recent changes in BaP-Illinois and an opportunity to network, face-to-face, with other members of the BaP electronic network. Hope to see you there!

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

Articles

How do Plants Grow in a Vacant Lot? Students Forming Scientific Arguments in an Inquiry-Based Environmental Science Project

Santina Wortman[1] and Megan Cahill[2]
[1]University of Illinois at Chicago, [2]Crane High School, Chicago

The vacant lot was a valuable resource for studying a number of topics in environmental science.

Our partnership stemmed from Santina's role as a fellow in the Scientists, Kids, and Teachers (SKIT) program a collaboration between the University of Illinois at Chicago and the Chicago Public Schools in which graduate students in science, mathematics, and computer science work closely with teachers and students in urban classrooms to enhance student learning. Santina worked with Megan who was a ninth grade environmental science teacher at Crane High School on Chicago's west side.

The vacant lot discussed here had most recently been used as a parking lot but it was no longer maintained. The once-flat blacktop was now warped from the combined effects of weathering, upward-pushing tree roots, and subsidence of the soil underneath. Plants like Kentucky blue grass, thistle, hairy aster, and even wild carrot were found throughout the lot, either in the maze-like pattern of cracks or among the rubble and garbage accumulating in depressions (figure 1).

We considered the vacant lot to be a valuable resource for studying a number of topics in environmental science, such as components of ecosystems, interdependence of organisms, energy flow, and nutrient cycling, and ecological succession. We felt that the vacant lot was the perfect place to demonstrate the relevance of environmental science in an urban setting - one that was a part of the students' everyday environment that would normally be overlooked.

In previous years, Megan's students had surveyed the lot to find evidence of primary and secondary succession. This year, we wanted to elaborate on the idea of using evidence by offering students opportunities to make scientific arguments that are based on evidence. Thus, we developed the vacant lot project with the intention of engaging Megan's students in a scientific investigation centered on using evidence to support or oppose a hypothesis.

Description of the Vacant Lot Project

We began the project by spending one class period discussing how plants grow in a vacant lot so that we could begin to uncover the students' prior knowledge. We learned that many students believed that plants growing in the cracks on the blacktop had intruded the blacktop from below. They thought that the plants pushed up through the blacktop to form the cracks, rather than that the cracks were only surface-deep and became filled with soil and seeds allowing plants to grow. When we asked the students how the cracks formed in the vacant lot, the most popular responses were earthquakes, jackhammers on the street, or something really

heavy falling on the ground. They did not initially consider the effects of weathering and freeze-thaw processes, in particular.

As the students discussed their ideas, we helped them put their ideas in the form of statements that could be tested (that is, hypotheses). Afterwards, we compiled the results from each class to create a list of ten hypotheses to test. The students spent the next two class periods collecting evidence in the field (figure 2). Working in groups of two to three, the students looked for evidence to support or refute each hypothesis, armed with cameras to take pictures of their observations as their evidence. On the fourth day, the students were invited to share their findings with the class by posting their developed pictures onto a large data table (figure 3, table 1). The students were asked to justify where they wanted to place their pictures before they could post them. This gave them several opportunities to demonstrate their understanding to us.

Figure 1. The site of the vacant lot field investigation.

Student Achievements and Challenges

One of the main reasons the project was successful is that it was student-driven, and hence enabled the students to take ownership of their work. The students were engaged from the start, as on the first day they got to share their ideas and generate their own hypotheses to test in the field. Then on the last day, the students were proud of their evidence and were competing to see who could put the most pictures up. Student engagement was high for everyone, even those students who were usually not motivated.

It was great to see the students' curiosity stimulated as they explored the lot in search of evidence. Their inquiry was not limited to the hypotheses they were testing; rather, they became interested in the unusual things they were finding, like trees growing through the chain-link fence surrounding the lot (figure 4). They wanted to know if the tree really grew *through* the fence, and whether there were chain links inside it, and if so, how? They also wanted to know what the different types of plants were that they were finding. Many were surprised to find such a variety of weeds, grasses, woody plants, and mold.

The students caught on quickly how to support or oppose the various hypotheses, and they were very creative, many times surprising us with ideas we had not considered. For instance, we presumed the students would not be able to find supporting evidence for Hypothesis #3: The plants spread from the outside of the lot to the inside. If this were true, one would expect to see a trail of plants from the middle of the lot to the outside. However, some students were able to support the hypothesis in a different way by noticing that the trees growing just outside of the gate had branches which extended into the lot.

Furthermore, students made an association between the words "oppose" and "opposite" to guide them in their search for evidence, such that once they found supporting evidence for a hypothesis, they would then look for an "opposite situation" to oppose the hypothesis. Following this logic, trees growing inside the lot with branches extending outside could be used to oppose Hypothesis #3. They also noticed that in some cases, they could use the same evidence to support one hypothesis and oppose another. For example, mold growing on the blacktop could be used to refute the hypothesis that the plants

Figure 2. Students looking for evidence in the vacant lot.

only grow in cracks, while also supporting the hypothesis that plants grow directly on the blacktop.

While students were coming up with insightful ways to use their evidence, they started formulating explanations for the situations they were observing. For example, when students saw that there were no plants spreading into the lot from the outside, they reasoned that the plants did not grow outside of the lot because there were no cracks on the streets for the plants to grow in. Another student suggested that maybe the plants would spread into the street if people did not drive their cars there. Despite the brief, simple statements these students were making, they were describing the effects of maintenance on plant growth.

As the students kept thinking scientifically, they also struggled with using indirect evidence to support or oppose a hypothesis and with making predictions from a hypothesis that was "counterintuitive." Two of the hypotheses the students were testing in the field were particularly challenging for some students. For instance, a common hypothesis that the students generated on the first day of our discussion was that the plants growing in the cracks were growing from underneath the blacktop (Hypothesis #5). The students had difficulty finding evidence to support this hypothesis because they were looking for direct rather than indirect evidence. When asked "If you wanted to know if this was true or not, how could you prove it? What would you look for?" one student answered, "Let's get a pot, put some seeds and dirt in it, cover it with some blacktop and then see if the plants grow through." This student wanted to perform an experiment to re-enact the hypothesis in order to find out if it was true. Another student complained, "How can we answer that because we can't physically go underground. We don't have magic powers to go underground." He was thinking that the only way to prove where the plants were growing was to see it first-hand. However, for this hypothesis, one would need to look for indirect evidence, such as, how deep the cracks were, to support or oppose this hypothesis.

Hypothesis #7, "Cracks form along seams where sections of blacktop were originally laid down," was also challenging for the students. Prior to the investigation, we had noticed that many of the cracks formed a rectangular pattern. Therefore, on the first day, we put forth the idea that the blacktop was laid down in sections, hoping that the students would be able to predict how the cracks would look based on this knowledge. This proved to be a very difficult task for the students. In each class, the majority of students could not reason that the cracks which formed as seams between sections of blacktop would form a rectangular pattern.

Some students claimed that they did not believe that the cracks would form this way because they had never seen (or noticed probably) cracks forming perpendicular to each other. It was difficult for them to imagine a hypothetical situation that they had not seen or considered before. However, once they could see for themselves that there were, indeed, cracks outlining rectangles in the lot, they seemed to accept our suggestion that the cracks had formed where the sections of blacktop were originally laid down. The remarkable observations of some students helped others to justify this explanation. They noticed that there was tar sealing these cracks, so they proposed that the tar had been used to seal up the seams between the sections (figure 5). Thus,

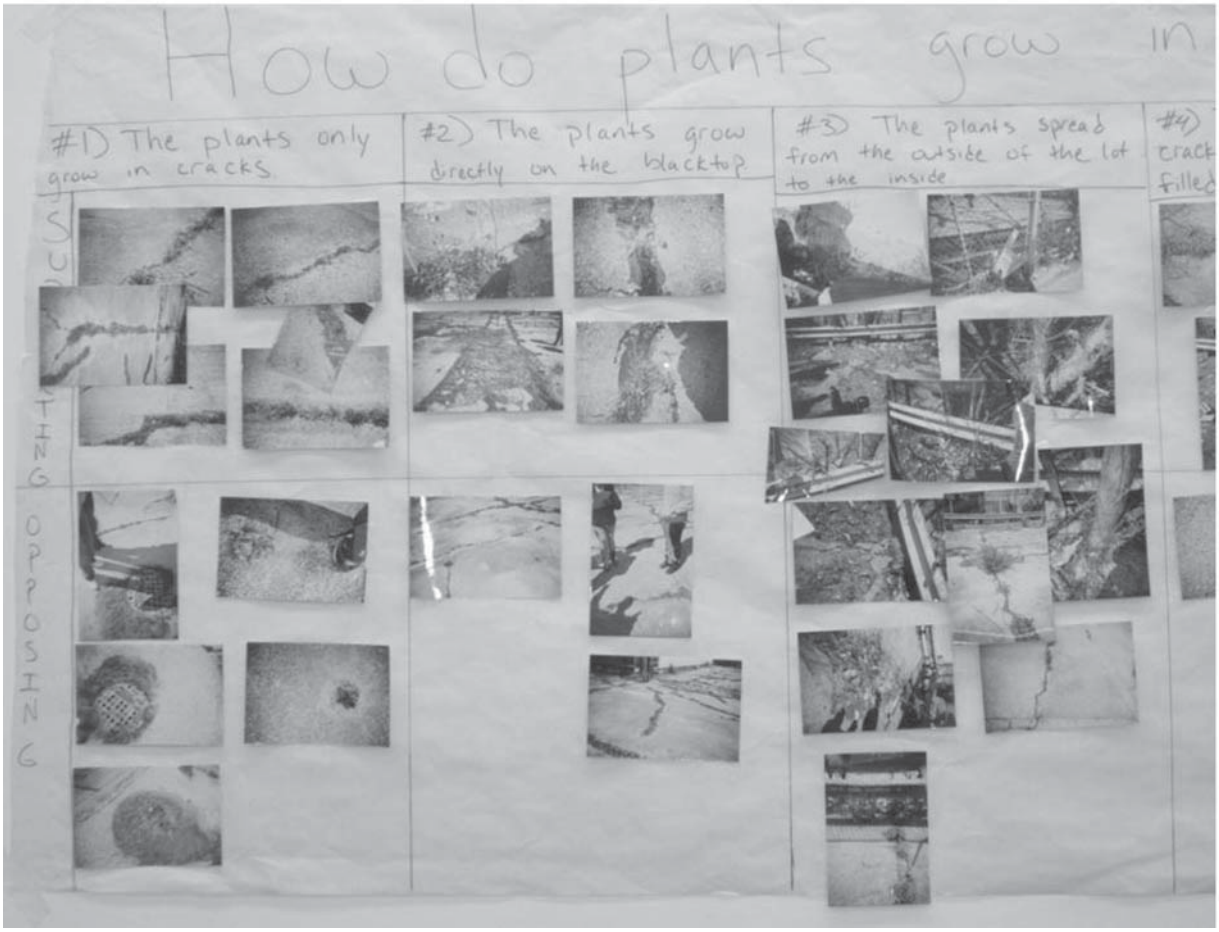

Figure 3. Part of a data table generated by students on the last day of the vacant lot project.

they came up with another creative way to formulate an explanation based on evidence.

Overall, we believe that this project gave students an opportunity to further develop valuable learning tools that are fundamental for the process of scientific inquiry. We had noticed in the past that many of our students tended to give priority to their personal experiences, rather than actual data, when asked to explain a scientific phenomenon. We were glad to see that by the last day of this project, the students were successfully making scientific arguments based on evidence to explain how plants grow in the vacant lot.

Concluding Thoughts

One of the challenges of urban science education is making environmental science concepts relevant to students who are essentially cut off from nature. We believe that students need opportunities to connect with their natural urban environment in order to overcome this challenge. The vacant lot project was just one of the ways we tried to make the students' local environment the context for learning environmental science. We hope that this experience not only engaged students in scientific

Figure 4. Trees bordering the lot had grown through the chain-link fence.

	Supporting Evidence	Opposing Evidence
Hypothesis #1: The plants *only* grow in the cracks.	Plants growing in cracks.	Plants growing in a depression, on the sewer, along the fence, in a pile of rubble, or individually.
Hypothesis #2: The plants grow directly on the blacktop.	An individual plant growing on the blacktop; plants growing in a pile of rubble; mold growing on the blacktop.	Plants growing in cracks.
Hypothesis #3: The plants spread from the outside of the lot to the inside.	Trees growing just outside of the gate/fence whose branches extend into the lot.	Trees growing just inside of the gate/fence whose branches extend out of the lot; plants growing in a crack in the middle of the lot.
Hypothesis #4: The plants grow in cracks that have been filled in with soil.	Plants growing in soil-filled cracks or where dirt is covering the crack.	A plant growing out of a small hole in the blacktop.
Hypothesis #5: Plants grow from the soil beneath the blacktop up through the cracks.	A plant in a very thin crack with no visible soil (the student argued that there wasn't any dirt covering up the crack so it had to grow up from underneath)	Plants growing on top of the blacktop in places where soil has collected.
Hypothesis #6: Cracks form by tree roots pushing up the blacktop.	Cracks surrounding the trees which follow the pattern of the tree roots.	Cracks that are not associated with tree roots.
Hypothesis #7: Cracks form along seams where sections of blacktop were originally laid down.	Cracks in straight lines, connecting at right angles to each other to form a rectangular pattern.	Cracks that form an irregular pattern; cracks formed on tree roots.
Hypothesis #8: The cracks are caused by construction work on the street nearby.		Cracks that are just within the lot and do not extend into the street.

Note: Hypotheses #9-10 were not considered on the last day due to time constraints.

Table 1. Descriptions of pictures submitted by students as supporting or opposing evidence for the various hypotheses.

inquiry, but that it also helped them gain a deeper appreciation for their environment. By looking at the lot in a different way - as an ecosystem where life and concrete compete for space - we hope that the students came to realize the value of the lot and no longer considered it as just a dirty place devoid of life.

We may never know whether or not the students' outlook on their urban environment has changed as a result of this experience. We are confident, however, that at least a few students were affected by this experience based on the comments we overheard in the field. One student realized the connection to ecological succession when he theorized that the vacant lot could one day become a forest. He realized that, over time, the cracks would keep connecting and break up all of the blacktop, and the blacktop would eventually become part of the soil. He pondered how long it would take before the lot would turn into a forest. Meanwhile, his partner suggested, "if we cleaned it up, it could be a garden … it would be beautiful … that would be a good idea to make the neighborhood safe and nice … there's stuff that could be used in here and it's not being used."

Acknowledgements

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Figure 5. The tar on some of the cracks was used as evidence that these cracks were along seams that had been patched up.

Write for the *Spectrum!*

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

Elementary School Education:
Jean Mendoza (jmendoza@millikin.edu)
Millikin University

Middle School Education:
Richard NeSmith (bioscience_ed@yahoo.com)
North Greenville University

Secondary School Education:
Kathy Costello (kacoste@siue.edu)
Southern Illinois University - Edwardsville

Higher Education:
Maria Varelas (mvarelas@mailserv.uic.edu)
University of Illinois at Chicago

Building a Presence for Science Program:
Mary Lou Lipscomb (lipscomb@imsa.edu)
Illinois Mathematics and Science Academy

Editor:
Judith A. Scheppler (quella@imsa.edu)
Illinois Mathematics and Science Academy

The Age of the Universe

Brian Poelker

"Inside the museums, infinity is going up on trial."
Bob Dylan

Students and the public often think of a *theory* as synonymous with a guess or speculation. Another misconception often held is that the theory can be *proven* and then become a *law*. A theory *explains* how nature works. The difference between guess and a scientific theory is substantial. Scientific theories are powerful, often wide-reaching ideas that explain the observations and facts we observe and measure in nature. Biological evolution, the Big Bang theory in astronomy, and the geological concept of deep time in the theory of plate tectonics have come under attack by creationists and intelligent design advocates in many school districts, and even state school boards around the country. Scientific evidence in all of these fields provides a framework for the origin of the universe, the formation of the solar system, and the evolution of life on Earth. What do we know, and how do we know it?

The Big Bang is a theory that explains how the Universe evolved. One critical fact is its time of origin. We now know that our Universe was born about 13.7 billion years ago. Independent measurements of different astronomical phenomena yield the same date. The Wilkinson Microwave Anisotropy Probe (WMAP) measures the cosmic microwave background radiation. This radiation is the leftover from the Big Bang. When we see this light, we are looking at the oldest data in the universe. It was formed a mere 400,000 years after the Big Bang when the Universe cooled enough for light to emerge (see figure 1).

Our universe continues to expand and to cool down since the Big Bang. The WMAP can measure very small differences in temperature, which makes ripples in the map. By measuring the temperature, size, and location of the ripples, astrophysicists can calculate the rate of expansion of the universe. These careful measurements produce an age of 13.7 +/- 0.2 billion years for the date of the Big Bang. These data match well with observations of Type 1a supernovae.

White dwarf stars can be stable up to 1.4 solar masses. If the white dwarf is a member of a binary star system, it can accumulate mass from its partner. As the mass increases above the 1.4 solar mass limit, thermonuclear reactions cause the star to explode violently. The brightness of the stellar explosion, its luminosity, is equal to about 4 billion suns. Type 1a supernovae can be distinguished from other stellar explosions by their spectra. Since these particular supernovae explode with a known luminosity, we can measure the distance to the galaxy (figure 2).

As a star or galaxy moves, the lines in its spectrum shift. Almost all of the galaxies are moving away from us as the Universe expands. This expansion stretches out the light waves. Red light has a longer wavelength than blue light. The lines of the spectrum shift toward the red end of the spectrum as the galaxy speeds away. The faster the galaxy is moving, the greater the lines are shifted. We can measure the red shift of the parent galaxy of the supernova to find out how fast it is moving away from us. The farther a galaxy is away from us the greater is its velocity. This measure of the expansion rate of the Universe is called the Hubble Constant. Type 1a supernovae act as standard candles in the sky. We know how bright they are and we can measure the distance to the galaxy using their luminosity. Knowing the distance to the galaxy and the Hubble Constant, allows us to work backwards in time. The Type 1a supernova data place the date of the Big Bang at 13.6 +/- 1.5 billion years ago.

Two totally different and independent measurements have produced the same age. The Big Bang theory is not perfect. All scientific theories are subject to revision as new information comes to light. The theory does not explain the cause of

the Big Bang. However, we can model in great detail what happened in the first few minutes after its creation. There is more we need to learn about the early Universe. But we do know the observable universe we inhabit is finite in terms of time and size. Long ago, our Universe had a birthday and we finally have the data to celebrate it.

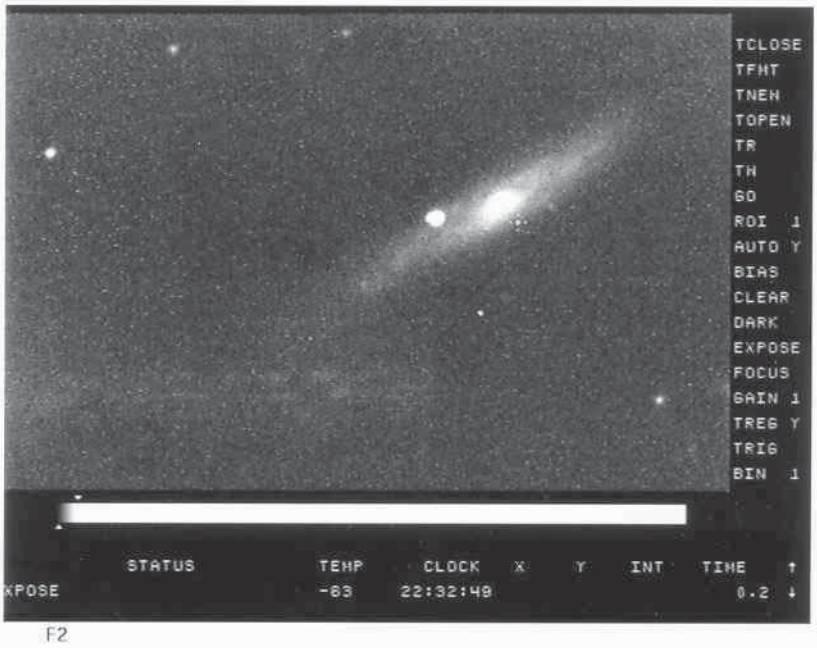

Figure 1. Microwave Sky. Photo courtesy NASA. This microwave map of the universe was produced by the COBE (COsmic Background Explorer) satellite. The large band at the center is our Milky Way Galaxy. The temperature decreases from the larger band to the outside of the image.

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Author Information

Brian Poelker is a retired science teacher. He received B.S. and M.S. degrees in science education from Eastern Illinois University. He has been honored at the national level with the Chemical Manufacturers' Association Catalyst Award, the National Association of Geoscience Teachers' Outstanding Earth Science Teacher Award, and the Geological Society of America's Award of Excellence in Earth Science Teaching. He was also selected as the initial recipient of the Illinois Science Teachers Association's Outstanding Middle School Science Teacher Award. Brian serves as a volunteer educator at the Ballard Nature Center in Altamont, Illinois. Brian can be contacted at bpoelker@frontiernet.net

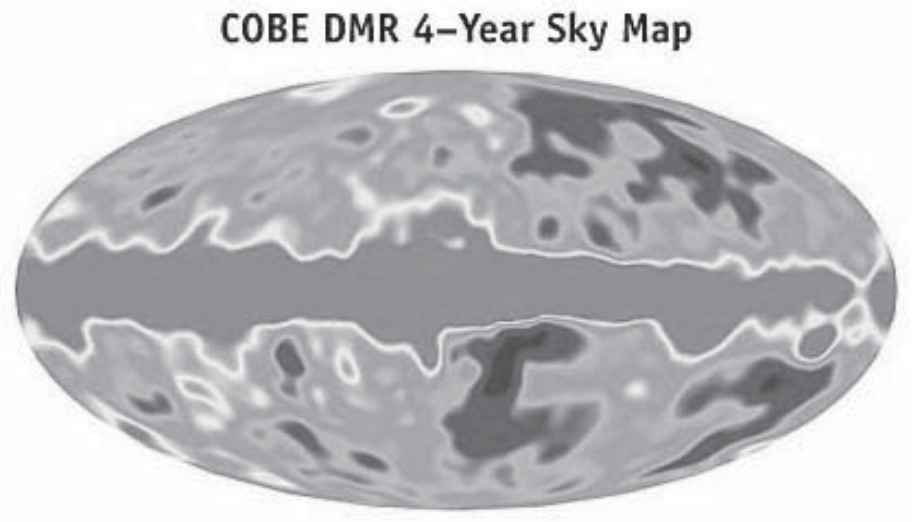

Figure 2. Supernova. Photo courtesy James O'Brien, UI-S Observatory, Springfield, IL. Supernova 1998S occurred in galaxy NGC 3877 and reached an apparent brightness of magnitude 12.1. This is about the same brightness as the whole galaxy!

Facilitating Student Academic Success Really Begins with Course Design

Dr. Richard A. NeSmith
North Greenville University

Curriculum should be defined by our determining the role of education in our society.

Teachers want students to succeed. Students want to succeed. Parents want to see their children succeed. Unfortunately, many times, we do not know what to do in order to assure that success is experienced. *Then what is the problem?* The problem may be as simple as realizing that we have been focusing on lesser important components of learning. Test scores? Course grades? Academic rankings? Are these the important components of learning? Are these relevant to "real life?" Most effective educators would argue that they are not. Shulman (1997) defined learning as "basically an interplay of two challenging processes—getting knowledge that is inside to move out, and getting knowledge that is outside to move in" (p. 10). The question we need to ask first and foremost is, "What information?" What is important, what is vital, and what can be left out of the curriculum?

Wiles and Bondi (2002) proposed that curriculum should be defined by our determining the role of education in our society. Our present emphasis on assessment – testing - is only a small component of learning so why do we give it such a high-stakes emphasis? What if…we stepped back and reviewed what we believe to truly be the important components in this concept we call learning?

Course instructional designer, Judith Boettcher, has made a strong case that *course design* (that is, how one plans, what one plans, and how one implements that plan) is a major concept of learning which has *not* received the same attention as those currently under consideration (Boettcher, 2003). Teaching and learning are no longer considered separate processes (Stage, Muller, Kinzie, & Simmons, p. 7), and good instruction finds its inception in good planning and preparation. Brewer, DeJonge, and Stout (2001) suggest that the design of an online course "can either facilitate or impede the learning process" (p. 12). The same can be said whether online or traditional. Distance learning has, almost from its inception, recognized and examined the importance of course design prior to instruction (content, delivery, and assessment). There is much that classroom teachers can learn from the research, experiences, and design practices of non-traditional instruction in the "hows" and "whys" of structuring courses and content so as to facilitate student learning. There are at least four major components to the *learning experience*. These learning components include: the student, the teacher, the environment, and the structure of the content (Boettcher, 2003).

The Student

The student, as a vital component in the learning process, is receiving greater emphasis now than ever before in our history. In, "Are student perceptions of teaching an important variable that influences student achievement?" (NeSmith, 1997, 2004, 2005b), we proposed that students' perceptions are vital to learning. How they perceive the educational process is *true* for them, even if it does not reflect reality, just as there need not be a fire for people in a building to act like there is one. Students are very resilient, but perceptions tend to act as modifiers; positively or negatively. Student responses to teacher interpersonal attributes vary greatly among students, but some predictability has been postulated (NeSmith, 1997, 2003, 2004a,

2004b; 2005b); however, there are some teacher attributes which are correlated with low achievement and others with high achievement. Thus, the dynamics between teacher and student play a vital role in learning.

The Teacher

The second component of the student's learning experience is *the teacher*. Teachers, like students, have perceptions of their teaching, and what they think students are learning (NeSmith, 2004a). Teachers' perceptions are not always the same as their students. It would be advantageous for classroom teachers to poll students' perceptions in order to adjust, adapt, and facilitate learning. Teachers can make a difference. Thus, teachers *perceived* as very strict but dissatisfied with their careers, or strict and uncertain about their careers tended to hinder student learning. [In] "classes where students perceived their teacher as expressing more dissatisfaction had significantly poorer achievement than their counterparts" (NeSmith, 2005b, p. 24).

The relationship between a teacher and his or her students tends to facilitate learning or hinder learning. Building relationships with students not only facilitates learning but also creates a caring learning environment in which students want not only to achieve but do so (NeSmith, 2005a).

Learning Environment

The *learning environment* is another component of the learning experience. It is dynamic, complex and relevant to learning (Driscoll, 2005; Wigfield & Harold, 1992). The learning environment includes all factors that influence the learner, including temperature, lighting, colors, smells, and more importantly, attitudes, expectations, and how students are valued. These tend to play more intensively on student achievement and outcomes of learning. Boettcher (2004) proposes that "the principles of effective learning suggest that new environments that supplement the classroom are needed" (n.p.). Schools, however, continue to function as designed during the Industrial Revolution (Daggett & Pedinotti, 2005; Resnick, 2004). According to Stage, Muller, Kinzie, and Simmons (1998), simple changes improving the learning environment will improve teaching and learning (p. *iii*), including influencing student motivation (p. 1), self-esteem, and self-efficacy (pp. 7-12). Driscoll (2005) contends that the learning environment is complex and can include not just the factors mentioned here, but also the content to be learned (p. 395).

The teacher is at the most grassroots level of influence when deciding on curriculum.

The Content

The final component of the learning experience is that of *the content*. The teacher is at the most grassroots level of influence when deciding on curriculum. This, however, is not the case, for as recent as a decade ago only 25 to 30 percent of middle school teachers believed they had "a lot of influence" in curriculum decisions (*In the Middle*, 2000, p. iv). Should not those professionals in the classroom be on the frontline of deciding curriculum matters, which nationally equals more than $11 billion (Tab, 2005, p. 3)?

Teachers who are well-trained in their content will produce more prepared students than teachers who are not trained. Ample evidence suggests that experts in a field think very differently than novices in the same field. Common sense would tell us that teachers who are well-trained in their content will produce more prepared students than those teachers who are not. In practice, teachers are still being placed in out-of-field assignments. In many schools as many as thirty to fifty percent of the faculty are assigned to teaching positions that they are not adequately trained for, with middle schools having the largest percentage of out-of-field teaching arrangements (Seastrom, Gruber, Henke, McGrath, & Cohen, 2002). Thirteen percent of middle school courses are taught by teachers who

Effective teachers know their content.

are not certified in science (*Mobility*, 2005). And, fifty-six percent of all high school physical science courses in the United States are taught by *out-of-field* teachers (*Science Teacher*, n.d.). The problem is *not* with these teachers, but with the system, itself. Low-income districts suffer the double-edged sword; schools with out-of-date curriculum and as high as thirty to fifty percent of the faculty in out-of-field placements (Ingersoll, 1996; Jared, 2002).

Effective teachers know their content. They know the peculiarities that come with their discipline. They recognize that all learners come to the classroom with different experiences, and it is their expertise in *both* pedagogy and content that makes them effective practitioners. The effective teacher does not surrender content structure to textbook companies. How content is structured is a vital element which is frequently overlooked. Yet, in practice, we still see others deciding on what should be taught, as well as the ill-fated practice of placing teachers in "out-of-field" assignments. Effective teachers know their content. They know the peculiarities that come with their discipline. They recognize that all learners come to the classroom with different experiences, and it is their expertise in *both* pedagogy and content that makes them effective practitioners. The effective teacher does not surrender content structure to textbook companies. How content is structured is a vital element which is frequently overlooked.

Course design and content structure are areas in which distance learning has rigorously focused because of the very nature of non-traditional learning. The success of distance learning requires that it overcome the reduced level of actual "in class" student-to-student and student-to-teacher interaction. In relation to this obstacle, distance education has made great strides in finding other means to enhancing the course content in an attempt to rectify, modify, or nullify, this barrier. The results are that we now have a massive amount of research being available about how learners are different and how content design is vital to accommodate student learning, modalities, and learning styles, and how the design of content plays a vital role in student learning (Boettcher, 2003).

A successful residential contractor always has a building plan; a blueprint. A valuable home is never the result of haphazard planning or shoddy construction. If the residential contractor is going to produce a quality structure, then the blueprint must be thoughtfully and properly designed. The same is true of effective lessons, effective courses, and effective programs. A prerequisite to instructional planning is content planning. Irrelevant, over-crowded curriculum is not acceptable nor is having students memorize non-essentials. Opferman (2002) observed that, "It seems schools are trying so hard to have a spiraling curriculum touching on many different learning objectives that students are not given enough time to really learn and know particular concepts (p. 3). Some propose that present-day curriculum is too *rationalized* and too *regimented* to interest students (Aldridge & Goldman, 2007, p. 5). Others have pointed out the redundancy of our present curriculum (Jacobs, 1997; 2004; Marzano, Kendall, & Cicchinelli, 1999, pp. 4-12). Posner (2004) noted that, "Much of what student learn in school, they never use explicitly, and they quickly forget" (p. 81). Eric Hoffer is credited with saying, "In a time of drastic change it is the learners who inherit the future. The learned usually find themselves equipped to live in a world that no longer exists" (Federal Bureau, n.d.).

Content should be *pre-designed* and structured by the teacher to promote concept definition, concept relationships, and concept attainment (Duit, Treaguest & Mansfield, 1997; Kauchak & Eggen, 2007). Curriculum models which promote reasoning skills, reorganization skills, remembering skills, and relating skills do exist (Lasley, Matczynski, & Rowley, 2002). However, most teachers simply open the prescribed textbook and begin on page one, with no idea what model they are utilizing or what goals they are aiming. In essence, constructivists have recognized that learners are constantly making sense of (that is, constructing) knowledge from their own database of experiences. This requires classroom teachers, just as it does those instructors of distance

learning courses, to carefully, intentionally, and properly plan and structure their lessons to promote content attainment (Boettcher, 2003). As each learner comes to the class on different levels with different experiences, they do not have the skills to structure what they are learning; therefore, the teacher/content expert must provide well-structured content for students. Well-planned lessons including well-planned structured content accommodate learners by activating their "existing knowledge structures in the brain" of both faculty and students, who have very different experiences (Boettcher, 2003, n.p.; NeSmith, 2006a).

As the 2007 NCLB policy incorporates science in the array of standardized testing, content attainment will need to become foremost. Rather than giving the textbook publishers the authority to determine what is important, science teachers need to work together logistically in establishing a well-structured content, which seeks to avoid the curriculum malady of a mile wide, inch deep curriculum to a more *in-depth-fewer topics* curriculum (Duit & Confrey, 1996; Belmonte, 2003; Bransford, Brown & Cocking, 2000, p. 24). *Less is more* is not a new idea to science educators. This concept is defined as "focus on key concepts to promote depth of understanding (Duit & Confrey, 1996) and teaching strategies that promote active learning based on inquiry and using interactive demonstrations" (*Shaping the Future*, 1996, p. 152). What applies to language arts applies to other disciplines. One teaching handbook pointed out that, "If students are presented with excessively long reading lists, they will be overwhelmed and may not start at all. It would be important to support the philosophy that 'Less is more'" (Kristjanson, Radi, & Tittle, 2004, p. 27). *Less is more* is not a proposal to water down the curriculum; to the contrary, it is a proposal to become more rigorous and less superficial by becoming more focused on what should be learned. Curriculum design specialist, Boettcher (2006), advises, via personal correspondence, that, "All content is not equal. Only a portion of the content of any course is core concept knowledge" (p. 4). Therefore, science teachers need to seek not to "concentrate the soup," but rather "cut the fat," per se, in science curricula.

Course design and content structure are areas in which distance learning has rigourously focused because of the very nature of non-traditional learning.

This concept needs to be re-implemented and re-emphasized in this Age of Information and, in fact, is being promoted by the National Science Foundation's in recent funding to change high school advance placement (AP) course to be *less is more* (*NSF Awards*, 2006). Teaching fewer topics, more in depth, has been shown to be critical to helping students construct conceptual understanding (Bove, Bryman, Mars, Mayer & Tapangco, 1996; Web Watch, 2006). *Less is more*, however, is not the present practice in most of our science courses (Shulman, 1991). Nor, is it a trade of fact-learning for conceptual-learning, but rigorously includes both (Bybee & Scotter, 2006). We must abandon the self-inflicted dichotomy mentality that demands one or the other. Teaching less content but in greater depth is not a call to abandon learning; it is a call to infuse inquiry *and* content (Robertson, 2006). In 1993, Dempster wrote, "'Less is more'" we keep telling ourselves. Students learn more when we teach less - but teach it well" (1993, pp. 433-437). He declared that exposing students to less material but in greater depth will lead to greater learning than the current practice of exposing students to a large amount of often disconnected information.

Curricular depth provides learners with: 1)base-line knowledge of scientific concepts, 2) mental connections, 3) identification of conceptual identification of conceptual relationships,

Trying to cover the textbook is no longer pedagogically sound, nor is it conducive to learning according to what we now know about the human brain.

4)"chunking" of information (Bybee & Scotter, 2006; Harris, n.d.; Willis, 2006; Wolf, 2001), and 5) more time to investigate the scientific concepts selected. The result yields more efficient learning, by design" (Boettcher, 2006). By reducing the breadth of topics one can spend more time on depth of specific topics. Such depth provides conceptualization by linking relationships, and well as connection dendrites. Exploration, explanation, and elaboration provide vital connections in the brain resulting in content assimilation, accommodation, and content accusation (NeSmith, 2006a).

Trying to "cover the textbook," is no longer pedagogically sound, nor is it conducive to learning according to what we now know about the human brain (Bransford, Brown & Cocking, 2000; Kauchak & Eggen, 2003). Isolated facts tend to be useless. *Focused* (in depth) conceptual learning, like concentrated light, becomes useful like a laser. The brain is not a repository of isolated facts, nor is it possible to expect middle school students to *memorize* hoards of facts which are obsolete, in many cases, even before they reach high school. Every concept cannot have the same emphasis nor can it have the same allotted class time. The argument of what is most important and what should be a part of the curriculum is an age-old question…even addressed back in 1860 when Herbert Spencer authored, *What knowledge is of most worth?*" in which he advocated that science should be include as a standard part of the, then "classical-based," curriculum (Tanner & Tanner, 1995, pp. 33-34).

According to Tyler (1949), what is of the most value (worth) in one's curriculum is a decision to be made by the local school and local school district, on the basis of community needs, the school's philosophy, and the best available evidence (Tanner & Tanner, 1995, pp. 33-36). In the past a needs assessment was generally utilized to provide the evidence, which included the needs of *students*, *society*, *particular students*, *particular communities*, and, needs derived from *subject matter*" (Oliva, 2001, pp. 200-222). Kyle (1991) noted that "curricula used in exemplary programs are often locally developed" (p.16), however, he failed to identify over-crowdedness of science curricula as a cause of failure (p. 19). In the present era, this would also include the state science standards, the National Science Teachers Association Standards, and the scope and sequence of the national standardized tests. Overlapping standards, "crowded curriculum," and "ballooning textbooks" need to be reassessed and reconstructed by science teachers in order to identify the essential from the lesser important topics, concepts, or data (De Vise, 2006; Hammonds, 2002; *The Crowed Curriculum*, 1999, n.p.).

Conclusion

The experience of learning encompasses four components: the student, the teacher, the learning environment, and the course content. Student perceptions, like teacher interactions and classroom environment can facilitate or impede learning. These components have been studied meticulously during the last decade. The final component, course content, is not so thoroughly explored. The *scope* and *sequence* of a course can be structured to facilitate student learning, as well, when instructors consider the variety of learning styles, modalities, student experience, and the uniqueness of the organization of information in subject-specific courses. This, however, is not conducive to learning, or content acquisition, if the teacher simply follows the

Every concept cannot have the same emphasis nor can ithave the same allotted class time.

textbook publisher's outline or, non-reflexively delves into the concepts unaware that students are unable to grasp the peculiarities of the content organization or structure. Content accusation is enhanced when teachers provide useful strategies, scaffolds, or concept organization for students.

Just as a refined and accurate blueprint is required in order to construct and sound and valuable house, the same can be said regarding education. If the preliminary identification of concepts or a muddled plan of what is vitally important, science education will continue to appear just the same; muddled. As technology continues to increase human knowledge, at jet-like speeds, teachers must realize that everything cannot be taught or learned. The proverbial *mile wide-inch deep* curriculum desperately needs to be collaboratively reexamined, reconsidered, and revamped (Belmonte, 2003; Bransford, Brown & Cocking, 2000, p. 24). A brain-friendly approach would include crucial concepts that can be utilized by effective teachers to activate students' experience and knowledge-base. Teaching conceptually, integrating various disciplines, and producing a well-structured course design will facilitate student learning while promoting concept attainment. This is attainable if fewer topics are "covered" and greater depth is sought. With the present explosion of information, we cannot teach everything. Teachers must select what is most vital and teach it from various angles. We need to teach for depth and understanding, teach for transfer, and teach expecting student academic achievement. This, however, is not likely to occur without identify priority concepts. Course design is vital in preparing for student success and is *the first step* to creating well-planned and well-structured content.

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Author Information
Dr. NeSmith is professor of science and technology education and dean of education at North Greenville University. He is a member of NSTA Science Program Improvement Review and educational consultant. He is available at BioScience_Ed@yahoo.com.

Note of Clarification from the fall 2006 issue, in the article titled "Play Ball! NCLB Science Accountability," we need to clarify that though NCLB does require science to be tested in 2007-2008; this is not, *at this time*, part of the AYP requirement. R. NeSmith

Necessity is the Mother of Inventions

Stephen Marlette
Southern Illinois University, Edwardsville

High quality science instruction can be done with limited resources and budget.

Someone once said, "Necessity is the mother of invention." Because of an unfortunate mishap in one of the elementary schools where our student teachers were placed, I was forced to look at an old activity, rocketry, in a new way.

A fire broke out over a weekend and severely damaged the science facilities at the school that was one of our partnership sites. To add insult to injury, water flooded and damaged a large portion of the remaining science equipment and supplies a short while later. The teachers at this school were forced to use a section of the hallway for their science planning area. Each rotated from classroom to classroom, utilizing carts to transport materials. These teachers were under a tremendous amount of pressure. As a program, we contemplated pulling out of this site to relieve any additional burden on these teachers. However, since the incident occurred right before a long break and only involved the science teachers, the program directors decided to continue with the partnership. While not ideal, the experience provided the teacher candidates with a first hand account of the flexibility that is part of the teaching profession.

As the science methods faculty member in the partnership, I knew that I had an obligation to provide my teacher candidates with the experiences they would need to develop the skills to teach science. I also needed to find a way to demonstrate to my teacher candidates that in spite of the adverse conditions, it would still be possible to provide students with a high quality materials-based experience that was not only hands-on, but also inquiry based. Furthermore, I was determined to demonstrate to my teacher candidates that high quality science instruction could be done with limited resources and budget.

I talked with the teachers at the school to determine the science units and activities that were planned for the spring. One of the activities I helped the teacher candidates focus on was rocket building, to be introduced during a unit on Newton's Laws.

Some at the school were concerned that these teachers would not be able to do a materials-based activity. My mind was immediately taken to an article I use in my science methods class titled, *Why Avoid Hands-on Science?* (Sumrall, 1997). This article identifies common teacher responses regarding why they avoid teaching science hands-on. Among them are the extra work, the potential for classroom chaos, and the lack of materials. Given the circumstance, the teachers were faced with each of these. Who would blame them if they decided to eliminate the materials-based science activities?

The next problem we faced was to make the rocket activity safe enough to be done indoors, available for teachers with limited prep time, made out of items that were affordable and readily available, and easy to set up and take down as teachers moved from classroom to classroom. I began searching for alternative rocket activities.

Van Evera and Sterling (2002) described their use of model rockets in conjunction with a unit on motion. This activity was motivating to students because it allowed them the opportunity for direct application of physical science concepts such as gravity, acceleration, and Newton's Three Laws. By identifying specific questions and systematically collecting data, they were afforded an additional opportunity to be involved in authentic inquiry. After designing their rockets, students launched them on *launch day*. The rocket engines and the possibility of fast moving projectiles made safety on launch

day a major consideration. Access to a large area outside was needed. Weather, such as rain or high winds, was a concern. In addition, a considerable amount of class time was spent on building and designing the rockets. During the launch process, only one rocket is tested at a time, while others wait and watch.

Based on the parameters I was given, using model rockets was not an option. Money for supplies must be budgeted and materials ordered weeks in advance. I wanted an activity that would allow for each project to be launched and tested multiple times.

I considered the use of water rockets built from two liter soda bottles (Kaahaaina, 1997; Thomas, 2000) or purchased from a toy store (Inman, 1997). These rockets allow the teacher to save money because they can be made out of inexpensive materials. They also provide inquiry opportunities by allowing a variety of variables to manipulate (pressure, fill level, nozzle area). However, safety was still a major consideration. A launch area still must be provided. Students must be kept a safe distance away from the launch area and the teacher must closely monitor the operation of the launcher.

While reading Farenga, Joyce, and Dowling's (2002) idea of a launch system compressor (LSC), using a plastic zip lock bag finally jumped out at me. In this system, pressing on an air-filled plastic baggy forces air through a tube made of rolled paper. A piece of paper rolled into a cone shape is placed gently over the end to serve as a rocket and is launched when the bag is compressed. My own modifications to this system included inserting an automatic bag inflation device so that students do not have to blow into the tube to inflate it (see figure 1). This makes inflation quicker and minimizes the spread of germs because the mouth doesn't need to be in contact with the end of tube.

Materials were easy to find. For a paper tube, I decided that discarded paper towel or toilet paper tubes would be ideal. They are already shaped and offer would-be designers a consistent diameter. For the rocket, I placed a Dixie cup over the end of the paper roll tube. Unlike the sharp end of rolled piece of paper, the cup offers a blunt surface, reducing the possibility of eye injury.

Rocketry Using a Launch System Compressor (LSC)

Materials (see figure 1)

Dixie cups serve as the rocket.

Items for the Launch System Compressor

- 1 Gallon Ziplock Freezer Bag
- Duct Tape
- Toilet Paper Roll or Paper Towel Tube
- Automatic Inflation Device: a gallon ice cream bucket

Rocketry using this launching system allows teachers the opportunity to involve students in authentic inquiry and experience the direct application of physical science concepts, while minimizing many of the elements that make traditional rocketry prohibitive. The materials for this are cheap and easy to find. It increases the number of launches students can complete in a given amount of class time. Students would now have multiple launch opportunities, so more time could be spent on designing, testing, and redesigning. This decreased down time and meant that students would have more time to be actively engaged. The easily portable materials could be used indoors, and be easily transferred from room to room on a cart.

Unfortunately, the teachers at the partnership school never utilized the launching

Figure 1. Materials.

system. But since developing this system and sharing it with my students, I have seen it used successfully in a variety of settings with a number of different age groups. Frequently, I use this activity to demonstrate Illinois Learning Goal 11b, Technological Design, in my science methods course. Each time, I think of how that little mishap helped illustrate that teachers can use rockets in a safe manner using everyday resources.

Directions and background information regarding this activity are provided on the following pages. While the discussion of the activity focuses on its utility for the ISAT test, grade 4, the ideas are transferable to upper grades.

The launch system compressor, shown in figure 2, has a useful addition that allows the bag to automatically fill with air. Inside the bag is a curved section of plastic. It was cut out from the side of an ice cream bucket and has its sharp edges taped. When compressed, the "rebound" in the plastic allows the bag to automatically fill with air. For this purpose, students have also used inflated balloons, sponges, and even inflated rubber gloves.

Directions for Assembling the Launch System Compressor (see figure 2)

1. Cut a hole in the bottom of a 1 gallon zip lock bag. The hole should be just large enough to insert the end of the toilet paper tube. (Slicing an "X" so that there are flaps of plastic to fold around the tube works well)
2. Secure the end of the paper roll to the 1 gallon bag using the duct tape. It is important that no holes are left around this seam.
3. Zip the end of the gallon bag shut. At this point, you should be able to fill the bag with air via the paper tube.
4. To launch a rocket, simply place a Dixie cup over the end of the tube and compress the inflated bag.

Note: Diameters of paper tubes vary. Some more closely match the diameter of the bottom of the Dixie cup than others.

Background

In the case of the launch system compressor describe in this activity, it is obvious that pushing down on the compressor forces air out of the hole and pushes the Dixie cup rocket. Thus, the force caused the rocket to move. The National Science Education Standards (1996) state that most students believe a force is acting on an object only if it is moving and that the force is "used up" if it is not moving.

Analysis of an example will provide reasons why this logic is faulty. An object like a book resting on a table is not moving, yet a gravitational force still acts it on. It does not move because the tabletop pushes back on the book with an opposing force that is equal to its weight. The book moves if an additional force is exerted to in either direction to disrupt the balance. For example, adding a stack of fifty books might cause the table to sag or break, thus causing the book to move downward or fall. When the force pushing down is equal to the force pushing up, the forces are *balanced*.

In the case of the Dixie cup rocket, the rocket rests on the end of the paper tube. In this state, gravity is pulling the cup toward the earth, but the paper tube is pushing back on the cup with an equal force in the opposite direction. The forces are balanced. When the Dixie cup rocket is launched, the forces are no longer equal. These forces can be described as being *unbalanced*.

Procedures

While there are many possible outcomes in using the launch system compressor and Dixie cup rocket, it easily could be related to the force and motion. For example, students could identify the forces acting on the Dixie cup when it is at rest on top of the paper roll. At this point, they should be able to apply the idea of balanced forces and unbalanced forces.

While grade 4 students might not need to know this terminology, as a teacher at this grade level you may want to know that Newton's first law also comes into play. The cup will not move unless acted on by an outside force. When the bag is compressed, the LSC forces air into the Dixie cup.

This applies an outside force on the Dixie cup. Newton's third law explains this in further detail by pointing out the air forced inside of the cup is pushed out of the opening of the cup by the inside walls of the Dixie cup; the air in return pushes back on the inside walls of the Dixie cup. This results in the Dixie cup being projected into the air. However, the grade 4 assessment framework suggests that it is enough for students to conclude that the cup moved because the forces were no longer balanced.

The study of motion and forces provides an ideal opportunity to work with students on the concept of variables and develop their abilities of technological design (Illinois Learning Goal 11b). Students could determine such things as how the flight of the rocket is affected by various weights (pennies or washers) taped to the Dixie cup. Students may also be challenged to solve a problem using the LSC and rocket. For example, given the set materials, design a system that allows you to land a rocket in buckets set a various distances.

Possible Illinois Assessment Framework (Grade 4) Connections

12.4.25 Define a force as a push or a pull that tends to move an object. Understand that forces may be balanced or unbalanced. Know that when the forces applied to an object are balanced, the motion or rest of that object does not change.

11.4.05 Identify a design problem and identify possible solutions. Assess designs or plans to build a prototype.

11.4.06 Assess given test results on a prototype (i.e., draw conclusions about the effectiveness of the design using given criteria). Analyze data and rebuild and retest prototype as necessary.

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Figure 2. Assembled Launcher with Rockets.

Author Guidelines

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

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

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

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

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

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

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

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

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

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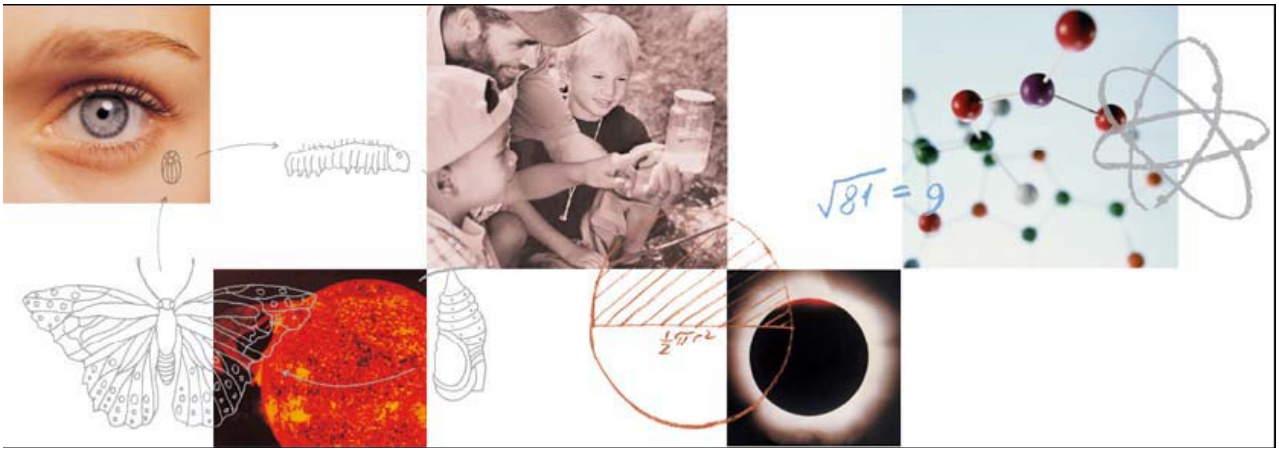
Index to advertisers:



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!

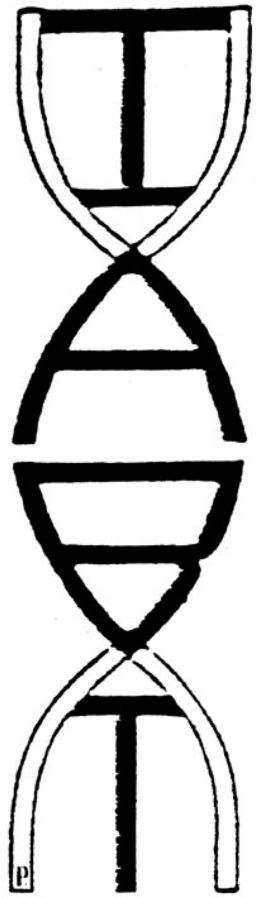
How do I learn more?

- **Nominate an excellent 7-12 teacher at www.paemst.org (K-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 3-4, 2006.**
  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!

Field Testing Opportunity - SEPUP

SEPUP (Science for Public Understanding Program) at the Lawrence Hall of Science, University of California, Berkeley, invites applications for the field testing of their revised *Science and Sustainability* 9th grade and new *Science in Global Issues* tenth grade integrated high school science curriculum which is being developed with funding from the National Science Foundation. The course has an inquiry-based approach to science topics centered on questions of global sustainability. In total, the two-year program consists of 4 semesters of biology (ecology, evolution, genetics, cell biology), two semesters of chemistry, and two semesters of physics.

SEPUP is calling for field test centers that consist of one director and 4-6 teachers in a school or district. Field test teachers will receive a full year course, or selected units, that include student materials, teacher's guide, and kit materials. The director and teachers from each field test center will be invited to attend a weeklong summer training conference in Berkeley, CA during the summer of 2007. Airfare, room, and board will be covered for conference participants.

For more details on the field testing of *Science in Global Issues* and for a copy of the field testing application guidelines, go to **www.sepuplhs.org**. The application deadline for the 2007-2008 school year is February 15, 2007.

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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!

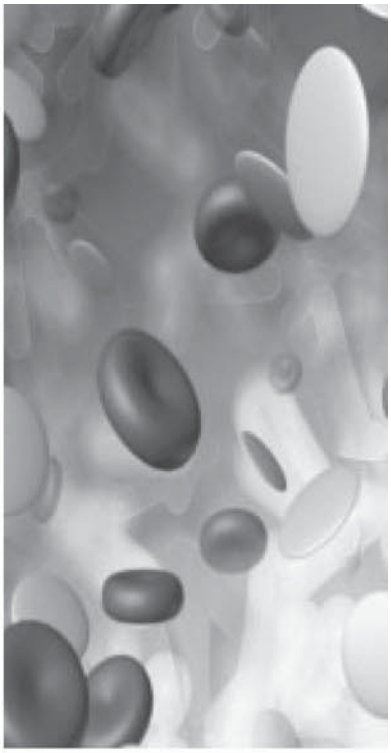
For more information on the IPRB and how we can visit your classrooms, conferences, or special events, please call the Illinois Petroleum Resources Board at 1-618-242-2861 or via email that is accessible through our website at www.iprb.org and arrange for us to visit!

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

NABT

National Association of Biology Teachers



Save the Date
Nov. 28 - Dec. 1

NABT Professional Development Conference

Transforming Life Science Education

Atlanta, Georgia

Atlanta, the "big city with lots of Southern hospitality," will be the site of NABT's 2007 Professional Development Conference. We'd like to extend a warm "Southern Welcome" to visit Atlanta and attend this exciting event. Past Conference attendees know that an NABT Conference has it all: dynamic speakers, stimulating sessions and symposia, wonderful workshops, and exciting exhibits; covering everything from bird flu to bioterrorism, from forensics to fossils.

Learn | **Interact** | **Explore**

National Association of Biology Teachers

Three easy ways to register:

Online: www.nabt.org

Mail: NABT
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Baltimore, MD 21279-1048

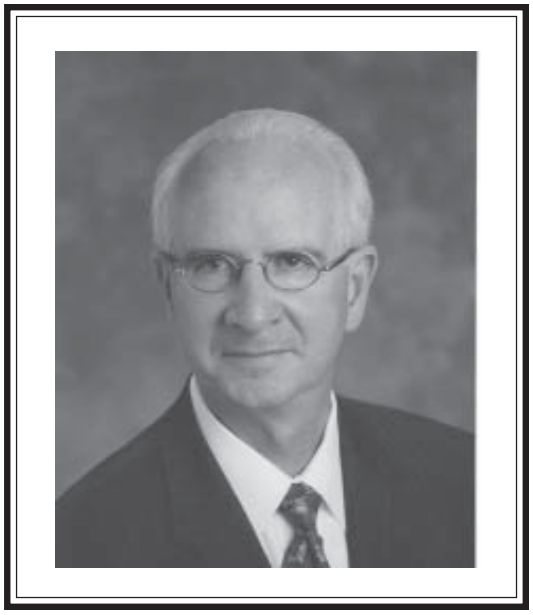
Fax: (703) 264-7778
Purchase orders and credit card only!

Questions?
Call us at (800) 406-0775

ISTA Thanks ExxonMobil

ExxonMobil has long been a supporter of ISTA through conference event sponsorships and the ExxonMobil Outstanding Teacher of Science Awards. J. Patrick McGinn, Midwest Public Affairs Manager, has been key to this long-standing and excellent relationship. Some of the award-winning teachers, along with ISTA, had the opportunity to thank Patrick in person at the Gala event on Friday evening during the ISTA Conference on Science Education.

Also at the Gala, Patrick brought door prizes as his and ExxonMobil's way of supporting and thanking science teachers for all of their hard work. Prizes included computers, iPods, and gas gift cards.



J. Patrick McGinn

Thank You!

Charlie Maguire

Charlie Maguire is the Vice President of Engineering for ExxonMobil Research and Engineering Company. In this role, Charlie leads the engineering organization based in Fairfax, as well as area engineering offices in Baytown, Texas; Toronto, Canada; Fawley, England; Kawasaki, Japan; and Singapore. Conference participants were privileged to hear Charlie present Our Energy Future as the keynote conference address on Friday morning. His talk encompassed issues related to energy reserves, exploration, and extraction, along with discussing alternative energy sources.

Educators Immersed in Science Research in Antarctica - see article on pages 24-25.

Clockwise from above: ANDRILL drill rig with rainbow. ANDRILL drill rig. ARISE educators [front row - Vanessa Miller (US), Matteo Cattadori (Italy); back row - Julian Thomson (New Zealand), Betty Trummel (US), Alexander Siegmund (Germany), LuAnn Dahlman (US)] in Antarctica this season. Betty Trummel working in the lab at McMurdo Station.

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