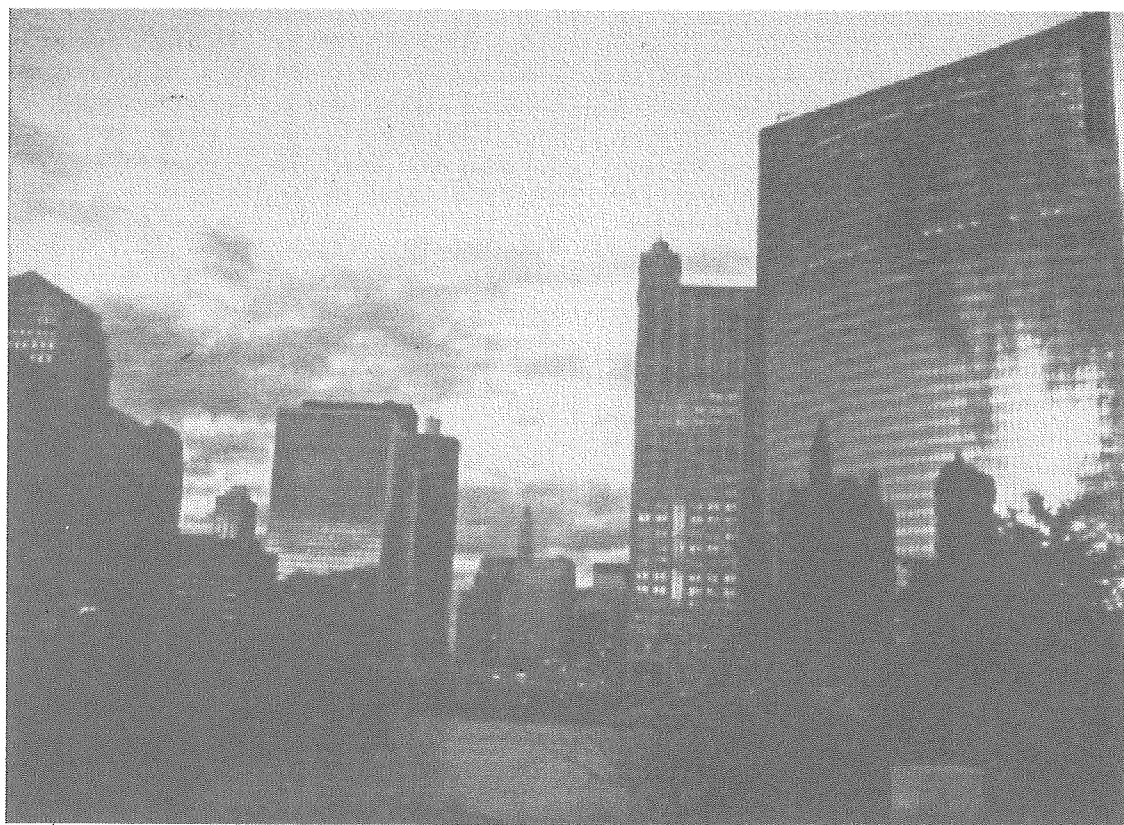


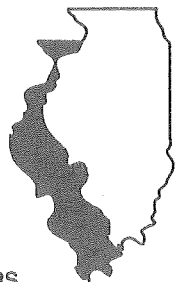
SPECTRUM

THE JOURNAL OF THE ILLINOIS SCIENCE TEACHERS ASSOCIATION



**1996 ISTA ANNUAL CONVENTION
MERCHANDISE MART EXPOCENTER
CHICAGO
OCTOBER 11-12, 1996**

FALL 1996



STATE OFFICERS

Bernard Bradley, President
Newberry Math and Sci. Acad.
700 W. Willow
Chicago, IL 60610
(312)534-8007

Douglas Dirks, President-elect
West 40 ESC #5
1st Avenue & Ridgewood
Riverside, IL 60546
(708)513-5391
FAX (708)447-6732

David Winnett, Past President
Department of C&I, Box 1122
SIU-Edwardsville
Edwardsville, IL 62026
(618) 692-3065
dwinnett@siue.edu

Don Nelson, Vice President
Western Illinois University
49 A Horrabin Hall
Macomb, IL 61455
(309)298-1411
dnelson@ccmail.wiu.bgu.edu

Wayne Green, Treasurer
Knox College
Galesburg, IL 61401
(309) 344-1404

Maureen Jamrock, Secretary
Coolidge Middle School
155th Street and 7th Avenue
Phoenix, IL 60426
(708)339-5300

Spectrum Editor
Kevin D. Finson
58 Horrabin Hall
Western Illinois University
Macomb, IL 61455-1396
(309)298-2101
FAX (309)298-2222
finsonk@ccmail.wiu.bgu.edu

Diana Dummitt, Associate Editor
Executive Secretary
1996 Registration and Exhibit Chair
College of Education, UIUC
1310 S. Sixth Street
Champaign, IL 61820
(217) 244-0173
FAX (217)244-3711
ddummitt@uiuc.edu

Gwen Pollock, Awards Chair
Ill. State Board of Ed.
100 N. First Street
Springfield, IL 62777-0001
(217) 782-2826

1996 CONVENTION CHAIR
Bernie Bradley
88 W. Schiller #2806
Chicago, IL 60610

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Submissions and inquiries regarding the journal should be sent to:

Diana Dummitt, Associate Editor

ISTA SPECTRUM

University of Illinois

College of Education

1310 South Sixth St.

Champaign, IL 61820

(217) 244-0173

e-mail: ddummitt@uiuc.edu

Subscription requests or changes should be sent to:

George Zahrobky, Membership Chair

Illinois Science Teachers Association

P.O. Box 2800

Glen Ellyn, IL 60138

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ISTA NEWS

FALL PRESIDENT'S LETTER

As the excitement of a new academic year energizes the science teachers in Illinois, we are faced by the challenges of a changing educational landscape. The publication of the draft version of the Illinois Academic Science Standards coincides with the demise of the IGAP Science Assessment. As you may know, Governor Edgar recently signed legislation that eliminates the IGAP Science Assessment. Beginning with 1998-99 academic year, only reading, writing, and math IGAP assessments will be administered in elementary schools, and only at grades three and five.

The ISTA Board views this development as short sighted and likely to send a negative message regarding science education to the school districts around the state. By focusing its assessment program only on the areas of reading, writing, and mathematics, the state is telling us that science and social studies are not important. The reallocation of resources away from these curriculum areas is one result that is likely to occur as we head into the Twenty-First Century. That would be very unfortunate for the future of the State of Illinois.

The ISTA Convention Program has been developed in light of the challenges that await us. The convention program will begin on Thursday, October 10 with a Preconference program on science standards. There will be presentations on the National Science Education Standards and the Illinois Academic Science Standards.

Representatives of The New Standards Project will describe the performance standards and related alternative assessments that have been developed as part of the Project. Status reports will be provided on the IGAP Science Assessment and the Technology plans developed for the state. Finally, participants will receive training in the use of the a software program called PIViT that has been developed at the University of Michigan. PIViT is a curriculum design tool that allows teachers to integrate standards, objectives, activities, and assessments.

The regular program of the Convention will begin on Friday, October 11. The program will feature more than 250 workshops, a Keynote Address on Standards by NSTA President JoAnne Vasquez, an exhibit hall jammed with exhibitors displaying the latest in science curriculum materials. ISTA Executive Secretary Diana Dummitt has succeeded in attracting the NSTA Science Store to our convention in Chicago. All of the NSTA publications will be available for purchase along with science education resources from other developers. Melanie Wojtulewicz, Manager of Science for the Chicago Public Schools has arranged for tours to every science resource in the Chicagoland area.

On Saturday, the convention program will conclude with more workshops, and the General Membership Meeting.

There are a couple of exciting programs in development by ISTA Board members. Plans are going forward for Science in the South. This will be a regional ISTA Conference for the benefit of the teachers in the southern part of the state. Regional Directors Dean Dittmar, Suzanne Asaturian, Deborah Clark, and Deborah Clinebell have been working with the Universities in the area to plan the program. Science in the South is a recognition of the need to provide additional services to the science teachers in the southern part of the state.

ISTA is also involved in the planning for a SWEPT program in Illinois. SWEPT stands for Scientific Work Experiences Program for Teachers. This program seeks to bring join the business and educational community in a program that will provide science, math, and technology teachers with summer work opportunities in the context of a professional development program. As this initiative evolves, ISTA members will benefit from the opportunities that develop.

In closing, I hope to see you at the ISTA Convention in October. The convention experience will be professionally rewarding and the setting in Chicago will provide the opportunity for many social gatherings.

Bernie Bradley



Kevin D. Finson
58 Horrabin Hall
Western Illinois University
Macomb, IL 61455-1396
finsonk@ccmail.wiu.bgu.edu

LETTER FROM THE EDITOR

Another year has zipped past, and here we are again, ready for another ISTA convention. This year's convention looks to be another great one. Even if you can only attend one day, make it a point to do just that! Bring a colleague with you. This is one of the best ways ISTA can grow and improve. The more science educators that are involved, the better! Science education has seemingly been under fire from a variety of sectors this year (considering the Congress' efforts to gut Eisenhower funding, Illinois' changes in IGAP science testing requirements, etc.), and we collectively need to come together to share ideas and improve what we do, to become stronger as an organization and as a discipline. There are few better opportunities than our annual convention to accomplish such a task. Renew yourself, revitalize, and learn something(s) new. Recommit yourself to ISTA, and get at least one colleague to join. Get involved. ISTA is only as strong as its active members. Be active! And enjoy one of the best state level science teacher conferences in the nation!

On another front...Earlier this year, we introduced in The Spectrum a new intermittent feature: invited papers. The first was written about constructivism by Dr. Robert Yager of the University of Iowa. In this issue a paper by Becky Meyer Monhardt, now at Utah State University, initiates our series on equity issues in science education. We felt the topic important enough to expand upon, so the Winter issue of The Spectrum will be largely comprised of short invited papers dealing with various facets of equity. Our desire is to plan future thematic issues, perhaps one per year, and announce them enough in advance that we can build those issues from reader submissions rather than relying on invited papers. Most likely, we will construct thematic issues with a mix of reader submissions and invited papers. At the present time, we are announcing the next thematic issue for summer 1997 on inclusion issues in science teaching. **Submission deadline is January 2, 1997.**

We'd like to hear from you concerning your thoughts on all of this. Do you desire thematic issues? If so, what themes would you like us to pursue? How often should The Spectrum do a thematic issue? Remember, this is your journal. We are striving to improve it and make it more useful for you. If we miss the mark, let us know. You can contact either Diana Dummitt or me at the addresses listed on the inside front cover.

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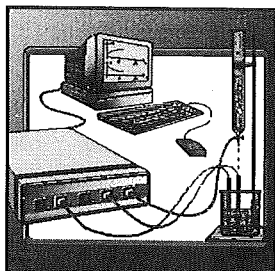
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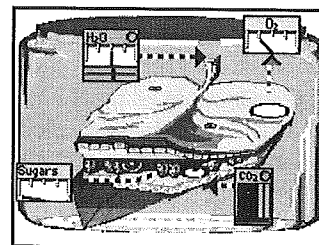
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SUMMARY OF ISTA BOARD MEETING

JUNE 22, 1996

The summer 1996 meeting of the ISTA Board was called to order in Champaign on Saturday, June 22nd at 9:20 AM by President Bernie Bradley. All officers and at least one director from each region were in attendance. Minutes of the March Board meeting were read and approved as presented.

OLD BUSINESS

MEMBERSHIP REPORT George Zahrobky reported the current total members whose dues are paid is 3,670. Elementary membership is increasing and the other areas are remaining fairly constant in numbers.

TREASURER'S REPORT Discussion of the treasurer's report led to Bernie's suggestion that the Board should develop its annual budgets based on funding as derived from memberships and then determine what expenditures are to be made rather than establishing a budget based on expenditures with the hope that memberships can meet the expenses.

SPECTRUM REPORT Advertising revenue remains constant. District directors are asked to provide updates of for their districts to be published in the Spectrum. The "invited papers" section was discussed.

EXECUTIVE SECRETARY REPORT Diana reported additional vendors are needed for the fall conference at the Merchandise Mart in Chicago. ISTA pins have been ordered from Jostens, and the metal ones will cost \$5.00. Pins will be available at the ISTA booth at the convention.

REPORT ON THE ILLINOIS ACADEMIC STANDARDS PROJECT Doug Dirks shared a portion of the draft document for science goals. The benchmark levels are to be early elementary, late elementary, middle/junior high school, early high school, and late high school. Complete copies are currently being printed by the ISBE. The standards went to press June 13th. The review period for the draft will run through November.

AWARDS AND ISBE REPORT Gwen Pollock reported that ISBE has again reorganized, and now has a Middle Level Division and an Elementary Level Division with no special subject area breakdowns. Scientific Literacy grant applications have been read and acted upon. IABT and EEAI sections for the safety handbook have been submitted, and ISTA is working on the elementary section.

NATIONAL SCIENCE STANDARDS Bernie noted that the Annenberg kits are now available for workshops on the national standards. ISTA will be involved in facilitating the dissemination of the information. ISTA board members will be available to lead sessions during the fall convention, and the board has sent letters to ROEs offering assistance. Planning for the introductory sessions on the national standards will continue.

NEW BUSINESS

1996 CONVENTION: At this time, more than 300 people are going to make 186 presentations. Commercial presentations will also be added. The president of NSTA will be one of the convention's speakers. There will be tours planned at a cost of \$10 each. The Thursday pre-conference will focus on standards, perhaps focusing on both state and national standards.

1997 CONVENTION: The convention will be held in the Pere Marquette Hotel and the Peoria Civic Center. A committee is already working on the convention and program. Bus transportation for Chicago-area attendees is being arranged. The preconference will be on Staff Development.

January 1997 will see SIU host an area ISTA meeting (targeting regions 5 and 6, but others are welcome). ISTA will help support such meetings.

Doug Dirks shared information regarding IGAP testing changes, a program developed by the Triangle Coalition, and the TIMS study. The TIMS study is the Third International Math and Science Study, and results will be released in November. It involved fifteen countries, and Illinois data was included in the U.S. data. A separate report on just the Illinois schools' performance will be available. Some preliminary results may be available by convention time in the fall. The ISTA board continues to pursue possible coordination of efforts with the Triangle Coalition (a coalition of education, business, and government agencies) dealing with summer internships for teachers. House Bill 2596 was passed by the Illinois legislature and is awaiting the governor's signature. The bill would make many changes in the IGAP testing. For example, changes would only occur in grades 3 and 5 for Reading, Math, and Writing. Science would not be tested until the 12th grade. There would be an exit exam for students in the 12th grade. Doug noted that the Assessment Advisory Committee of ISBE was not involved in the planning of the legislation. The meeting was adjourned at 4:10 PM. The next Board meeting will be at the fall convention in Chicago.



Gwen Pollock
Illinois State Board of Education
100 N. First Street
Springfield, IL 62777

DID YOU KNOW?

Lots of excellent efforts for science education have happened over the summer and lots more are planned for this school year. Let just touch on a few of these.

First, CONGRATULATIONS to the nominees for the national selection committee for the Presidential Awards for Excellence and the winners of the state selection process for the ISTA Awards for Excellence. The application and selection processes are some of the most challenging and rewarding efforts with which I have ever been associated. The very best days of the year are the days that I get to call a principal to have personal congratulations offered to the teachers. We premeditate to arrange phone calls for the teacher to answer in the principal's office and then all sorts of festivities begin locally—sometimes balloons and celebrations or school assemblies to announce the award.

The recognition will continue at this year's convention at a reception at the temporary home of the Chicago Academy of Sciences, located on North Pier, just steps from the Chicago River boat tours and the Navy Pier extravaganza. We cordially invite you to visit with us at this reception and congratulate the winners yourselves. They will be presenting showcasing the 1996 winners, led by the 1995 national level winners, Nancy Nega and Sue Kerr, who were treated royally in Washington last spring. I am so proud of ya'll.

I would like to highlight several other sessions for the convention for which I have some connection. The first is a meeting for science supervisors (department chairs, curriculum folks, etc.) to set the stage for an input process for statewide leadership activities. Another meeting will be devoted to a presentation by Marge Lucky, the new NASA specialist assigned to Illinois by the Lewis Research Center in Ohio, and me. We will be announcing a statewide plan for continuing staff development in earth and space sciences, tentatively set for next spring.

As an update, the PLAN-IT EARTH project succeeded beautifully this past summer, under the direction of Dr. Marilyn Lisowski. We are still working on many efforts for PLAN-IT, including a greater dissemination phase for the existing ecosystem units (Forests and Flowing Waters) and the continued development of curriculum for the remaining Illinois ecosystems. This is a superlative project for secondary schools, integrating all of the sciences, as well as social studies, math and language arts. The strong partnership that has evolved with the Department of Natural Resources is exceptional. I can't seem to say enough words of excellence—I am very proud of this project, both personally and professionally.

An update on the Meisters and Mentors project: 36 teachers met together for orientation in early August to set the stage for a 'job-shadowing, classroom-impacting, powerfully fun time together. Through the school year, we will be seeing science process skills in action, with career connections of scientists, technologists and technicians in such field sites as streams being sampled, conservation policing, fires being controlled, fisheries stocking and more. Many of the teachers have already worked with state agency scientists in their watersheds before school even started; some have already enhanced existing classroom activities with their own personal experiences. I hope to be able to share more of their experiences in future issues.

Other plans in the hopper include continuing the saga for science safety. New sections will be added to the guidebook (which your schools should already have), along with training for CHEMIS, a US Fire Administration project for the inventory, storage and disposal of chemicals. Lake County teachers participated in an exciting experiment this summer with Abbott Labs and microscale chemistry procedures. More later.

I also want to suggest that you and your colleagues study the draft academic standards which were sent to all schools in July. This is an important time in our careers in science education. Please study the goals, standards and benchmarks—are they clear? are they rigorous? are they at the right time in the student's life? did we overemphasize? did we underemphasize? There are feedback instruments in each document. Please review, comment, consider the implications and help us to help our kids even better. Your regional office and intermediate service centers' staff are all working to help in the review process; you may choose to direct questions and comments through that channel.

Sometimes my job is pure fun. I am sincerely looking forward to seeing you and being with the 'real people' in science education in Chicago in October. Maybe we can do the macarena, too!!!

REGIONAL REPORTS

REGION 2

We look forward to seeing you at the annual conference on October 11-12 at the Chicago Merchandise Mart. This year's theme is Standards — both National Science Standards and Illinois Academic Standards. National Science Standards were released early this year and briefings on them are scheduled throughout the conference to facilitate your scheduling. Please try to attend one of the briefings. Illinois Academic Standards were received in multiple copies by building principals during the summer. Get a copy, read it, and plan to give us your professional opinions/ input either by FAX, e-mail, U.S. mail, or in person at the conference. The review period before revision begins will be until about November. Your input is especially needed in the area of developmental appropriateness of the benchmarks for the age students you teach. See the inside back cover of the Spectrum for our addresses.

Cathy Flannery and Karen Meyer
Region 2 Directors

REGION 3

As we sit and watch the athletes competing in the Olympics many of us marvel at their ability. While many of the athletes may not think of themselves as being scientific, they all have an understanding of the science as it relates to their particular event. They understand leverage to attain a higher leap or swing or they understand friction and laws of motion to move quicker. Their knowledge of science is being put to use or applied in their everyday lives. This same principle of the application of science is one of the things all your students need everyday as they prepare to compete in today's and tomorrow's world. Just as the Olympic athletes have their coaches to guide them, your students have you as their teacher to guide them. And just like the athletes, every day your students must also practice their scientific skills in order to be able to use them in the future. So make everyday a Science Day in your classroom.

As the year begins you will hear about the state standards. Take time to study them. Discuss them with your colleagues. Think about how they fit into your classroom and the teaching of your students. This year will offer many opportunities for you to become more acquainted with the standards. We encourage you not to let these opportunities pass you by. October 11th and 12th, ISTA will hold our Annual Conference in Chicago and the introduction of the state science standards will be a part of the conference. This will be a wonderful opportunity to hear about the standards while also meeting, talking and sharing with other teachers. The conference also provides you with the chance to see what's new in the area of science from microscopes to computers and textbooks to children's literature books related to science. As if that is not enough, we're sure you can find some other things to do while you're in The Windy City.

Chicago in October is not the only place where you can experience science this school year. April 18, 1997 will mark the 11th Annual K-8 Science Update at Western Illinois University. This one-day event, sponsored in part by ISTA, is like a one-day science conference. Concurrent sessions on the teaching of science conducted by practicing teachers, like you, are held throughout the morning as well as many exhibits by science related vendors. Following a delicious lunch and awarding of many, many door prizes, mini-sessions are held where you move from station to station learning new hands-on science activities. The K-8 Science Update allows you to participate in two ways; as an attendee and/or a presenter. Either way you choose to participate just contact the Science Education Center, Western Illinois University, Macomb, IL 61455 for further information or watch for more information in future issues of The Spectrum.

For those of you who would like to get outside of the state of Lincoln for some science, the National Science Teachers Association's Annual Convention will be held in New Orleans on April 3-6, 1997. At this time we don't have a lot information about the convention except to say that it is a wonderful way to become involved in science and the teaching of science. Again, watch The Spectrum for more information about this convention.

Science is taking on an active role in the Region III area. The Sun Foundation facilitated a grant program called ECHOES for inservice teachers to learn more about ecological wetland topics.

The program, under the direction of Karen Zuckermann, lasted two years and required each participant, among other things, to put an action plan into place. Action plans included everything from schoolyard landscaping, prairie and vegetable gardens, and ongoing field trip studies. The "get your hands dirty" approach was just what the participants needed in order to get their students motivated. Teachers heard speakers from the University of Illinois, local and state conservation departments, and local farmers. Mid Illini and Two Rivers Educational Service Centers offered several hands-on and critical thinking science workshops for teachers. These workshops also included course credit from Aurora University. Technology is still looking to also be a major push. Whether you are a novice or an experienced "surfer," both centers offer terrific and inexpensive opportunities for teachers. Look for these programs in the fall in each of the respective newsletters.

In closing, we want to remind you that for your students to learn science they must do science. Feel free to contact Don Powers at the Science Education Center, phone 309-298-1777 if there is ever anything he can do to assist you in helping your students learn science.

Susan Grzanich
Don Powers
Region 3 Directors

REGION 5

The Region 5 and 6 Directors have been instrumental in organizing a regional ISTA Conference in southern Illinois. So far, we have had two meetings to discuss such a conference. We can now report that the conference will be held on Friday, January 24, 1997 from 8:00 am to 2:00 pm at the Student Center of the SIU-Carbondale campus. Various workshops will be presented along with a membership luncheon. We hope that such a conference will increase ISTA membership, assist teachers with new curriculum ideas, and allow teachers to view the new technology of the science industry. Cost will be \$35 per person and include a one year membership in ISTA.

Now is the time to ask permission to attend. Eisenhower funds and scientific literacy funds are available through your districts to cover your expenses. A Region 5 membership "dessert" meeting will be held on Thursday, September 12, 1996 from 7-9 pm at the Belleville East High School.

Dean Dittmar and Debbie Clinebell
Region 5 Directors



REGION 6

Greetings from Region 6! There are many exciting events coming up in our region. The Regional Directors from Regions 5 and 6, along with a team of enthusiastic educators from Southern Illinois University, have been planning and organizing a regional ISTA Convention which will be held at SIU Carbondale January 24, 1997. There will be a call for papers soon, and our hope is that teachers from these regions will share their excellent ideas at the convention. We are working hard to make this a high quality one day event to bring our large regions together at last. It is our goal to put our regions on the ISTA "map" and encourage membership as well as science fellowship. Also coming up in our region is the Illinois Junior Academy of Science Fair on Thursday, April 3, 1997, the Junior Science and Humanities Symposium on March 23-25, 1997, the Math Field Day in March 1997, and the Expanding Your Horizons for Girls in February 1997. We are at this time tentatively planning a FIRST ANNUAL Regional ISTA meeting at Benton Middle School to discuss our upcoming convention "Science in the South," the October state convention in Chicago, and any other concerns or topic discussions you might want to share with others in our region. Contact me for more information.

As the newly-elected Region 6 Director, I (Deborah Clark) have had the opportunity in the past six months to attend two ISTA Board meetings and three planning meetings for the forthcoming "Science in the South" Conference to be held at SIU-Carbondale. This has truly been an education for me and I have seen first hand how much time and effort the ISTA Board and Regional Directors put forth to address the needs of science teachers in Illinois.

As the new school year begins, I would like to encourage all science educators to become actively involved in ISTA. Not only will you benefit from networking with other science teachers, but you will also be involved with the cutting edge of science reform — the National Science Education Standards and the Illinois State Science Goals (which are currently under review). You can get involved by attending the 1996 Convention at the Merchandise Mart in Chicago in October, by attending the SIU-C conference, and/or by running for an office! Region 6 will be electing one new Regional Director this coming spring. Each region has two directors and each one is elected for a two year term. If you think you might be interested, please contact me. It's a great way to get actively involved in science education!

Suzanne Asaturian and Deborah Clark

Region 6 Directors

**PLAN ON ATTENDING.
SUBMIT A REQUEST TO YOUR
ADMINISTRATION NOW.**

**ILLINOIS SCIENCE TEACHERS ASSOCIATION
SCIENCE IN THE SOUTH CONFERENCE
SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE
STUDENT CENTER
FRIDAY, JANUARY 24, 1997
8 a.m. - 2 p.m.**

SESSIONS, WORKSHOPS, EXHIBITS, LUNCHEON AND MORE.

Cost of \$35 covers materials, refreshments, lunch, and 1997-98 ISTA dues.

1997 ILLINOIS SCIENCE TEACHERS ASSOCIATION
SCIENCE IN THE SOUTH CONFERENCE
SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE
FRIDAY, JANUARY 24, 1997
CALL FOR PAPERS

Any science-related topics that would be of interest to K-12 science teachers. Hands-on, applied, and activity-oriented sessions/workshops would be preferred.

DEADLINE FOR SUBMISSION: POSTMARKED BY OCTOBER 12 1996

Complete (print or type) a form for each workshop. This form may be duplicated.

Principal Presenter:

Name _____
Affiliation/School _____
Mailing Address _____
City, State, Zip _____
Day phone (____) _____
Evening phone (____) _____

2nd Presenter:

Name _____
School _____
Location _____

3rd Presenter:

Name _____
School _____
Location _____

Check time preferred: ___ 50-minute session ___ 70-minute workshop

Title of Presentation _____

Program Description(exactly how you want it to appear) 30 word maximum:

Check the Intended Audience:(any or all) ___K-3, ___4-6, ___7-8, ___9-12, ___Administration

In order to minimize costs, presenters are encouraged to bring their own equipment when possible. Audio Visual Equipment required: _____

SAFETY: Will you be using chemicals or hazardous materials? _____ If yes, please describe. _____

Conference presenters will not be required to register for the conference and your lunch will be provided.

Signature _____ Date _____

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Carbondale, IL 62901

ISTA Annual Convention

Merchandise Mart ExpoCenter—Chicago

October 11-12, 1996

Teachers, principals, supervisors, and others concerned with effective science education throughout the State are invited to attend the annual conference of the Illinois Science Teachers Association at the Merchandise Mart ExpoCenter in Chicago, Illinois. The convention begins Thursday October 10th with a special leadership preconference on the National and State Science Standards. Regular sessions begin on Friday, October 11th at 8:30 AM and continue throughout the day and conclude at noon on Saturday. Over 250 workshops are scheduled in the convention hotel and the ExpoCenter.

The role of effective science education today dominates the conference whose theme is "Setting the Standard". You will not want to miss the keynote presentation by JoAnne Vasquez. Ms. Vasquez is the current National Science Teachers Association President and an Elementary Science Resource Teacher at the Science Resource Center for the Mesa Public Schools. Her Keynote address will focus on the need for policy makers and teachers to address all of the National Science Education Standards, not just the content standards. Don't miss her entertaining and highly informative presentation.

On the social side, throughout the convention, you will find numerous opportunities to discuss science teaching with other professionals from around the State. We hope you make new friends and share your ideas. This is the conference to bring your spouse to. There is something for everyone; restaurants, entertainment, lounges, recreation, and sightseeing.

Take an active role in the reform of science education and join us at the 1996 ISTA Convention!

Meeting Location

Convention registration, sessions and exhibits will be at the Merchandise Mart ExpoCenter and Holiday Inn Mart Plaza. The Merchandise Mart Complex is located in a fast-growing, vibrant location, within the heart of Chicago's cultural renaissance. Nearby, artists' studios, galleries, restaurants, clubs and stylish shops have transformed the old warehouses of River North into the city's newest cultural and entertainment attraction. In addition, the Mart is located just around the corner from Chicago's major sight-seeing attractions and five minutes from Chicago's fabulous shopping area known as the "Magnificent Mile" on North Michigan Avenue.

The ExpoCenter is located on the second floor of the Chicago Apparel Center. The Holiday Inn Mart Plaza lobby starts on the 14th floor of the Apparel Center with stunning river and city views in all directions.

New! Early Bird Registration

Avoid the Friday morning crunch and register onsite at our table in the Holiday Inn Mart Plaza lobby.

Thursday, October 10
5 PM — 9 PM

Regular Registration Hours

Onsite registration and pick-up of Final Programs will be held at the Registration Area at the Merchandise Mart ExpoCenter during the following hours:

Friday, October 11
7 AM - 4 PM
Saturday, October 12
7 AM - 10:00 AM

By action of the ISTA Board of Directors, registration is required for participation in all activities of the ISTA convention. The lapel badge issued to each registrant is the "ticket of admission" to all sessions, exhibits, and other activities except those for which a separate fee is stated.

Exposition of Science Teaching Materials

The Exposition of Science Teaching Materials is an outstanding and integral feature of ISTA conventions. It will be held in the ExpoCenter. Its displays enable teachers, supervisors, and others concerned with science education to obtain the latest information on new science teaching equipment, textbooks, audiovisual aids, laboratory furniture, technology, supplementary materials, and other services and facilities available to make teaching and learning more effective. A comprehensive list of exhibitors will appear in the Final Convention Program. For your convenience, the Exposition will be open during the following hours:

Fri., October 11
8 AM - 4:30 PM
Sat., October 12
8 AM - 12 NOON



A Welcome from ISTA President Bernie Bradley

I invite you to attend the twenty-ninth annual convention of the Illinois Science Teachers Association. The site for this year's convention is the Merchandise Mart ExpoCenter in downtown Chicago. I urge you to share this information with your principal, district science coordinators and other colleagues. They will all find something of interest to them as part of the convention program.

As has become the tradition, this year's program will begin with a pre-conference on Thursday, October 10. The theme of this year's pre-conference will be "Setting the Standard." Participants will be provided with an overview of national and state science standards. In addition, performance standards and alternative assessments developed by the New Standards Project will be described. The future of science assessment in Illinois will be discussed and each participant will receive a copy of PIViT. PIViT, an acronym for Project Integration and Visualization Tool, is a software application developed at the University of Michigan. PIViT helps teachers visualize and plan complex, integrated curricula aligned with national or state science standards.

The convention program will begin on Friday, October 11 and will offer a rich variety of presentations, exhibits by science education vendors, tours of interest, and a Keynote Address by JoAnne Vasquez, President of the National Science Teachers Association. Ms. Vasquez will focus on the role of the National Science Education Standards.

The theme of this year's convention is "Setting the Standard." In keeping with this theme, National Standards Awareness Sessions will be facilitated by ISTA officers and Regional Directors during each workshop cycle. In addition, sessions will be scheduled to provide convention participants with an opportunity to provide feedback to the Illinois State Board of Education regarding the Illinois Academic Science Standards.

Melanie Wojtulewicz, Manager of Science Support for the Chicago Public Schools, has worked hard to arrange an exciting array of tours to just about every science resource in the Chicagoland area. Be sure to look over the schedule of tours found in this Convention Preview. You can sign up for tours onsite as space permits.

Another feature of the convention program will be the reception for the recipients of the Presidential Awards for Excellence in Science. The reception will be held at the Chicago Academy of Sciences on Friday night. The Academy is located in North Pier, the site of many intriguing shops. The newly renovated Navy Pier is a short ten minute walk from North Pier. At the conclusion of the reception, take advantage of the opportunity to tour one of Chicago's new hot spots.

Come and enjoy this year's ISTA Convention in Chicago. I know you will find it be a worthwhile, enjoyable experience. Hope to see you there.

Bernie Bradley, ISTA President

Tours

Melanie Wojtulewicz, Manager of Science Support for the Chicago Public Schools, has worked hard to arrange an exciting array of tours to just about every science resource in the Chicagoland area. This year we are offering an unprecedented number of exciting tours. Space is limited but there may be spots open to registrants onsite. Check at the Tour Confirmation Table during onsite registration for the convention.

Reception for Presidential Awardees

Join us after the program on Friday for light refreshment, conversation and recognition of the Presidential Awards of Excellence in Science Teaching winners. The reception and awards ceremony will be held at the Chicago Academy of Sciences on North Pier, near Navy Pier, and just above the port for the Chicago River Boat tours. The reception will begin at 5:30 PM with the recognition ceremony beginning at 6:15. Free shuttle buses will depart from the Merchandise Mart at 5:00.

Hotel Reservations

Approximately 300 hotel rooms are available at the convention hotel, the Holiday Inn Mart Plaza. Reservations may be made by calling 312-836-5000. Room rates for the hotel are \$95.00 plus tax. In order to receive the special convention rate for rooms you must state that you are attending the ISTA Convention. Be sure to call immediately as reserved rooms fill up quickly

ISTA GENERAL MEMBERSHIP MEETING SATURDAY OCTOBER 12 12:15 PM

This session of the Convention affords the members of the Illinois Science Teachers Association to express their ideas, concerns, and suggestions to the Board, regarding the future directions of the Association. ALL MEMBERS (including those who have just joined at this Convention) should plan to attend. Vendors have donated thousands of dollars worth of prizes to be given away during the meeting.

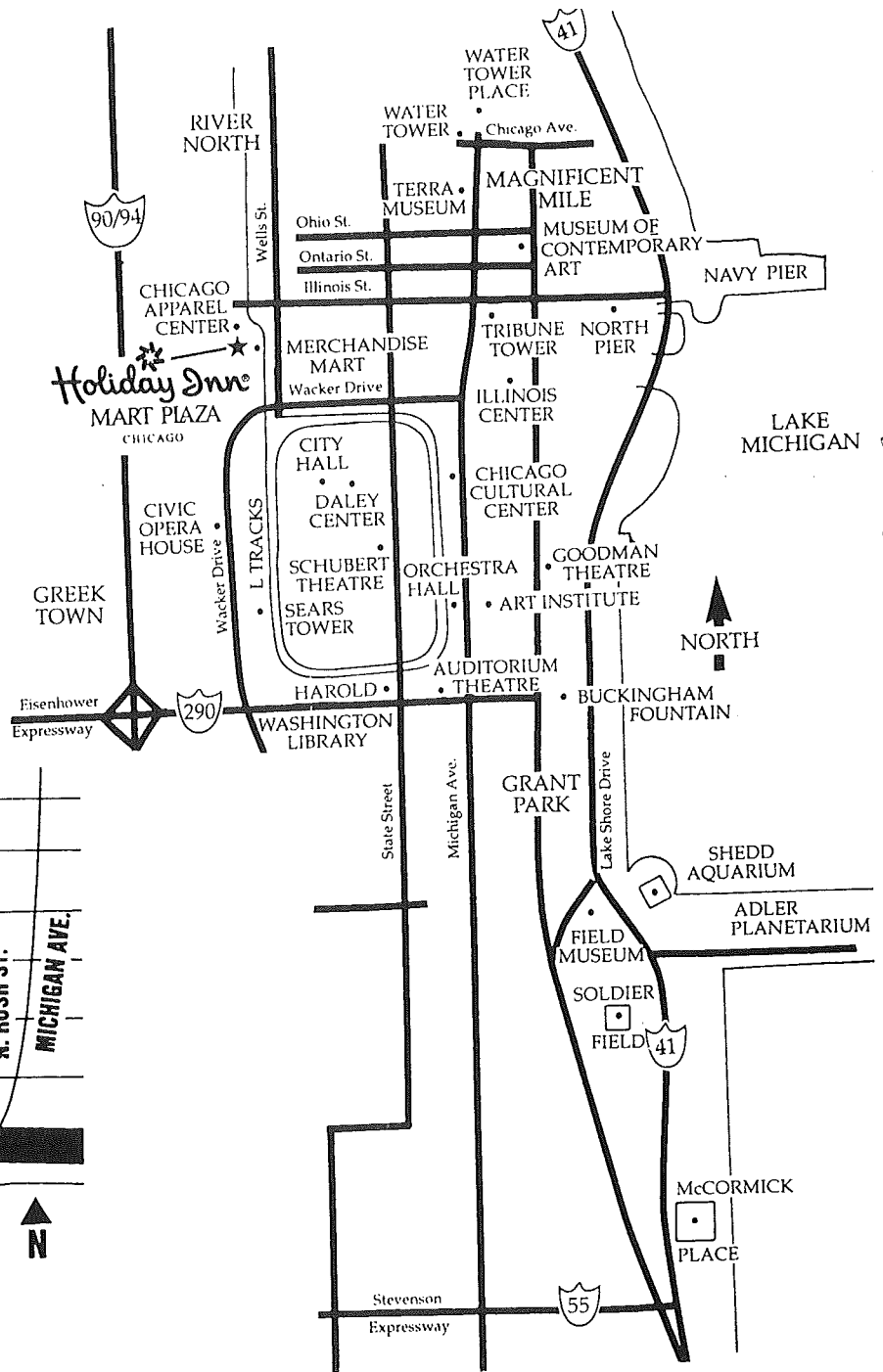
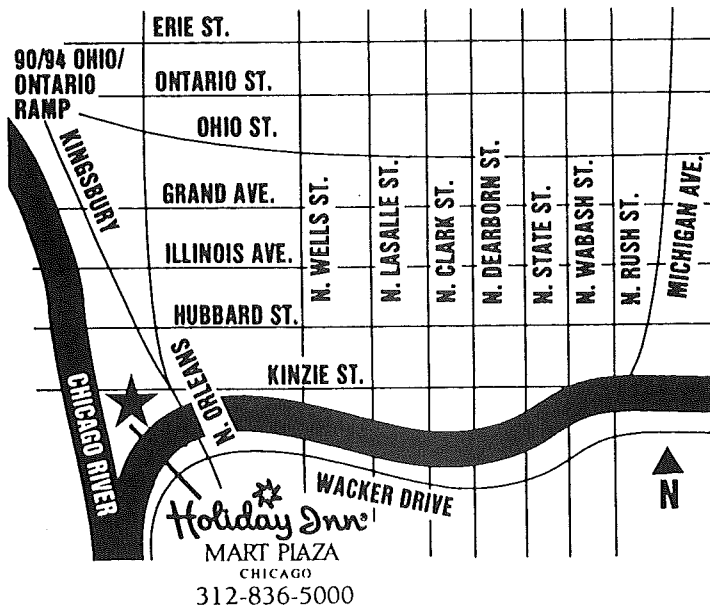
Location

Transportation to Merchandise Mart

Car: Downtown Chicago is conveniently reached by automobile. Please refer to the map printed in this Advance Program to plan your best connecting road.

Parking: Parking is available at Hotel for all guests. The rate is \$12.00 per day with unlimited in and out privileges. In addition, there are numerous lots in the vicinity of the Merchandise Mart.

Air: Airport Express Shuttles are available to transport you to the hotel. Shuttles from O'Hare International Airport run on a regular cycle. Cost for round trip is \$25.50. For transportation from Midway Airport it is necessary to reserve a space by calling 1-800-237-1734. Cost is \$19.00 round trip.



FROM THE SOUTH, EAST, OR WEST:

I-90/I-94 (Dan Ryan). Exit at Washington East/51C, turn right on Washington. Go to Wacker Drive and turn left. Make another left at Orleans Street and cross over bridge. The hotel is on the left-hand side.

FROM I-88:

I-88 connects to 290 (Eisenhower). Exit at Franklin Street. Follow Franklin until it turns into Orleans Street (just over the river). The hotel is on the left-hand side.

FROM ST. LOUIS AND MIDWAY AIRPORT:

Take I-55 to I-94 (Dan Ryan). Exit at Washington East/51C, turn right on Washington. Go to Wacker Drive and turn left. Make another left at Orleans Street and cross over bridge. The hotel is on the left-hand side.

FROM LAKE SHORE DRIVE:

Take Lake Shore Drive and exit at upper Wacker Drive. Follow this to Orleans Street. At Orleans Street take a right and cross over the river. The hotel will be on the left-hand side.

FROM NORTH I-90/I-94 (KENNEDY EXPRESSWAY):

Exit at Ohio St., go to Wells St. (3rd light). Turn right, cross the river and turn right on Wacker Drive. Go 1 block, turn right on Orleans and cross bridge. The hotel is on the left-hand side.

**Illinois Science Teachers Association
Annual Convention
Final Tour Schedule**

All buses will leave promptly at the assigned time from the front drive of the Merchandise Mart, 350 N. Orleans. Plan to arrive early to catch the bus. All tours are on a tight schedule.

No.	Date	Destination	Description	Includes Lunch	Leave Merchandise Mart	Return to Merchandise Mart	Cost	Limit
1	Thursday October 10	Garfield Park Conservatory 300 North Central Park Boulevard	Participants will be taken on a guided tour of the Garfield Park Conservatory which is under restoration and will participate in PreK - 9 activities on soils. Administration of the Garfield Park Conservatory Alliance will be present to give an overview of new services being offered as the conservatory takes its rightful place as a living museum. Lunch will be served by students who staff the <i>Flower Pot Cafe</i> of Flower Vocational High School	Yes	9:00 a.m.	1:30 p.m.	\$13	40
2	Thursday October 10	Museum of Science & Industry 5700 South Lake Shore Drive	Guided tour of current exhibits, the learning labs and Science Club Network activities will be featured.	No	1:00 p.m.	5:00 p.m.	\$7	40
3	Thursday October 10	Chicago Children's Museum Navy Pier	Guided tour of exhibits led by science specialist	No	9:30 a.m.	12:30 p.m.	\$7	40
4	Thursday October 10	National Weather Service Forecast Office Romeoville, IL and Argonne National Laboratory Argonne, IL	Jim Allsopp of the National Weather Service will give a tour of the facility that forecasts weather for Illinois and the Chicago metropolitan area. The tour will give teachers an overview of NWS operations, including GOES satellite images, NEXRAD Doppler radar, NOAA Weather Radio, forecasts and warnings. Self-paid lunch at Argonne. A guided tour of the Argonne campus will include the Advanced Photon Source which provides the nation's most powerful X-ray beams for pioneering research in materials science. A superconductivity/cryogenics demonstration and other areas of research will also be presented.	No	8:30 a.m.	2:30 p.m.	\$10	40
5	Friday October 11	Brookfield Zoo 3100 South First Avenue Brookfield, IL	Teachers will receive an overview of zoo school programs and opportunities for teachers. A sampling of activities from teacher workshops will be offered as well as a guided tour of one exhibit and some time on your own.	No	9:15 a.m.	2:30 p.m.	\$16	40
6	Friday October 11	Fermi National Accelerator Laboratory Batavia, IL	There will be a guided tour of Fermilab that will include an introduction to the laboratory, a tour of the Wilson Hall and the Linear Accelerator Building, a question and answer session with a scientist, and a cryogenics demonstration. Lunch will be provided by the Education Center with a chance to meet and hear Dr. Leon Lederman, Director Emeritus. There will also be a visit to the bison herd, a walk through the Interpretive Prairie Trail, a visit to the Lederman Science Center which will include a chance to explore the interactive exhibits, and to learn more about the Teacher Resource Center and the Technology Classroom.	Yes	7:30 a.m.	4:30 p.m.	\$20	40
7	Friday, October 11	Adler Planetarium & Astronomy Museum 1300 South Lake Shore Drive	Clear or cloudy - come see Adler's observatory and do some Hands-On Universe (astronomy) image processing in their Cyberspace Computer Learning Center.	No	6:30 p.m.	9:30 p.m.	\$7	30

8	Friday October 11	Garfield Park Conservatory 300 North Central Park Boulevard	Participants will be taken on a guided tour of the Garfield Park Conservatory which is under restoration and will participate in PreK - 9 activities on seeds. Administration of the Garfield Park Conservatory Alliance will be present to give an overview of new services being offered as the conservatory takes its rightful place as a living museum. Lunch will be served by students who staff the <i>Flower Pot Cafe</i> of Flower Vocational High School	Yes	9:00 a.m.	1:30 p.m.	\$13	40
9	Friday October 11	Shedd Aquarium 1200 South Lake Shore Dr.	A guided tour of the Aquarium and Oceanarium and new <i>Frogs</i> Exhibit led by Curator of Education Bert Vescolani. Resources will be provided.	No	9:00 a.m.	12:30 p.m.	\$7	40
10	Friday October 11	Museum of Science & Industry 5700 South Lake Shore Drive	Guided tour of current exhibits, the learning labs and Science Club Network activities will be featured.	No	1:00 p.m.	5:00 p.m.	\$7	40
11	Friday October 11	Chicago Botanic Garden Lake Cook Road Glencoe, IL	Tram ride tour with continual guided lecture, docent led walking tour of the Japanese Garden, box lunch in the Linneaus Gallery and free time to browse. The Garden should be in its height of fall color. Tram rides proceed with or without rain. Dress for the day.	Yes	8:30 a.m.	2:30 p.m.	\$24	40
12	Friday October 11	Field Museum of Natural History 1200 South Lake Shore Drive	Content area specialist in Geology, Peter Laraba will provide a guided tour of the dinosaur exhibit, "Life Over Time."	No	9:30 a.m.	12:00 p.m.	\$7	40
13	Saturday October 12	Adler Planetarium & Astronomy Museum 1300 South Lake Shore Drive	Explore light in its many forms in our "Lights! Spectral! Action! exhibit. Also, see Adler's newest sky show "Seeing the Invisible Universe."	No	11:30 a.m.	3:00 p.m.	\$7	30
14	Saturday October 12	Adler Planetarium & Astronomy Museum 1300 South Lake Shore Drive	See how to make your own classroom comet and view Adler's sky show "Comets are Coming!"	No	12:30 p.m.	3:30 p.m.	\$7	40
15	Saturday October 12	Lincoln Park Zoo 2300 North Cannon Drive	Lunch with Dr. Ken Gold, Director of the Lowland Gorilla Program, the most successful gorilla breeding program in the world. Tour of the gorilla exhibits by specialized docents before lunch.	Yes	9:30 a.m.	2:00 p.m.	\$12	25
16	Saturday October 12	Friends of the Chicago River	One and one-half hour historical/ecological/issues tour of the Chicago River by boat. Wagner Charter Boat will board from the dock at Lower Wacker between Wells and Franklin, just across the river from the Merchandise Mart.	No	9:30 a.m.	11:30 a.m.	\$18	50
17	Saturday October 12	Scitech 18 West Benton Aurora, IL	Presentation of available educational programs followed by a self-guided tour of the exhibits.	No	8:45 a.m.	1:00 p.m.	\$10	40

Transportation is being provided by Greatway Transportation. For further information, call Melanie Wojtulewicz, Manager of Science, Chicago Public Schools, (312) 535-8860 x121. This is the final schedule. Disregard all previous printed schedules published prior to September 4, 1996.

Visit the Exhibit Hall

Science materials, books, equipment, and teaching tools of all kinds will be on display and for purchase in the Exhibit Hall. Also on exhibit will be the programs and services of organizations and institutions, ranging from museums to universities to national laboratories. Among our exhibitors so far...

COMMERCIAL

Addison-Wesley
AlexanderDESIGN
American Science & Surplus
Amsco School Publications
Associated Microscope
Anderson's Book Shop
Arbor Scientific
Beckley-Cardy Group
Britannica Educational Systems
Brock Optical
Carolina Biological Supply Co.
CASL Technologies
Central Scientific Company
Cuisenaire Company of America
Delta Education
Educational Design—IGAP Coach
Encyclopedia Britannica
Fisher Scientific
Flinn Scientific, Inc.
Follett Software
Glencoe/McGraw-Hill
GPN
Gray's Distributing/The Learning Tree
Grolier Publishing
Harcourt Brace and Company
High Touch-High Tech
Holt, Rinehart and Winston, Inc.
Insights Visual Products
Internet Innovations
ITW Hi-Cone
J.M. Le Bel Enterprises
Ken-A-Vision Mfg. Co. Inc.
Kendall/Hunt Publishers
LEGO Dacta
Leica Inc.
LOGAL
MacMillan/McGraw Hill
N & N Publishing Company
NASCO
Nebraska Scientific
New Castle Publications
Ohaus Corporation
Optical Data
Parco Scientific
PASCO Scientific
Prentice-Hall School Division
Quantum Technology
Sargent-Welch Scientific
Scholastic, Inc.
Schoolmasters Science
Science Kit & Boreal Labs
SMG—Science, Math & Gifted Products
The Science Source
Scope Shoppe

Scott, Foresman and Company
Showboard, Inc.
Silver Burdett & Ginn
Synergistic Systems
Texas Instruments
Usborne Books at Home
Tri-Ed Enterprises
Wild Goose Company
Wm. C. Brown Communications

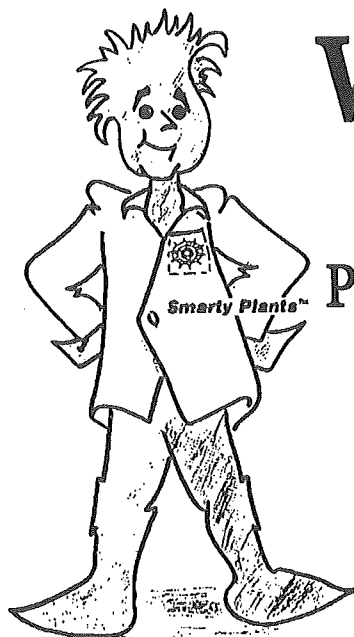
NONCOMMERCIAL

American Association of University Women
Center for Mathematics, Science, and Technology
Chicago Academy of Sciences
Chicago Systemic Initiative
Earth Foundation
Environmental Education Association of Illinois
Facilitating Coordination in Agricultural Education
Fermi Laboratory Education Office
Illinois Association of Biology Teachers
Illinois Clinical Laboratory Science Association
Illinois Department of Commerce & Community Affairs
Illinois JETS
Illinois Groundwater Project/Rivers Project
Illinois Science Olympiad
International Museum of Surgical Science
ICE-University of Wisconsin
Institute of Food Technologists
Illinois Science Olympiad
Kohl Children's Museum
National Science Teachers Association
Power House—ComEd Co.
Save the Rainforest
Sci-Tech
St. Louis Science Center
Teachers Academy for Mathematics and Science
USDA Natural Resources Conservation Service
WYSE-Worldwide Youth in Science and Engineering

NSTA Science Store

For the first time ever, the Entire NSTA Science Store will be coming to the ISTA Convention. Don't miss this great opportunity to browse and buy something. Publications, kits, T-shirts, pins and some surprise items will be on display. Located in the ExpoCenter Exhibit Area next to the ISTA booth.

In-School Science Field Trips



**We come
to your school!**

PRE-K thru 6th GRADE



Polly the Polymer Train™

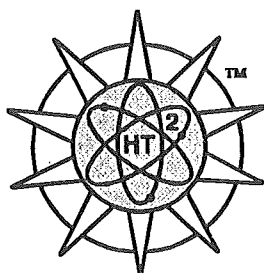
High Touch-High Tech® offers a variety of fun and educational experiences—each program provides 90 minutes of hands-on interactive, and sensory learning!

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- **SMARTY PLANTS®**—Discover the amazing world of plants.
- **GLOBE GOO AND GUTS®**—Learn the systems of the body and find out what makes us tick.
- **EDISON'S WORKSHOP®**—Discover all the "hair raising" facts about the world of electricity.
- **CHEMFUN®**—Find out how much fun chemistry can be!
- **DIG IT®**—Step into the world of Geology and discover the secrets of the earth's crust.
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ENVIRONMENTAL SURFING ON THE WEB

The enormous growth of the World Wide Web can be seen in the many environmental sites now available for viewing. Some of the sites that may be of interest to you are:

<http://es.inel.gov/>

enviro\$en\$e-dedicated to assisting pollution prevention implementation and solvent alternative information; links to many other systems.

<http://www.epa.gov/docs/fedrgstr/>

the Federal Register (FR) Environmental Subset.

<http://www.epa.gov/>

US EPA server with links to sites throughout the agency.

<http://envirolink.org/>

Envirolink-a resource for locating environmental information on the Internet.

<http://www.awma.org/>

Air and Waste Management Association Home Page.

<http://www.great-lakes.net/>

Great Lakes Information Network.

<http://dnr.state.il.us/>

Illinois Department of natural Resources Home Page.

<http://www.hazard.uiuc.edu/hwric/hmlhome.html>

Illinois HWRIC Home Page.

<http://www.nceet.snre.umich.edu/~david/NEdir/html.dir/orderinfo.html>

Creates regional environmental directories which together form a comprehensive national environmental directory database.

<http://www.geopac.com/>

environmental Professional's Guide to the Net; for those interested in locating technical sites on the Internet.

VOLCANOWORLD

VOLCANOWORLD (<http://volcano.und.nodak.edu>) is a homepage dedicated to increasing understanding of volcanoes on Earth and beyond. VolcanoWorld is part of NASA's Public Use of Earth and Space Science Data program. In the first half of 1996, about 150,000 people visited the homepage from 90 countries (and Antarctica). VolcanoWorld has been selected as one of the top 5% of all World Wide Web homepages. Part of VolcanoWorld's success can be attributed to converting jargon-rich detailed volcanic reports to short summaries that are presented in lay terms. human interaction is increased by the use of a volcano cartoon character named Rocky who appears throughout the homepage. "Ask a volcanologist" allows users to submit questions on topics that interest them. Three volcanologists have answered to over 1,500 diverse questions that increased basic knowledge of how volcanoes work, outlined hazards posed by specific volcanoes, described volcanic products, and summarized the history of dozens of volcanoes. "Volcano Lessons" provides background information for teachers with little or no formal training in Earth Science. Information is organized from simple and introductory to more complex and detailed. topics include Plate Tectonics, Hot Spots, Evolution of Hawaiian Volcanoes, Volcanic Land forms, Volcanic Products, and types of Eruptions. Each topic is complemented with a series of Teaching Suggestions and Activities that progress from grades K-3 to 9-12. These activities can be printed and used in the classroom. Also included in Volcano Lessons is a set of HyperStudio stacks on similar topics that can be downloaded and used on computers in the classroom. Other parts of VolcanoWorld serve as learning tools. "What's Erupting Now" presents timely summaries of volcanic eruptions. Pictures of current or past eruptions are used to convey the style and magnitude of the event. "Volcanoes of the World" explores more than 200 volcanoes in 40 countries. "volcanic National Parks" takes users to virtual field trips in Hawaii Volcanoes National Park and Mount St. Helens Volcanic National Monument.

UIUC PHYSICS DEPT OUTREACH

Physics Dept Outreach Website

(<http://www.hep.uiuc.edu/~ik/outreach.html>)

•The Physics Van

(<http://www.hep.uiuc.edu/~MATS/Van.html>)

•Saturday Physics Honors Program

(<http://www.hep.uiuc.edu/~ik/Sat.html>)

•Teachers workshops

(<http://www.hep.uiuc.edu/~ik/workshops.html>)

Inga Karliner
Chair, Outreach Committee
Physics Dept. U of Illinois
1110 W Green Street
Urbana, IL 61801
email:karliner@uiuc.edu

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN PHYSICS DEPARTMENT OUTREACH PROGRAM

The UIUC Physics Department has an active educational outreach program. Since 1994, more than 6000 elementary school children attended Physics Van shows where undergraduate physics students perform interesting and exciting demonstrations. Children enjoy the shows and send us many letters and drawings with questions and thanks. Many primary school teachers were so impressed with the Physics Van that they asked for physics workshops for teachers. In response, a Fun With Physics workshop for teachers was offered in 1996. These programs, as well as the series of workshops Operation Physics for teachers in grades 3-8, will continue this year. We will mail out further information to schools as soon as schedules become available. To add your individual name to the mailing list, write Dr I. Karliner at the above address.

We invite interested students, parents and teachers to the Saturday Physics Honors Program where you will meet scientists and learn first hand about their recent research. The program is in its fourth year. While a number of high school seniors is enrolled in a more formal way in this program, everyone is welcome to the lectures without fee or registration.

A New Adventure In Recycling

QUEST
OF THE
RING LEADERS



<http://www.ringleader.com>

ITW Hi-Cone, the world's largest manufacturer of recyclable 6-pack rings, has developed a cyber-adventure called "Quest of the Ring Leaders" and you're invited to join in the Quest. Elcyer will be your guide as you journey through the world of Sunnyville and discover how you can help revitalize their environment.

The Quest is located at <http://www.ringleader.com> on the World Wide Web and in addition to the Quest, you'll find valuable resource information about photodegradability, entanglement, closed-loop recycling, and of course how you can participate in the Ring Leader Program. So put on your cyber shoes and get a new kick out of the World Wide Web.

//TW Hi-Cone

All sessions will be held in room 141 Loomis Laboratory of Physics, 1110 W Green Street, Urbana, IL, and are 10:15-11:30 am or 1:15-2:30 pm. For more information contact Ms Penny Sigler (Program Secretary), Physics Department, U of Illinois, 1110 W Green Street Urbana, IL 61801. Parking is available on the east side of the building in lot B-21.

1996/97 SCHEDULE

Sept 28, 1996

10:15 am

The Birth, Life and Death of Stars
Prof. James B. Kaler, Astronomy UIUC

Oct. 26, 1996

10:15 am

So You Thought Computers Could Do Anything? Some Probably Unsolvable and Infeasible Computational Problems
Prof. Michale C. Loui, CESRL, UIUC

1:15 pm

Surfing Waves in the Microcosmos: Using Light Waves to View the Body
Prof. Eric Wiener, Nuclear Engineering, UIUC

Nov. 16, 1996

10:15 am

The Strange Fate of Cats (and Other Things) According to Quantum Mechanics
Prof. Anthony J. Leggett, Physics, UIUC

Jan. 25, 1997

10:15 am

Exotic Objects of the Cosmos: Neutron Stars, Pulsars, and Black Holes
Prof. Frederick K. Lamb, Physics, UIUC

1:15 pm

When Ash Meets Cowhide: The Physics of Baseball
Prof Alan M. Nathan, Physics, UIUC

Feb 15, 1997

10:15 am

My Time is NOT Your Time: Einstein's Relativity in Theory and Practice
Prof. Gary E. Gladding, Physics, UIUC

Mar. 8, 1997

10:15 am

Scanning Tunneling Microscopy, and Other Ways to Really See Atoms. (to be confirmed)
Prof. Munir H. Nayfeh, Physics, UIUC

ARTICLES

Becky Meyer Monhardt
Utah State University
Logan, UT 84322

SUBTLE BIASES IN SCIENCE CLASSROOMS: PRESCRIPTION FOR CHANGE

Of course science education should provide equal opportunities for male and female students. Today, no one would argue with that. Yet, in many science classrooms across the nation, this seems not to be the case.

How can this be? We have certainly made great strides since the days when women were prohibited from science lab classes and were openly discouraged from pursuing careers in science. As women become more common in science fields that were once reserved only for men, it is easy to believe that the barriers that once prevented females from developing and pursuing an interest in science no longer exist. While blatant discrimination against females is generally no longer tolerated, some believe that little has actually changed for women and girls in science (Haggerty, 1995).

The new strain of biases that exist in today's society, as well as in science classrooms, is perhaps more subtle in nature and often not readily recognized. Unfortunately, the message these subtle biases send to female students is still the same: Science is for boys, not you.

Classroom teachers face the challenge of overcoming gender stereotypes that are transmitted to students from a variety of sources: the popular media, peers, parents, and often the school culture itself. Research indicates that even very young children have developed stereotypical views related to science, and often enter the primary grades with these perceptions (Taber, 1992).

Science textbooks are still an important vehicle for teaching science. These textbooks often reinforce existing stereotypical views held by students. Females are often portrayed in illustrations in passive roles, while males are more often portrayed in active roles. Even in textbooks where females are highly represented in the illustrations, they are often absent from the narrative. Little information about the accomplishments of women in science is included in textbooks. When women scientists are mentioned, who are they? Are they the exceptions or are they women that most female students can actually identify with?

What happens in the science classroom is very influential in shaping student's attitudes toward science. Research indicates that students' attitudes toward science has their beginnings in the elementary school (Kahle and Lakes, 1983). At this level, a student's main contact with science is through the science teacher. How much attention an individual student receives from the teacher and the *kind* of attention seems to be paramount.

Several recent studies have provided information on teacher-student interaction patterns in science classrooms (AAUW, 1992; Sadker and Sadker, 1994). These studies indicate that teachers interact far more frequently with boys than with girls. Boys are reprimanded for misbehavior and disobeying the rules eight to ten times more than girls, but teachers also spend more time praising them for academic work or intellectual performance. The time spent interacting with girls is the opposite, more time is spent praising them for behavior, neatness, or appearance, while criticisms are reserved for academic and intellectual performance.

Teachers generally give students four types of responses: praise, remediation, criticism, and acceptance. Sadker and Sadker (1994) in their research in more than a hundred classrooms, report that boys receive more of all four responses than do females. The responses that boys receive from the teacher are generally found to be specific, clear feedback, the type of response that fosters achievement. Responses directed toward girls are more generic in nature. "Okay", although well-meaning, does little to help girls learn strategies to correct mistakes and reflect on their answers.

Sadker and Sadker also found a disparity in the kinds of questions that are asked in science classrooms. Teachers ask girls lower-level questions, while directing higher order questions toward male students. Boys are eight times more likely to call out an answer without raising their hand than are girls. When girls did call out an answer they were more likely to be told to "raise your hand before responding."

Tobin and Garnett (1987), in a study of classroom interaction involving high school students, found similar results. They found that while teachers involved males and females equally in lower cognitive level interactions, they involved males to a greater extent in higher cognitive level interactions. This creates a cycle of failure for females. Less practice in responding to higher level questions results in being less able to respond appropriately when asked to do so.

Male students tend to participate in a more overt manner than females, raising their hands to respond to questions more frequently than female students. Target students, those students who were most likely to dominate classroom interactions, tend to be male rather than female. Classroom observations indicate that, in general, males tended to participate more in whole class settings, while females engage in individualized, seat work in a more sustained manner than males (Tobin and Garnett, 1987). Girls and boys are different and react differently in classrooms.

Research indicates that while there are gender-related differences in interaction patterns at all level, teachers are often unaware of it (Sadker and Sadker, 1985, Tobin and Garnett, 1987, Bellamy 1994). "It doesn't happen in my classroom" is a prevailing view among many teachers. They are often quite surprised to find that they are unconsciously favoring male students.

The use of hand-on activities has been found to enhance students' learning and enjoyment of science (Cole and Griffin, 1987; Mallow, 1981). If active participation during science class is more conducive to learning than simply listening and taking a passive role, the obvious questions are, "Who is participating in science classrooms?" and "What is the nature of the participation?" It is no surprise to find that often males are the more active learners in science classes. They tend to assume control and manipulate the lab equipment to a greater extent than females (Theborge, 1993).

Tobin and Garnett (1987) report differences in laboratory participation for girls and boys. It was not uncommon for girls in grades 8-11 to stand back while males manipulated equipment and materials. Teachers often unintentionally reinforce the non-participation of females. In interacting with males, teachers frequently explain how to do something, but for girls, they may do it for them (Sadker and Sadker, 1994).

This lack of participation by females in "doing science" has a direct link to interest and achievement. Females generally receive higher grades, yet research data consistently shows that not only do males score higher on science achievement tests than young women, they also are more interested in science (Peltz, 1990; Tobin and Garnett, 1987). Data indicate that by the time a student reaches 11 years of age, attitude changes create a clear diversification in interest. Boys show a more positive view on interest surveys and are especially enthusiastic about the physical sciences. This may be because they have participated more in these types of activities than girls and have accumulated more positive experiences in areas that include mechanics and electricity. Many girls simply have not had opportunities to develop the science related skills and may be reluctant and uncomfortable in doing activities that require manipulation of unfamiliar tools. At age 9, girls have already had less experience than boys in using science instruments, but they still indicate the desire to have such experiences. By age 13, however, this interest has begun to dwindle and a negative attitude toward science, science classes and science careers has begun to develop (Kahle and Lakes, 1983).

Another reason why females may be less interested in science is that they often see no relevance to topics that are being taught. A study reported by Ramsden (1990) aimed at stimulating the interest of 13 and 14 year old girls in physics, found specific things that were important to girls. The degree of success of activities from the students' points of view included their relevance to daily life, usefulness to future life, extent of participation in activities, variety of activities, and opportunities to express views and opinions.

IMPLICATIONS FOR TEACHERS

The following strategies offer suggestions for teachers to use in insuring equality of opportunity for females in their classes. The first step is the most difficult — identifying that bias does exist. Teachers, even those who consider themselves to be non-biased, are often surprised to find that bias does exist in their classrooms. Once these subtle, unintentional behaviors have been identified they can be corrected.

There are several ways to begin.

Awareness of Bias

- Videotape your classes. Review the tape and code with whom you are interacting as well as the types of interaction. What kinds of feedback do you give males and females? Do you praise girls for the appearance of their work while praising boys for their accomplishments? Who gets the most of your time? Who gets the *best* of your time? Do you call on boys more frequently than girls? Are quiet girls ignored? Are the same expectations for achievement communicated to both boys and girls?

- Find out how your students view science and scientists. Ask them to draw what they perceive a scientist to look like. How many portray scientists as male? Where do their ideas come from? What are you doing to ensure the accuracy of their views?

- Ask students what they like and dislike about what goes on in the classroom.

Dispelling Stereotypes

- Provide students with role models. Bring women who are involved in science careers into the classroom whenever possible. Emphasize that women scientists can retain their female identity.

- Discuss the accomplishments of female scientists. Point out the obvious disparity of female scientists to male scientists from a historical point of view. Discuss why women may not have dominated science as the men did. What will the future be like?

- Focus on the accomplishments of typical women in science. Don't focus only on the most famous women scientists. The lives of these women often give little insight into those who succeed in science but have less distinguished careers. Students may not be able to identify with the "exceptions."

- Encourage female students. Note their accomplishments, letting them know that they are capable and competent in science. Emphasize to them that they can accomplish anything they want and show them you mean it by expecting them to achieve.

Selection of Textbooks and other Curriculum Materials

- Check that precise gender-neutral language is used when appropriate. Ask students how they feel about the use of terms such as "mother earth" or "daughter cells". Does everything have to be genderless?

- Make sure the material represents both sexes equally in text and illustrations. Are females shown only in passive roles or are they portrayed as active participants actually "doing science?" Are the roles of females comparable in accomplishments of power?

- The material should relate to prior experiences of students without reinforcing existing stereotypes. Content should be relevant to a variety of pupil's everyday experiences as well as to likely future experiences.

- Material should utilize open-ended problems to which there is more than one answer. Both sides of an issue should be represented.

Encouraging Active Participation

- Choose activities that involve all students directly in hands-on manipulation of materials and with direct involvement with data collection and analysis.

- Before using new equipment make sure every student becomes familiar and comfortable with it. See that girls have a fair share of the equipment.

- Have students use a combination of qualitative and quantitative methods in gathering data.

- Correct possible disparity in spatial abilities between male and female students by implementing programs devised to improve spatial abilities.

- Require girls to participate in activities. Don't do the activity for them, but expect and encourage them to do it on their own. Don't tolerate passivity or helpless behavior anymore than you would tolerate classroom disruptions.

- Select activities that interest girls as well as boys. To find out, ask them what they are interested in. Topics like bacteriology, food and nutrition, gardening, environmental topics and those dealing with the human body have been identified as "girl-relevant" content. Perhaps these will be of interest to your female students, but perhaps not. Give them the opportunity to investigate a topic of their choosing whenever possible.

- Encourage students to use their own different approaches to solve a problem.

Enhancing the Learning Environment

- Design your classroom to stress cooperation rather than competition.

- Encourage creativity by seeking and attempting a wide range of ideas, approaches, and solutions.

- Intervene in communications patterns among students which may shut out females. Note patterns of interruption and make a special effort to ensure that all students have the opportunity to finish what they want to say.

- Give male and female students a long and equal amount of time to respond after asking a question.

- Encourage pupils to express their own ideas and opinions.

- Have students work in same sex or equal mixed sex groups to solve problems.

- Monitor groups carefully to ensure that members are mutually supportive.

- Rotate leadership roles within the groups.

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NAAEE ANNUAL CONFERENCE

The North American Association for Environmental Education is having its 25th annual conference this year. The conference is titled *Environmental Education for the Next Generation: Professional Development and Teacher Training* and is being held in San Francisco Bay Area, California on November 1-5, 1996. Project Learning Tree will be exhibiting and participating in the conference. If you are planning to attend, please stop by our exhibit.

NAAEE encourages classroom teachers to attend this conference. If you are interested, or would like more information you may contact Janet Thoreen at NAAEE's Conference Registration Office, P.O. Box 400, Troy, OH 45373. Phone/Fax 513-676-2514.

Carl J. Wenning
Illinois State University
4560 Physics Department
Normal, IL 61790-4560
Phone: (309) 438-8756

COMET HALE-BOPP TO LIGHT UP 1996-97 SKIES

Two amateur astronomers, observing independently from New Mexico and Arizona, discovered an unusually bright comet during the summer of 1995 which astronomers now hope will rival and even possibly exceed the apparition of Comet Hyakutake that lit up the sky last spring. The newly discovered comet was discovered independently by Alan Hale and Thomas Bopp on the evening of July 23, 1995. Since these observers both discovered the comet independently and within a few minutes of one another, the comet now bears the names of both amateur astronomers.

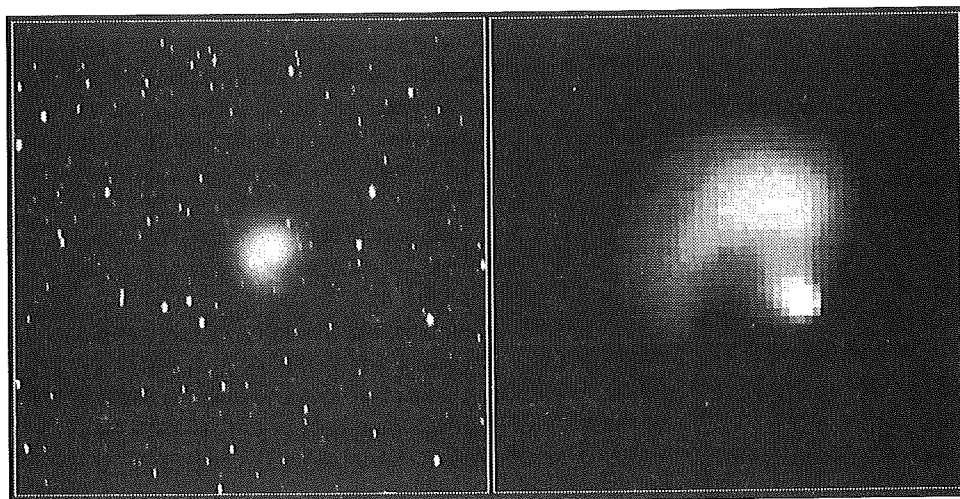
Discovered outside Jupiter's orbit, Comet Hale-Bopp was the most distant comet ever discovered by amateur astronomers. This is so because the comet appears 1000 times brighter than Comet Halley when viewed at the same distance from the Sun. Because of its relatively great brightness, astronomers at first thought that Comet Hale-Bopp was either a very large comet or was experiencing a bright outburst. Neither turns out to be the case. Detailed observations since discovery have shown that the comet is intrinsically bright for an object of its size.

As Comet Hale-Bopp approaches the Sun, it will brighten significantly when its surface ices melt and a glowing tail is swept outward away from the sun by the solar wind. Hopes are high that in March and April 1997 the new comet will rival or exceed the brightness of Comet Bennett of 1971, Comet West of 1976, and Comet Hyakutake of 1996. Readers are forewarned, however, that it is still possible for Comet Hale-Bopp to fizzle. Comet Kohoutek of 1974 and Comet Austin of 1990 did just that. As famed comet hunter David Levy is reported to have said, "Comets are much like cats; they have tails and do precisely as they wish." The orbiting iceberg known as Comet Hale-Bopp takes approximately 2,500 years to orbit the sun. Its orbit is a very long, stretched-out ellipse. It comes to us from a point in space between the inconspicuous southern constellations of Telescopium and Pavo. It began its fall toward the sun around the year 750 AD. At its most remote point in space it was approximately 370 times the earth-sun distance. This amounts to about 34 billion miles from the sun, and nearly 10 times the average orbital distance of Pluto. The comet will draw nearest the Sun on March 31, 1997, Central Standard Time. At that time it will pass about 85 million miles from the Sun. The comet will have approached nearest the earth some nine days earlier (March 22) at a distance of 122 million miles. Even though the comet crosses over earth's orbit, there is no chance that the comet could collide with planet Earth. Hale-Bopp orbits the sun in a plane that is inclined 89.4 degrees relative to earth's orbital plane. The comet will come up from the south, pass over the northern limb of the Sun, and then plunge down again on its way back into the depths of space. This means that

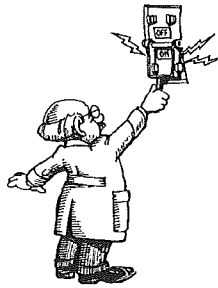
the comet can be observed for a greater period of time in the southern hemisphere than from the northern hemisphere. However, when the comet is expected to be at its brightest in March and April next year, the best views will be had from the northern hemisphere. It appears likely that the comet's nucleus will peak in brightness near magnitude -1. This means that the comet's icy nucleus will appear slightly fainter than Sirius, the brightest star in the nighttime sky. Compare this to Comet Hyakutake whose brightest magnitude was +1.5. In this scale of measurement, Hale-Bopp will be 10 times brighter than Hyakutake. Observing and recording the changing appearance of Comet Hale-Bopp could prove to be an interesting school-year project for budding scientists. The comet's day-to-day motion can be photographed or recorded on a series of star charts. Making estimates of the comet's nuclear magnitude also might be accomplished by comparing it with the magnitudes of known stars. Noting the orientation of the tail with respect to the sun can be instructive. If ever there was a good year for that special unit on astronomy, this is it.

What to Expect

September 1996: Skilled observers knowing where to look might detect the still faint comet (magnitude 5) with the unaided eye. Finding it should be easy using binoculars from a dark sky site if one knows where to look. Look for the comet among the stars of eastern Ophiuchus, just north of Scorpius. The comet will be located 1/3 way up in the



Comet Hale-Bopp showing unusual jet. 10/5/95, NASA Hubble Space Telescope, H. Weaver and P. Feldman.

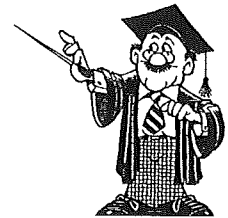
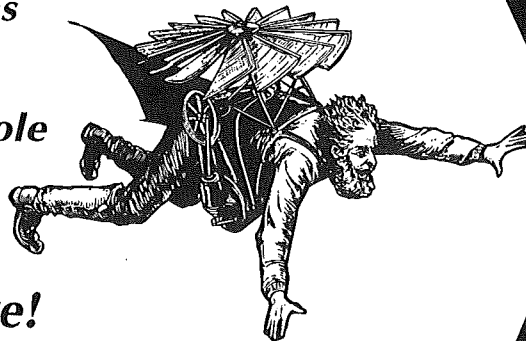


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southwest at the end of evening twilight (about an hour and a half) after sunset at mid month. October - November 1996: The comet, still among the stars of Ophiuchus, brightens slowly as it moves northward toward the Sun. It might be sighted by the general public at this time. The comet is expected to reach magnitude 3.5 to 4.0 by the end of the period and might be glimpsed without optical aid if averted vision is used. On November 1 the comet will appear 1/4 way up in the west-southwest at the end of evening twilight. By Thanksgiving Day the comet will have moved into the tail portion of the constellation Serpens.

December 1996 - January 1997: Beginning to move faster and faster each day, the comet rapidly brightens, reaching magnitude 0 to 1. The comet draws closer to the Sun and becomes a difficult object for the general public to locate. The comet appears near the Sun, and is very low in the sky. The comet sets in the west at the end of evening twilight and rises in the east at the beginning or morning twilight at the beginning of the year. Keen-eyed skywatchers might be able to observe the comet after sunset and before sunrise at this time because the comet lies north of the sun. Throughout this period the comet moves from Serpens into Aquila. February - early March 1997: The comet continues to move north of the sun, but remains rather low in the sky when it is visible. During the latter part of this period it becomes a brilliant object (0 magnitude or brighter), and should be easy to find in the pre-dawn sky. The tail, now more pronounced, should be observed extending upward and away from the sun.

On February 20 the comet will appear 1/4 way up in the east-northeast at the beginning of morning twilight. The comet lies within the Summer Triangle in February, and will pass between Cygnus and Pegasus in early March.

Late March - early April 1997: On March 21 the comet passes due north of the sun a second time. It will be an easy, naked-eye object in both the morning and evening skies. Look for the comet in the northeast before sunrise, and in the northwest after sunset. Comet Hale-Bopp should be at its best during this time interval. It is expected to be near its peak brightness (magnitude -1) at this time. It can be found among the stars of Andromeda, and just below Cassiopeia in the sky. The best dates for observing the comet should be March 26 - April 12. During this period the bright Moon will not interfere to any significant degree with observations. For observers in the mid-northern latitudes, the comet should be about one-quarter of the way up in the sky in the northeast at the beginning of morning twilight on April 5. By mid April the comet will have moved into Perseus.

Late April - May 1997: In late April, the Moon will interfere with observations as the comet moves into Taurus. The comet's nucleus will fade significantly during this time, but the tail should continue to develop. Its maximum length should occur during May or June. The comet moves rapidly towards the south and continues to fade. Northern hemisphere observers lose the comet during this period.

ATTENTION:
1997 Science Inservice Opportunity for Teachers in Grades 5-9

Earth Processes
Instructional Center
(EPIcenter):

A Summer Program for Middle Level Teachers

An opportunity for middle level (grades 5 - 9) teachers of Earth Sciences, EPIcenter (supported by the National Science Foundation) is being offered in 1996 at Purdue University, West Lafayette, Indiana. The program is designed to: 1) improve the background of Earth processes science content for teachers in grades 5-9; 2) assist teachers in applying Earth science content in their classrooms through training in use of Earth processes science teaching materials; 3) assist teachers in disseminating their understanding of Earth processes through local in-service, regional, and national presentations; 4) provide support for the participants to return to their schools in leadership roles via opportunities in grant writing and modeling skills.

The summer intensive portion of EPIcenter will take place July 6 - August 1, 1997, on the West Lafayette, Indiana main campus of Purdue University. Participants will consist of 30 teachers who teach science at one or more levels of grades 5 through 9. Follow-up to the summer program will include staff visits to participant classrooms, an 800 number for participant support, leadership conferences, and meetings at national and state science conferences. **Travel, subsistence, stipend provided by the grant program, and six semester hours of tuition-free graduate credit (3 credits- Summer '97, 3 credits-Spring '98) will be available.** Women, minority, and special needs teachers are especially encouraged to apply. Teachers will be chosen from Illinois, Indiana, Kentucky, Michigan, Ohio, and St. Louis metropolitan area.

For further information and application materials, please contact:

Dr. Gerald Krockover, Co-Director
EPIcenter Program for Teachers
Purdue University
1397 Civil Engineering Building
West Lafayette, IN 47907-1397
Telephone 800-213-5765
FAX (317) 496-1210
E-mail: Internet: hawk1@purdue.edu

Laura Somers
Zion-Benton Township High School
3901 West 21st Street
Zion, Illinois 60099

MERGING TWO WORLDS: A GLIMPSE INTO A SCIENCE PORTFOLIO

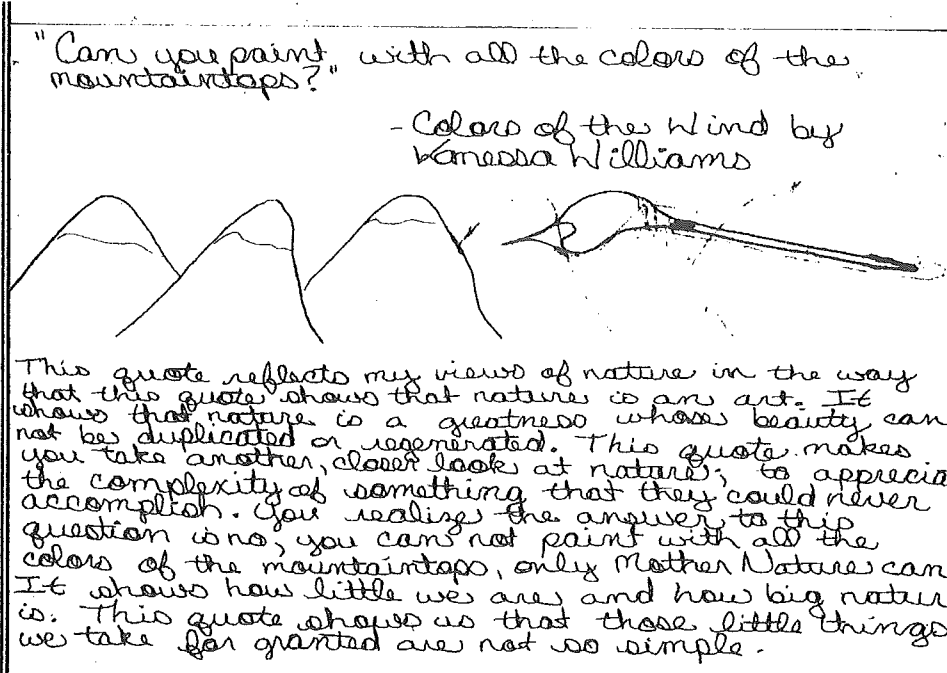
Think of your high school science class. Rote memorization, multiple choice exams, fill in the blank worksheets—and if you were lucky—a couple of dissections. Science classes of the past allowed little room for creative thought in the process people call the scientific method. I am glad to be teaching science in this decade because of the advances in scientific discovery have changed how we teach science. Science no longer depends on memorization. Instead, science teaches a thought process that requires working technical knowledge and creativity.

The problem now for science teachers is not how to help students memorize but rather, how to help students internalize scientific thought and then apply science to meaningful situations? In Fred Newmann's article, *Linking Restructuring to Student Achievement* he states, "...a 'restructured' vision of the goals of education seeks to evaluate performance activities that are worthwhile, significant, and meaningful: in short activities that are authentic." (1992) As a 12th Grade ecology and biology instructor, I am using a portfolio method to get a genuine portrait of student experiences. This portfolio incorporates the creative and technical aspects of science.

The Environmental Ecology class at Zion-Benton Township High School is a blended class that embraces all tracks of students. Teaching students with multiple skills, abilities, and backgrounds presents many teaching opportunities, but one particular concern is using a form of assessment that is challenging to students regardless of previous science experience. An assessment tool that stretches beyond traditional means that is fair and meaningful to students is a necessity, to help students to think like scientists.

Based on a logical quest for truth, the Environmental Ecology class at Zion-Benton is nontraditional. In addition to the text, students read the works of Henry David Thoreau, Rachel Carson, Norman Maclean, and Opal Whitely. This literature bridge provides a conceptual framework for new knowledge, and relieves the worksheet mentality that accompanies a textbook course. Exposing students to a personal approach to man's quest for truth offers a perspective that can awaken imagination, excite the mind to wander and personalize interpretation of science. In *Mind Matters, Teaching for Thinking* Dan Kirby and Carol Kuykendall state, "Examining the way naturalists think about the world may provide good models of thinkers who go beyond the world of vision to connect and integrate perceptions." (1991) With no programmed worksheet, teachers and their students must forge a bridge of thought and experiences on which to build a learning community, where science becomes a dynamic invitation into a student's search for identity. The students' portfolios are the assessment of how well the search went.

One creative expression in the portfolio is a scrapbook journal approach. In this science scrapbook, students compile images, thoughts, and quotations that reflect their personal views about a class topic, generally their perceptions of nature. In Figure 1, junior Skye Nance illustrates an example of one of her scrapbook pages. Skye uses a music lyric from Vanessa Williams to begin her inquiry into the meaning of nature, "Can you paint with all of the colors of the wind?" She illustrates her quote and reflects on meaning in a short paragraph. Her use of graphics is important, since it brings her mental picture to a solid medium. When reviewing Sky's work, it is easy to see what image those words triggered in her mind. In his speech *Images at the Core of Education*, as printed in *Educational Leadership*, Dr. Elliot Eisner states, "Images actualize the variety of the capacities of mind. Our human cognitive ability is extraordinarily diverse. Images are at the core of education because the imaginative exploration of the image makes possible worlds possible. Imagination traffics in image construction." (Oct. 1995) We store knowledge as image, therefore students who personalize their work using art, music lyrics or literature will retain the science concept longer because they have a concrete personal picture. Furthermore, allowing students to reflect on the backbones of teen culture not only raises personal interest in science but also increases the personal relevancy of content. Students need to feel their opinions and thoughts matter, instead of filling in the blank on a textbook worksheet. In order to begin to regain the natural curiosity that children have, but lose as they are programmed to always give the correct answer.



In the quotation example in Figure 1, Skye Nance uses a music lyric to begin her inquiry into science interpretation. The use of a simple sketch enhances her words and provides a visual gateway into her thoughts. Through the use of important icons in the teen culture such as art, music and literature students see the importance of science in their values and daily lives.

Expression of scientific concepts and facts through a free verse poetry is another avenue of the portfolio. Offering the students the opportunity to think and write freely about topics of interest reveals an emotional connection to content. In figure 2, Senior Jason Marsoobian demonstrates his affection for the Red-tail Hawk, an animal of particular importance to him because of his Native American heritage. In reflecting the Hawk's significance, Jason brings emotion to learning.

**Looking into the sky
A relative glides over us
One so wise, I wear his feathers
when I dance
Soon this will one day become a
dream
When it becomes far too late
He will perish from the summer skies
to nourish the earth and become one
on its journey to the spirit world up
above**

**Looking down below
A world is seen
A changing world
which is not understood
My brother the "wasichu"
Is destroying the Mother Earth
And the medicine wheel is broken...**

By Jason Marsoobian

Figure 2.

The connection between Jason and the Red-tail hawk is a strong one. He perceives this bird of prey as a wise relative to the human race. He is concerned about man's development of the bird's habitat, fearing that there will come a day when the Red-tail will face extinction. In the line, "A world is seen. A changing world," Jason is referring to man's manipulation of his world and crowding out those animals that were here first. In first reading this poem, one may think it portrays a gloomy picture about the future. Actually, it offers hope that knowledge can be proactive. If humans consider our actions now, then maybe the "medicine wheel" will not be broken.

Through the use of images, meaningful quotations, and creative expression each student is expressing personal interpretation. Pulling students away from the worksheet mentality is vital to instilling emotion and relevant thought in a science class. Using nontraditional sources such as music and

literature to accompany content, creates windows into student's hearts and minds.

Certainly, science would not be science without the "hands on" investigative laboratory work. Traditionally, the lab experience focuses on the thoughts of students applying the scientific method, which is accompanied by a formal lab report. Students provide an abstract, a predictive hypothesis, procedure, and a data section represented by both graphics and written results. Finally, the written analysis and error portion of the report, which unifies these areas of the scientific method. But, with creative and open ended instruction which I use, the labs are not a time of working through a predetermined outcome, but a process of discovery through questions and observations. In putting together labs of this nature, I often do not know the outcome myself. An example of this type of lab is the *Create an Ecosystem Lab*, in which students build and maintain a mini-ecosystem. Students design the habitat, choose an animal, and observe the animal for a ten day period. This lab concentrates on the first skill in the scientific method, critical observation, and discovering how the component parts of an ecosystem work together to maintain a balance.

The use of portfolios as a method of assessment can only be useful if there is a reflection process that requires all aspects of the portfolio to be woven into a cohesive whole. Presenting students with a problem or a situation that requires combining their creative and technical work is essential to connecting the smaller aspects of science into the larger picture of making meaning. In *Mind Matters Teaching for Thinking*, Kirby and Kuykendall state, "...we should hoist the flag for school activities that ask students to work toward larger meaning, by collecting smaller, more particular ones." (1991) An essential aspect of the scientific method is unifying observation, procedure, data, and analysis in a problem solving process. In blending the creative and technical aspects of the portfolio, students are extending the use of the scientific method to internalize content in a useful setting. For example, I posed the question: What would happen to the Zion community if the Wetland Demonstration Project was destroyed by the extension of Yorkhouse Road? The students needed to address the question on a number of levels and create a comprehensive project to cover ecosystems, water quality, the government/science connection, and quotes concerning the value of land. The result reflects the nine week content of the class.

The portfolio projects are not always teacher directed. I rely on student empowerment by giving them choices in their projects. Since Environmental Ecology is an elective class, projects of choice are important. I do not want students walking away from the class without exploring their own interests. Not only do students have a choice in their topics, but also how they organize their research. I encourage the use of nontraditional sources such as children's literature, music lyrics, and the internet as segues into their topics. Exploring these "offbeat" angles during their research students revisit prior experiences and build upon them by

reforming their own perceptions, reaching new conclusions by refining questions.

In figure 3, Amy Hughes in her study of Wolves used a number of nontraditional resources to highlight the major points of her inquiry. She begins with a look at the stereotypes of the Wolves as covered in *Little Red Riding Hood*. She uses this as a question on which to base the rest of her investigation of the habits and man made problems of the wolf.

As her paper continues, Amy visits the *True Story of the Three Little Pigs*. She compares the stereotypes of fairy tales and new information discovered during her research. *The True Story of the Three Little Pigs* by Jon Scieszka is told from the wolf's perspective, in the end the reader finds out he was framed by the media. Amy uses the quote, "I don't know how this big bad wolf thing got started, but it's all wrong." Amy then goes on to reflect that the wolf is merely acting on instinct, and through the fairy tales of childhood this animal has indeed earned an unfair bad reputation.

Wolves are not bad creatures. This quote alludes to the fact that wolves are not always trying to kill people and terrorize little piggies. They simply kill pigs for the same reason WE terrorize little piggies: BACON!!!

Then Amy uses a quotation from the musical, *Into the Woods*, by Stephen Sondheim to dispel the common myths of wolves, to strengthen her point that misconceptions are often communicated through literature. And only after investigating the plight of the animal in depth can the myths of childhood be dispelled:

"And you're back again,

Only different than before..."

-Giants in the Sky, *Into the Woods*.

Amy writes, "After having researched them, I look at wolves differently. I mean, I used to think that wolves were bad, too, because of the fairy tales, and things of that nature. But now I see that the wolves are merely acting on instinct, and that's all they know. Wolves are not out to kill people, like the werewolf stories say they are."

Using these materials personalizes Amy's approach to her written work, and offers a unique twist to a research project. As teacher Tom Romano states in his article, *The Multigenre Research Paper: Melding Fact, Interpretation, and Imagination*, "...when intellect, emotion, and imagination merge, when writers, painters, sculptors, dancers, composers, physicists, ecologists take that which is outside them and bring it inside, intimately; and when they give it back then, with form and imagination and meaning. Their own personal meaning stamped upon it." (1990) The

The Trouble With Wolves



finished product of a multiple genre research approach, results in a reflection of student personality that is informative as well as creative. Amy Hughes' work supports Romano's ideas about personalizing the expression process. When we allow students to bring their interests, hobbies, and values into the portfolios learning science becomes dynamic and exciting for both teachers and students.

In conclusion, fusing creativity and technical systems of thinking brings students into a holistic approach to science education. Creativity and authentic lab work replaces drill and practice. The dynamic world of science would not exist without the technical aspects of the scientific method. So what's the key to attracting students to science? Pulling students away from worksheets, building on prior knowledge through literature, music and drama, presenting situations that require creation and production of knowledge combined with genuine opportunities for expression. Merging creativity and technical knowledge is vital in presenting students with a unified approach to problem solving and applying knowledge that stretches beyond filling in the correct answer on a scantron sheet. The use of portfolios as an assessment tool revolves around the reflective process that combines logical scientific thought, and creativity.

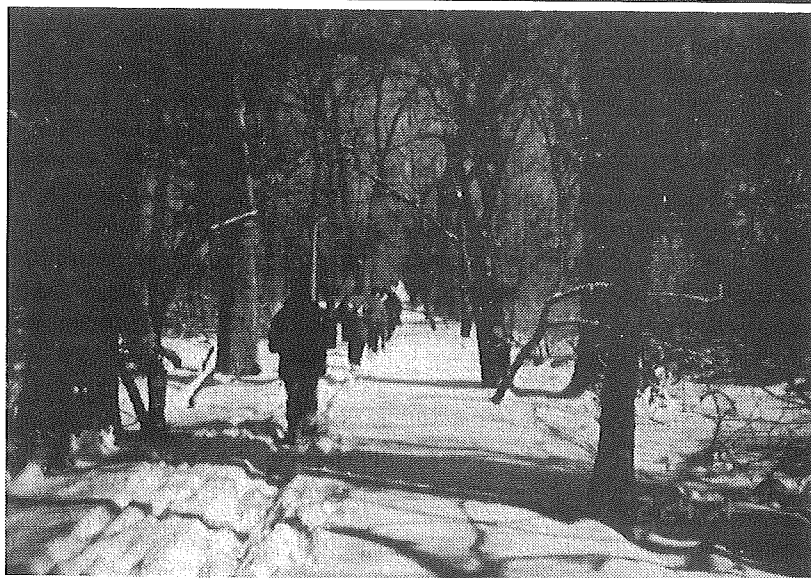
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Linda M. Tilton
Cheryl Breckinridge
Woodlands Academy of the Sacred Heart
760 East Westleigh Road
Lake Forest, IL 60045

RETURN TO THE PRAIRIE

The cry to "Save the Rainforest" has sparked great public interest. We see children's videos, t-shirts, conservation movements, even international conventions, news coverage and international conservation agendas focusing on the topic. But we forget the "rainforest" in our own back yards, our native habitats. In order to make our high school students more aware of their own native rainforest, our Illinois prairie, we have incorporated a laboratory study which includes visits to a local prairie restoration site (Lake Forest Open Lands) near our school. We cannot begin to teach our students the value of and respect for the Earth until we get them out and allow them to experience first hand their own inheritance, our local prairie and oak savannas.



The movement in many biology courses is toward new discoveries in biotechnology. Unfortunately, there is a tendency to forget the natural history or outdoor dimension of Biology that originally attracted many of us to the field. In our haste to move toward the next century and address the technologies unfolding, we are leaving behind what may be the best part of Biology, the study of Nature, our wild lands. By reintroducing these subjects into our curriculum, we can plant the seeds of care, concern, and responsibility for the preservation of the Earth, beginning with the "rainforest in our own backyards."

In order to accomplish our goal, the laboratory unit must be woven into the Biology curriculum. We accomplish this by taking advantage of a local Nature Conservancy site five minutes from our school and dedicating four laboratory periods during the year to field studies. We visit the local prairie site in each season, affording students the opportunity to observe the same site over the period of a year while concurrently working with a field biologist and naturalist actively involved in restoring and managing the prairie site.

The focus of each prairie visit is adapted to the season. As soon as school begins, in late summer, our students are introduced to the land. The prairie as our biological and historical heritage, the physical sites and sounds, fauna and flora of summer and land management concepts are addressed. Students are encouraged to record their impressions in lab journals along with descriptions of native fauna and flora. We address the dilemma early settlers faced in cutting through the deep roots, clearing the land and planting crops in the rich dry soil. Also we observe soil horizons and consider adaptations of plants to the blistering dry summers, freezing winters and analyze the effects of fire.

In late October we return again to explore the prairie after a frost or two. The autumn lab period includes observation of the changes that have occurred since the late summer visit. We discuss the value of not only setting land aside for preservation but the need for managing. Invasions of native lands by foreign species is introduced. Restored sites and restorations in progress are visited and comparisons are made. Rare and once common seeds are identified, collected, sorted and some are planted. When possible, the students are present for the "burn" or observe the after effects of fire. Prairie fires provide special intrigue to our high school age students.

We return to the prairie site once again in winter, usually in late February. Many students have never enjoyed the pleasure of a brisk walk outdoors at this time of year and their lab period is often the one students remember most vividly. The prairie has changed drastically since the autumn tour. Illinois

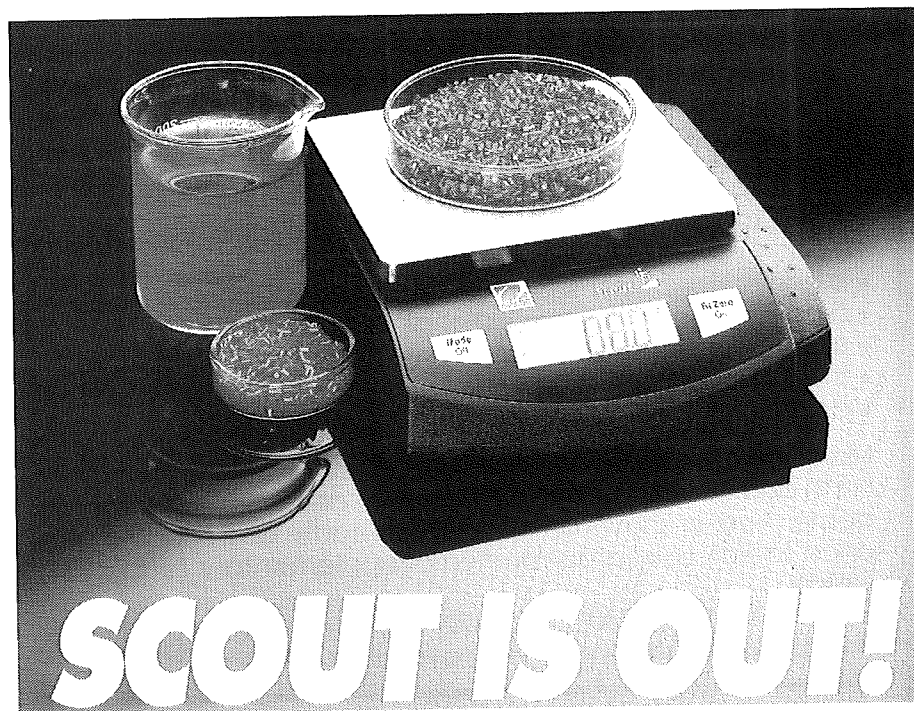
winters unfailingly provide us with cold crisp sunny days or sometimes the excitement of a snowy day. Our naturalist shares the lesson of animal adaptations and survival in the severe weather. Students are encouraged to imagine life of earlier times. We examine evidence of the prairie plant life and move into either the Savanna or wooded location for hands-on restoration work of Open Lands. We focus on the invasion of alien species like buckthorn or honeysuckle and their adverse effects of the landscape. Students become involved in the removal of these aliens using the tools of the trade, saws, and pruning shears. We will return to this site in the spring to note any changes.

We make our final visit on a spring day in April. At this time of year many changes have begun to occur on the prairie. The incredible emergence of wildflowers and grasses is well underway and our students are dazzled by the sights, sounds, and fragrances of the prairie. (Wild onions for which Chicago was named are -particular stars of the spring show!) We emphasize the new life, rebirth, and also take this opportunity to check on the seeds planted in the fall, identify some of the common wildflowers and share the folklore associated with native plants for medicines and cooking. Students are challenged to use dichotomous keys on the local flora.


We require the kids to "reflect" on the prairie through the seasons for their final laboratory assignment of the school year. Many choose to address the physical changes of the prairie, others focus on the natural changes of the ecosystem, or some wax poetically in their reflection. A sense of concern for the future appears in most of the essays. All seem to appreciate the cooperation of the dedicated naturalists provided by the Open Lands in professionals like Julia Plumb and Roger Tucker.

As teachers our goals continue to grow and develop. Originally we hoped to acquaint students with the habitat that once dominated Illinois and to include fieldwork as part of the introductory biology experience.

We want our students to work with a naturalist and actively take part in restoring the prairie habitat while discovering local community conservation activities as an example of hometown environmental action. Finally, we wanted to expose students firsthand to the major concepts of ecology, plant physiology, wildlife conservation, environmental impact issues and seasonal cycles. It is difficult to determine who benefits the most from these labs, the students or the teachers returning to the science we first loved.



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To be added to the mailing list, please send your name and address to Norman Bettis, Illinois Geographic Alliance Committee, Dept. of Curriculum and Instruction, Campus Box 5330, Illinois State University, Normal, IL 61790-5330. Attn: Chris Wissmiller 309/438-2756
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Submissions and suggestions are welcome and should be addressed to the editor — Robert Ashley, Red Bud High School, 815 Locust, Red Bud, IL 62278 618/282-3826 FAX 618/282-6828.

IGA CALENDAR

ICSS Annual Meeting, Springfield
Oct. 3-4, 1996

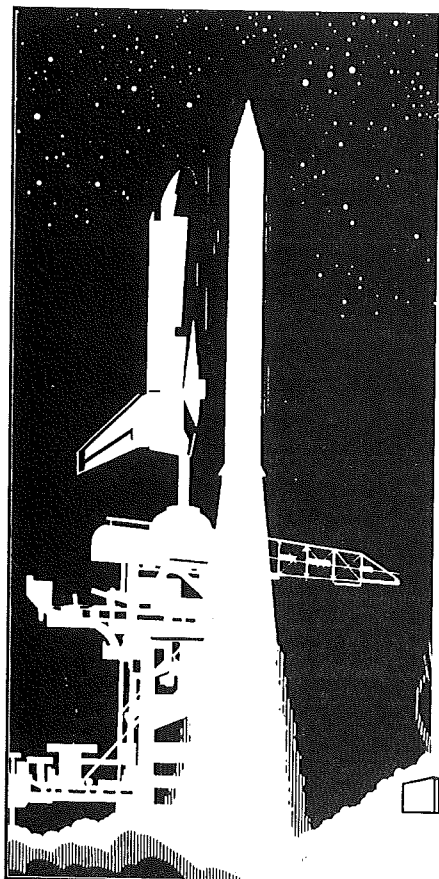
IGA Fall Conference, Wildlife Prairie Park
Oct. 19, 1996

Geography Bee registration deadline
Oct. 15, 1996

NCGE Annual Meeting, Santa Barbara
Nov. 13-16, 1996

Geography Awareness Week
Nov. 17-23, 1996

NCSS Conference, Washington, DC
Nov. 22-25, 1996



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ENGINEERS HOST STUDENT DESIGN COMPETITION

In conjunction with **NATIONAL ENGINEERS WEEK, (NEW)**, Chicago engineering societies are hosting a student design competition in area schools. The contest, known as the "Future City Design Competition™", will require middle grade students with the assistance of an engineer mentor to design a future city with the aid of the award winning computer game, SimCity Classic™ and "FUTURE USA" graphics package.

This year's event will be co-sponsored by Fluor-Daniel and the American Society of Civil Engineers-Illinois Section. Additional support is provided by the Structural Engineers Association of Illinois. Funding has been generously provided by Fluor-Daniel, HNTM, and Commonwealth Edison. (Additional funding and volunteer time is needed again this year. Contact Chris Rops at 312-930-9119 if you can help.)

This program has been developed by engineers to provide much needed technological education to the students. Communications director Bob Johnson states, "Few if any schools are providing education in applied science (read engineering). This program is an opportunity to understand the creative as well as the practical side of science and math." the design competition is open to all Chicago area 7th and 8th grade students. Program registration is due by September 30, 1996 and requires a \$15 entry fee. Registration is limited to the first fifty schools so early registration is strongly encouraged. For more information on the competition, call the **NEW** hotline at 703-684-2852 or Carol Rieg at (301)977-6582. Locally, the competition will take place January 1997 at the University of Illinois at Chicago. winners of the local competition will advance to the final judging in Washington, DC., during **NATIONAL ENGINEERS WEEK**, February 16-22, 1997. the winning teams will receive grants and prizes for their school and team members.

(Additional) The top five finalists from last year's competition received a computer system courtesy of Fluor-Daniel. Last year's winning team, Pleasantdale Middle School, Burr Ridge, received a trip to Washington, DC to compete in the national finals. All teams from 1996 regional judging received gifts courtesy of the **ENGINEERS WEEK** — Chicago luncheon, February 1996. The team members from MYA Middle School of Ann Arbor, Michigan captured the national title in the 1996 competition and won a trip to U.S. Space Camp, Huntsville, Alabama.



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Since 1951, **NATIONAL ENGINEERS WEEK**, has been the nationwide celebration of the engineering profession, to acknowledge the essential role which engineering has played in advancing civilization and adding quality to our lives. In Chicago, activities scheduled include engineering lectures, student outreach efforts, bridge building competitions, job fair and exhibitions of engineering achievements. Sponsoring engineering societies for "**Engineers Week; Illinois '97**" include: Illinois Engineering Council (IEC), Illinois Society of Professional Engineers-Chicago Chapter (ISPE-ChiChap), Structural Engineers Association of Illinois (SEAOI), Institute of Electrical and Electronics Engineers Inc. (IEEE), American Society of Civil Engineers (ASCE), Illinois Section, American Institute of Chemical Engineers (AIChE), Society of Military Engineers (SAME), Polish-American Engineers Association (PAEA), Women's Transportation Seminar, Greater Chicago Area Chapter (WRS), American Society of Mechanical Engineers (ASME), American Industrial Hygiene Association - Chicago Section (AIHA), Worldwide Youth in Science and Engineering (WYSE), Institute of Transportation Engineers (IRTE), Western Society of Engineers (WSW), Illinois Chapter of the American Concrete Institute (ACI-IL), Chicago Committee on High Rise Buildings (CCHRD), Society of Fire Protection Engineers, Chicago Chapter (SFPE), American Society of Heating, Refrigerating & Air-Conditioning Engineers (ASHRAE), American Public Works Association (APWA), American Nuclear Society (ANS), Association of Engineering Geologists - North Central Division (AEG) and Illinois Society of Professional Engineers (ISPE).

E-WEEK - Chicago is endorsed by the National Society of Black Engineers (NSBE) and the National Student Technical Association (NSTA).

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Teacher Training Specialist
Illinois State University
4560 Physics Department
Normal, IL 61790-4560
Phone: (309) 438-8756

TOTAL LUNAR ECLIPSE OF HARVEST FULL MOON

A total eclipse of the Harvest Moon will be visible from Illinois on Thursday evening, September 26, if the weather cooperates. This second total lunar eclipse for 1996 is more favorable for western hemisphere observers than a similar event visible locally this past April 3. Of particular note is the proximity of the planet Saturn, only 3 degrees south of the Moon during totality.

The Moon will begin moving into the dark shadow of the Earth at 8:12 PM. Seventy minutes of totality will begin 9:19 PM. After totality ends at 10:29 PM, the partial phase resumes and continues until 11:36 PM.

At mid-eclipse (9:54 PM) the Moon's southern limb will pass just 4 arc-minutes north of the Earth's umbral shadow, while the northern limb lies within 8 arc-minutes of the shadow's edge. A large variation in shadow color and brightness can be expected at this time. The upper left quadrant of the Moon's disk should

appear brighter since this portion of the Moon will not be immersed as deeply in the Earth's shadow as the lower right quadrant. The Moon's disk may appear a discernible reddish brown to dull black in the lower right quadrant, and a brighter orange-gray in the upper left quadrant. This difference in coloration is due to red, orange, and a bit of yellow sunlight being refracted into different parts of Earth's dark shadow by its atmosphere.

In order to observe this lunar eclipse, skywatchers should observe from a site that has an unobstructed eastern horizon. The horizon generally should be free of trees, buildings, hills, and other obstructions. Watch as the Moon rises in the east at about 6:36 PM. Pay particular attention to the Moon illusion, a situation in which the Moon appears much larger upon rising than is usual. Observing this phenomenon and the total lunar eclipse with the unaided eye is quite rewarding, but telescopes and binoculars will enhance the viewing experience.

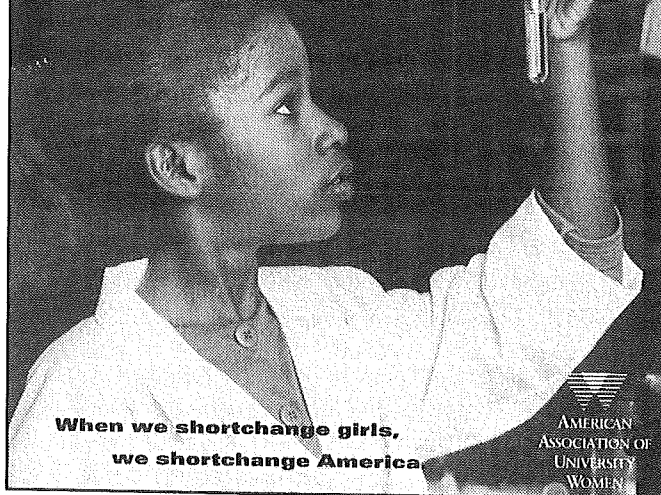


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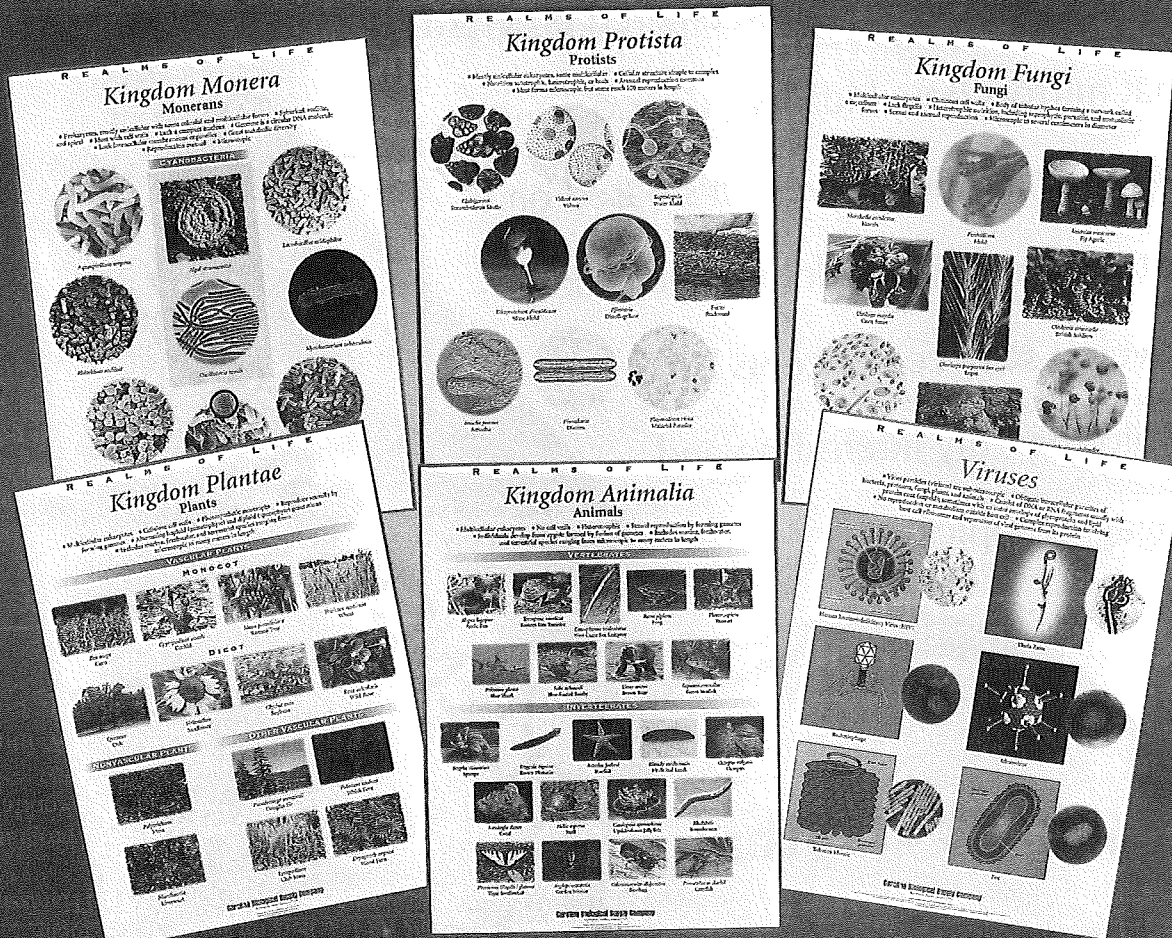
Charlotte Crawford

Managing Editor, "What's Working for Girls in Illinois"
Director, AAUW Illinois, Inc. Speakers Bureau

The American Association of University Women (AAUW), is the nation's leading advocate for education and equity for women and girls. AAUW Illinois, Inc. offers a variety of resources to promote equity:

- * "What's Working for Girls in Illinois," a newsletter outlining programs that work for girls in Illinois. Annual subscription \$10.00.
- * Teacher Fellowships for public school teachers through our Educational Foundation's Eleanor Roosevelt Fund. In 1995-96 total Foundation awards exceeded \$2.5 million to 269 women.
- * Speakers Bureau workshops designed to help adults and students understand the detrimental effects of gender bias and ways to promote bias-free behavior.
- * In-service workshops for teachers on sexual harassment.
- * Teacher training in use of "Expect Respect: A Sexual Harassment Curriculum for Youth."
- * Publications from AAUW's national 10-year research program on school climate including "Girls in the Middle: Working to Succeed in School."

For information on services or membership in AAUW Illinois: write PO Box 9522, Downers Grove, IL 60515, e-mail equity@juno.com or phone 800/451-AAUW.



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MINI IDEAS

Karen Mesmer, Baraboo, WI
Reprinted from THE MASTHEAD

LEARN FROM THE TABLOIDS

Students often ask if there are really UFO's, whether a grasshopper can grow as big as a person, and whether there really was a werewolf seen in downtown Milwaukee. Their ideas come from the ever present tabloids, so ubiquitous at super market checkout counters. Middle level students often feel that if they read it in print, then it must be true. This activity offers a way for students to distinguish between science which demands empirical evidence and pseudoscience which does not use empirical evidence to justify its claims. They also learn that a lack of peer review is a distinguishing mark of pseudoscience.

Have students read different articles from tabloids. Examples include articles on flying saucers, Big Foot, the Loch Ness monster, astrology claims, "Gorilla gives birth to Human Child", and psychic phenomena. Have them evaluate the article from a skeptical point of view. They may include the answers to the following questions:

1. What does the article claim?
2. What evidence does it give?
3. What source does it cite?
4. Could this be real science? Why or why not?
5. What would you do to investigate the claims in this article?

Bring in copies of "Skeptical Inquirer" magazine (P.O. Box 703, Amherst, NY 14226-9973) and give summaries of the scientific investigations into paranormal and pseudoscience claims. The 1994 season of the PBS television show, NOVA, had a program by James "The Amazing" Randi, a magician and a scientific researcher of pseudoscience claims. This show points out how science demands natural and not supernatural explanations, which is a very important concept for everyone to understand.

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TRAGEDY IN THE COMMONS: AN ENVIRONMENTAL ACTIVITY

"Tragedy in the commons" has proven to be an all time favorite. Its active, hands-on nature is appealing to kids. I like the activity because it provides an opportunity for exercising higher order thinking skills (making evaluations, creating solutions....), integrating several different subjects (math, science, social studies, solutions....) and doing me in-depth research of the topic. I've done the activity with third-fifth graders, and they have all begged to do it again.

Overview

People share responsibility for common resources that belong equally to all individuals in the global community. These "global commons," such as the oceans, the atmosphere, and outer space, extend beyond national boundaries. International cooperation can result in the sustained development of the global commons and management in the common interest. In this activity, the students will harvest fish from an outdoor "commons." The students will make decisions that may exploit the resource and result in extinction of the fish. The students will analyze their fishing experience and recognize the dynamics and decisions that drive the tragedy. This activity is appropriate for grades 6 - 8 and is divided into three 40-minute lessons.

GONE FISHING

Materials

- 600 paper clips
- poster board or a large sheet of paper

Advance Preparation

1. Find an area 50 meters square, a mowed lawn works best, but blacktop, a gymnasium, or a large classroom will also work.
2. Randomly scatter the paper clips (fish) throughout the area. Don't worry if some parts of the area have more fish than others.
3. Make a chart on poster board for recording the results (see figure above).

Figure 1

	Round 1	Round 2	Round 3	Round 4	Round 5
Country 1	# of fish harvested \$ Profit				
Country 2					
Country 3					
Country 4					

Teaching Steps

1. Divide the class into four groups and allow each group to choose a name for the country it represents. Tell the students that they will be fishing in common waters and the livelihood of their country depends on fishing.
2. Put each group in one corner of the playing area, which represents the common waters. Each group is allowed to send one 'boat' (person) in the first "year" (one minute) to harvest "fish" (paper clips). Each group needs to harvest 10 fish per year to feed the people in its country. Each additional fish can be sold for a profit and its worth \$2.00.
3. Begin the first round by letting each country send one boat into the playing area to collect fish. At the end of one minute, yell "stop." Ask the boats to return to their home port and count their fish. The students should put their fish in groups of 10. Ask each group to tell you how many fish they caught. Record this number on the chart.
4. Instruct the student to subtract the first 10 their country needs to feed its population from the total number of fish they collected. If a country catches fewer than 10 fish, the country is in distress and one student in the group must sit out the remaining rounds to represent a declining population and smaller work force. If a country catches more than 10 fish, the extra fish are each worth \$2.00 towards the purchase of additional boats. The countries may purchase additional boats for \$10.00 each. Once a group purchases the boats it needs, the remaining fish become the country's profit. Record each country's profit on the chart.
5. Ask the students to use the chart to calculate the number of fish remaining in the water from the original 600. Tell the students that these fish can reproduce and their reproduction rate is one-half of the remaining fish. Return the correct number of paper clips to the playing area, collecting the number you need from the groups' piles. (For example, if more than 400 fish remain, return all the paper clips to the playing area. If 300 fish remain, return 150 fish to the playing area, making a total of 450 fish available for harvest in the second round.) Collect and set aside any extra paper clips.
6. Begin the second round of fishing, allowing the new boats to leave each group with the original boat. After one minute, ask each group to count its fish, feed its country, buy additional boats (up to the number of people in the group), and record its profit. Calculate the number of fish to return to the water, as in step 5, throw the correct number of paper clips into the playing area.

7. Continue to fish in one-minute rounds. When the students have depleted (or nearly depleted) the fish population, the simulation is over. Gather the students and ask the following questions as you discuss the results of the students fishing expeditions.

- Which country was most profitable in its fishing excursions?
- What happened to the number of paper clips the students collected as fishing continued?
- If the goal was not to make money, but to sustain themselves on Earth for the longest time, did anyone win?
- What could the students have done to sustain the fish population?

Common Problems

In 1968, Garrett Hardin wrote a paper titled "Tragedy of the Commons." In this classic work, Hardin described the way common areas fall victim to tragedy; individuals who share the commons try to increase their "take" from the commons. The individuals are compelled to continue such action because the positive consequence for the individual (profit) far exceeds the negative consequences for the individual (degradation of the commons). The rational conclusion drawn by each individual sharing the commons is therefore the same, to increase profit without limit in a world that is limited.

1. Ask the students how the fishing activity is a "tragedy of the commons." What was the commons in the activity? What is the tragedy? Help the students understand that the "fishing" area represented an environment common to all countries. Each group wanted to harvest as many fish as possible from the commons. Tragically, as time passed the fish became scarcer, and the commons supported fewer healthy countries. Eventually the fish in the commons were near extinction, and the fishing countries were forced to look elsewhere for fish. Help the students graph the number of fish their team caught each minute plotted against the time to illustrate the law of diminishing returns. Remind the students that, as time passes, the fishing boats would have to go further and fish for a longer time for smaller yield.

2. Introduce the students to the concept of carrying capacity. Tell the students that the carrying capacity of a commons is the greatest number of individuals of a given species that the environment can support with its available resources. Discuss the carrying capacity of the common waters with respect to fishing countries.

3. Help the students to understand the dynamics and decisions that result in the tragedy of the commons. In the fishing activity, the countries might have cooperated to draw up restrictions on fishing in the common waters. Restrictions that benefit a resource, however, may not be in the economic or political interest of an individual or a government in the short term. It is often in a group's short term interest to exploit the resource, even though it may destroy a future livelihood.

Option for Action

1. Ask the students to identify the commons in their lives. Suggest that they consider their house, school, ballpark, national parks, and other public places. What decisions do they make that affect the commons? For example, if they choose to leave picnic litter in a neighborhood park, how does that affect the environment of that commons and the people who share it.

2. Instruct the students to write to an elected official about a commons in their school neighborhood, town or the world. Ask them to describe it, identify decisions that affect it, and consider the potential of tragedy for the commons. How might the tragedy be avoided? Students might suggest education, taxes, or rules and restrictions to protect the commons. Encourage the students to ask for decisions that have positive rather than negative consequences for the commons.

Going Further

1. Repeat the fishing simulation, but create a new purpose, sustaining the largest number of countries for the longest period of time. Ask the students to consider ways to cooperate. Let the students divide up the commons, pass restraining laws, or limit profits.
2. Encourage the students to read about some global commons. How are the countries of the world cooperating? What resources must all people share?

Background for the Teacher

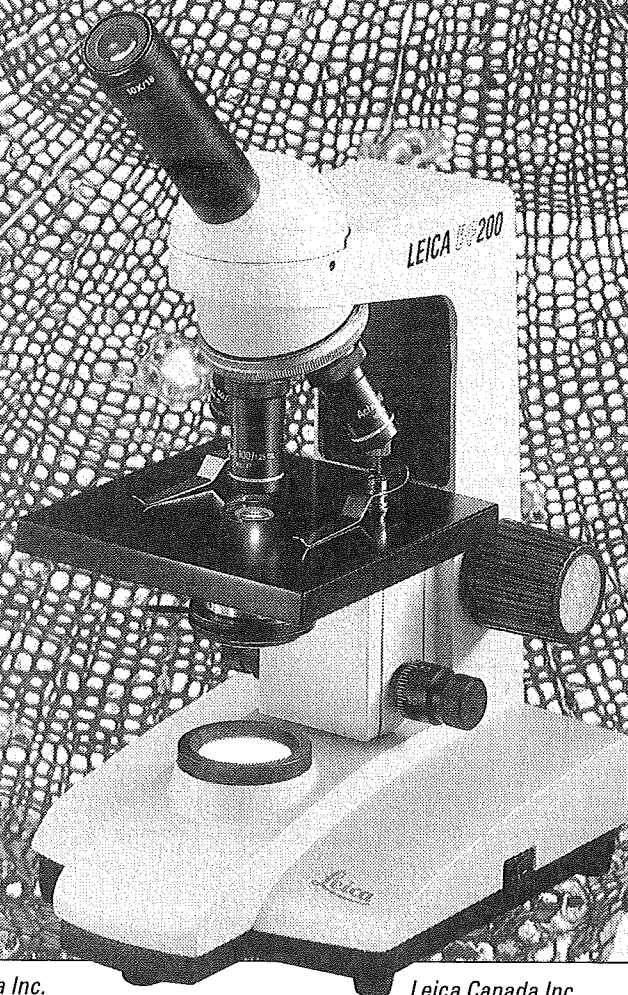
The carrying capacity of the Earth's resources is limited. Demands on finite resources by the Earth's population threaten to destroy the integrity of many ecosystems. "Global commons" are at great risk of excessive exploitation, particularly if people assert their claims to the resources in a free-for-all. Problems in the commons already exist: ozone levels in the atmosphere are too high, and the oceans are polluted.

The global commons can be secured with agreed-upon, equitable, and enforceable rules governing the rights, duties, and obligations of nations. Management of the various commons is evolving. A binding treaty has protected Antarctica for more than 25 years. The international community has suggested a regime for the management of the oceans with the law of the Sea Convention. Space, as part of the common heritage of all people, is protected from national appropriation by the 1967 Outer Space Treaty. International cooperation and agreed-upon regimes for surveillance, development, and management of the commons will encourage the sustained development of shared resources.

Why are these mutually agreed upon restrictions necessary? When the population of the earth was low, actions on the part of individuals were easily absorbed by natural cycles. As the density of the population increased, the natural cycling processes became overloaded, and the same actions by more people began to result in pollution, extinction, erosion, and desertification. Today, there are few commons that can remain free without inviting ruin brought on by a population with its own best interests in mind.

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AWARDS AND RECOGNITION



EIU PROFESSOR SHARES LOVE FOR THE ENVIRONMENT WITH OTHERS

Growing up in an inner-city neighborhood near the Pittsburgh steel mills, Marilyn Lisowski was unaware of the natural environment around her. "There were virtually no trees or open spaces in our neighborhood of row houses. There was some semblance of grass at a nearby cemetery, but that was about it," Lisowski recalled. Lisowski admits she knew nothing about science and nature until high school when an enthusiastic science teacher took her under her wing and taught her about the importance of understanding and protecting the environment. This was the turning point in Lisowski's life, which led her to devote her professional career to educating public school teachers and children, in particular, about the environment.

"Environmental education has great potential in helping not only the quality of the environment and our earth, but of providing more meaning for every child's life because they feel they are contributing to and participating in the betterment of the planet," Lisowski said.

"I have seen what a difference having an appreciation for our natural resources can have on people's lives," said Lisowski, who has taught nature camps to diverse populations. Such activities as cleaning up the shoreline or refurbishing nature trails have had a positive effect on the behavior of juvenile delinquents, she noted.

Lisowski's efforts to educate others about the environment have earned her recognition as the 1996 Illinois Environmental Educator of the year by The Environmental Education Association of Illinois (EEAI). EEA is composed of concerned citizens who are interested in educating people of all ages about the environment.

The Eastern Illinois University professor of elementary and junior high school education received EEA's coveted Malcom E. Swan Award for Outstanding Service in the field of environmental education. The award, presented at EEA's annual spring conference, recognizes the efforts of individuals who have had a large-scale impact in the field.

John Beaver, professor of science education at the Science Education Center at Western Illinois University in Macomb, said Lisowski was selected as EEA's outstanding environmental educator in Illinois for her impact on environmental education throughout the state, her creation of programs, efforts to promote environmental education in Illinois and ability to acquire grants to fund past and current environmental education initiatives earned her the state honor. Lisowski serves as chairperson of EEA's strategic plan "Environmental Literacy for Illinois" and as the Illinois coordinator/director of water education. She also is grant director for several environmental education programs for K-12 students.

A former principal and elementary and high school science teacher, Lisowski has been at Eastern since 1987. She has received several Faculty Excellence Awards for Research and has been awarded grants, totaling more than

\$500,000, for a variety of research and environmental education projects that have reached thousands of elementary and secondary teachers and school children across Illinois.

She has led Project CO-TEAMS (Connections and Outreach for Thematic Experiences and Activities for Meaningful Science), a professional development program for kindergarten through ninth grade teachers in Illinois, and "Schoolyard Science," a site-based, hands-on environmental education project involving 60 Illinois elementary schools. "Through efforts such as Project CO-TEAMS, teachers, administrators and parents can become better informed about science programs in their school districts and can make more enlightened learning choices for today's students. Teachers, especially, are in a position to develop a sense of value and commitment to the environment and to leave students with more than just the facts," Lisowski said.

In June, Lisowski teamed-up with Michael Jeffords, lead scientist at the National History Survey in Springfield, to train 26 high school teachers from central Illinois how to better utilize field-based activities to teach students how science works.

Lisowski has developed and conducted ecological travel programs to Central and South America and Europe and has co-authored several books, including a junior high life science textbook and field and activity books on various aspects of the environment.

She has been honored with several Phi Delta Kappa Research Awards and was named Ohio's Outstanding Science Teacher of the Year, Florida's Honor Science Teacher of the Year and Carlow College's Outstanding Alumni Science Award recipient.

Lisowski earned a bachelor's degree in biology from Carlow College in Pittsburgh, Pa., and a master's and doctorate in science/environmental education from The Ohio State University.

**NABT (National Association of Biology Teachers)
OBTA (Outstanding Biology Teacher Award)
1995/96**

**MRS. MARILYN HAVLIK
Kenwood Academy
5015 S. Blackstone
Chicago, IL 60615**

The National Association of Biology Teachers, in conjunction with Prentice Hall and Leica, Inc. is pleased to present Mrs. Marilyn Havlik with the 1995/96 Outstanding Biology Teacher Award. This honor, given annually since 1961, identifies a teacher from each of the United States, its possessions, Puerto Rico, the District of Columbia, and Canada who has made valuable contributions to the profession and to his/her students. Criteria for the award include teaching ability, experience, inventiveness, initiative, inherent teaching strengths, and cooperativeness in the school and community.

Mrs. Havlik is a Biology/Life Science teacher at Kenwood Academy in Chicago. She received her degrees from Chicago Teachers College - South (B.S. Education, Biology) and Chicago State University (M.S. Biology). Marilyn's teaching career spans approximately 27 years, starting at Kenwood Academy in 1969, and including the position of Department Chairman from 1985 to 1989. Marilyn has had a wide range of experience relating to her career.

A special presentation will be given by the national Association of Biology Teachers at its national Convention in Charlotte, N.C. in October. In addition to certificates awarded to both Marilyn and her school, she will be presented with a precision pair of binoculars by Prentice Hall and also a microscope from Leica, Inc. Arrangements will also be made with Kenwood Academy to present the certificate in the Fall.

The National Association of Biology Teachers and the Illinois Association of Biology Teachers are extremely proud of Mrs. Havlik's accomplishments. Such accomplishments and awards should make not only Marilyn's school district, but the entire state proud. She is a priceless member of the education community.

If you would like further information, please contact Kenwood Academy, 5015 S. Blackstone, Chicago, IL 60615 (312-535-1407), myself, or Mrs. Marilyn Havlik at school before June 6 or at her home, 3514 Hollywood, Brookfield, IL 60513 (708-485-7538). If you would like applications for the 1996/97 OBTA Award from Illinois after January 1, 1997, contact:

Mrs. JoAnne Edwards
OBTA Illinois State Chair
Wheeling High School
900 S. Elmhurst Road
Wheeling, IL 60090

Applications must be received by **March 15, 1997.**



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OPPORTUNITIES

HISTORY OF SCIENCE TOUR JUNE 1997

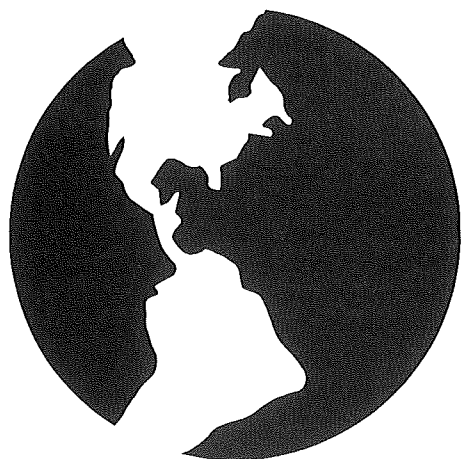
Lee Marek and Yvonne Twomey are arranging this tour of Ireland and England for the summer of 1997. Dates have been set and we will depart on June 13, 1997 and return on June 28, 1997. For those who are interested in graduate credit, preliminary arrangements have been made for 3 semester hours at a very modest additional cost. The theme of both the trip and the graduate course will be "The Founding and Early Flowering of the Royal Society". A reading list and other information will be provided later.

The Instructor of Record will be Lee Marek. In Ireland we will visit Galway, Birr, Lismore and Dublin. In England our tour will include Bath, Oxford, Cambridge and London. In each city special arrangements will be made for our group; guided tours, lectures and other activities which relate to the theme of the tour are planned. Among these are visits to some places which are not open to the public. While in Dublin we will be based at Trinity College Dublin, founded in 1591 and claiming to have one of the oldest Chemistry Departments in the world (opened in 1711).

Visits in Ireland will include a tour of the newly established Historic Science Centre at Birr Castle, (the home of the Earl and Countess of Rosse), where the Great Telescope which was constructed in the Birr Desmesne by the third Earl of Rosse in the 1840s has recently been restored. Until it was dismantled in 1914, this was the largest telescope in the world. Robert Boyle's birthplace at Lismore Castle, County Waterford, is also on our agenda.

In England we will be able to visit the elegant and most interesting city of Bath, with its well preserved and still functioning Roman Bath. The Colleges of Oxford and Cambridge with their beautiful architecture and many associations with founding Fellows of the Royal Society such as Robert Boyle, Robert Hooke, Isaac Newton, Christopher Wren (originally a scientist, not an architect) and many others will also be seen. London's Royal Institution in Albermarle St. is open to us, and a guided tour will show us the Faraday museum and the lecture theatre where Faraday gave his famous Christmas Lectures. Faraday built on the success of the lectures given earlier by Humphry Davy. Indeed, Davy's lectures were so popular that traffic jams were caused by the numbers of carriages that thronged Albermarle Street, so that in 1808 it was designated as the first one-way street in London.

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There will be some free time for activities of your own choice. Before the date of departure, information will be provided about visits that you could make on your own to theatre or music performances, restaurants, and places of interest to which group visits are not planned. Air travel will be by regular scheduled flight, and surface travel by luxury bus. Accommodation will be of a comfortable three-star standard, usually with en-suite bathroom. All travel, hotel and entrance fees will be included as well as all breakfasts and some lunches and dinners.

The cost is not yet determined, but it is intended to keep it below \$2999 per person based on double occupancy and travel from Chicago. Travel to and from a place other than Chicago, single rooms, and extension of the trip can all be arranged at a supplementary charge. It is expected that all plans will be complete and the cost determined in September. At that time, those intending to participate in the tour may sign up and pay a deposit. Travelling companions are welcome, and there will be much to see that is of interest to non-scientists. Payment in full would be expected by 60 days prior to departure. The group will be limited to around 25 in number. If you are interested in receiving further information when it becomes available, please contact either: Yvonne Twomey, 841 Kinston Court, Naperville, IL 60540 Tel: 708-961-9811 Fax: 708-961-0495 e-mail: ytwomey@mcs.com or Lee Marek at Lmarek@aol.com giving your address, phone number(s) and e-mail address.

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AWARD-WINNING ELEMENTARY HEALTH AND SCIENCE PROGRAM AVAILABLE

In response to the growing need for resources to implement **comprehensive health education**, the Massachusetts Society for Medical Research (MSMR) is making its award-winning resource for elementary-level health and science education available to teachers and education organizations nationwide. *People and Animals: United for Health* is an **interactive** health and science calendar for students in **kindergarten through grade six**, addressing key concepts in elementary health education in an interactive and visually-engaging calendar format.

The *People and Animals* calendar has won several awards for **creativity** and **educational innovation**. Taking a Gold in the 1994 Summit Awards, the calendar was singled out for creative excellence by a panel of judges from 50 states across the U.S. and four Canadian provinces. This honor puts the MSMR in prestigious company. Other winners included the Cincinnati Zoo, Universal Studios, Disney Studios, PBS, MTV and Partnership for a Drug-Free America. The *People and Animals* calendar was also awarded Silver prizes in both the Best Children's Calendar and Best Educational Content categories in the 1995 Calendar Awards, an annual competition of the Calendar Marketing Association.

Designed in a hand-illustrated, poster-size format, each month of the *People and Animals* calendar covers a different health or science topic using coloring, writing and drawing activities related to the monthly theme; hands-on experiments; discussion-oriented questions; healthy living tips; a Career Corner; and other graphic and content elements. Topics are (September through August): *Infectious Diseases; Aging; Diabetes; AIDS and Feline Leukemia; Dental Health; Heart Disease; Poison Control and Product Safety; Biodiversity and the*

Environment; Mental Health and Substance Abuse; Body Organs and Transplantation; The Five Senses and the Brain; and Nutrition. Focus is on the interconnection between people, animals and the environment.

Currently in its third year, the *People and Animals* calendar has been displayed in schools, libraries, town halls, children's museums, pediatrician and dentist offices, poison control centers, and other locations across the U.S. In elementary schools, it is used in classrooms as a resource for health, science and physical education and a centerpiece for school health and science displays; in after-school environmental clubs and school health and science fairs; as a library display piece; and as a resource for family and community education initiatives.

The Massachusetts Society for Medical Research is committed to fostering a better understanding of life science by improving basic literacy in and enthusiasm for the biological and health sciences among the public, the media and future generations of scientists and citizens. An essential aspect of our mission is to serve as a bridge between the science and education communities. The Society develops outreach initiatives, including professional development programs for educators and direct classroom programs with hands-on activities for students.

For further information about the *People and Animals: United for Health* calendar and other MSMR educational programs and materials, contact the Society at the above address.

FLINN ANNOUNCES BIOLOGY WITH COMPUTERS LAB MANUAL

Biology with Computers is a new lab manual which contains 26 experiments for use with a Macintosh (catalog number TC1311) or IBM-compatible (catalog number TC1312) computers. All of the experiments can be used with the Serial Box Interface or Universal Lab Interface featured in your Flinn catalog.

All lab experiments were written, developed, and tested by high school science teachers and include complete materials lists, sample data and graphs, answers to questions, and detailed procedures for setting up and performing the experiments. Topics include plant transpiration, biological membranes, enzyme action, protein biochemistry, physiology, energy in food, ecosystem interdependence and more.

Biology with Computers is now available from Flinn Scientific, Inc. for only \$35.00 and includes a school site license for all experiment files. **Teachers only** should contact Flinn Scientific for additional information.

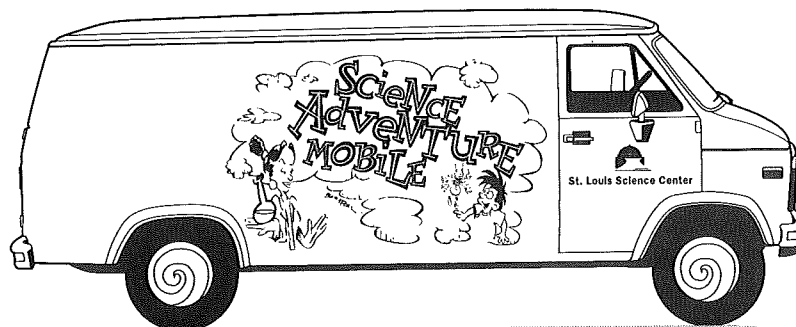
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ZPG ANNOUNCES NEW LESSON PLAN— LIVING A QUALITY FUTURE

Zero Population Growth, Inc., announces the release of *Living a Quality Future*, a teacher companion to ZPG's *Children's Environmental Index*, a 1995 report ranking over 200 U.S. cities on 14 indicators which help determine quality of life for young people. The Index's environmental, economic and social indicators range from the percentage of children in poverty to the number of days of unhealthy air. In developing the 16-page Index, ZPG researchers compiled government data on air and water quality, Superfund sites, crime, unemployment, child poverty, teen birth rates, school expenditures, teacher/student ratios, and more. The new lesson plan provides teachers with innovative ways to evaluate this data representation and explore issues of community sustainability.

Using the *Living a Quality Future* lesson plan, students in grades 9-12 learn to examine indicators of community health, sharpen critical thinking, calculation, and chart and graphing skills. In one activity, students create their own list of social and environmental factors influencing quality of life and express their visions of a desirable community. They then use the Index as a tool for analyzing data and drawing correlations between indicators. *Living a Quality Future* is designed as an interdisciplinary unit, fitting especially well into social studies, math and science curricula, since it addresses real world issues and stresses problem solving and data interpretation, as well as statistical analysis.

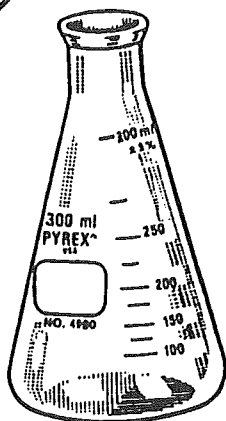
"In producing the *Children's Environmental Index*, ZPG sought to localize environmental and population issues and emphasize the importance of sustainable communities," says Pamela Wasserman, ZPG Director of Education. "Now students can use it as a launching point to develop their own ideas on community well-being. The lesson plan and Index also promote citizen participation, motivating students to hold local planners and officials accountable for their city or town's healthy future and to get involved in these local issues."

Living a Quality Future teaching unit includes one teacher guide and 30 copies of the *Children's Environmental Index* (a 16-page report with data charts). It is available for \$10.00 per set from: **ZPG Publications, 1400 16th Street, NW, Suite 320, Washington, DC 20036 (202)332-2200 (voice); (202)332-2302(fax).**

Zero Population Growth, Inc. (ZPG) is a national, nonprofit membership organization which works to educate the public about the need to bring human population into a sustainable balance with the environment and the Earth's resources. ZPG's Population Education Program provides quality teaching materials and training workshops for K-12 teachers.

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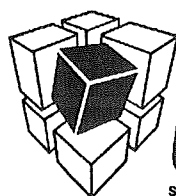
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**CURRICULUM RESOURCES FROM
NATIONAL GEOGRAPHIC SOCIETY**

These reviewers' opinions do not necessarily reflect the opinions of National Geographic Society staff.

GeoLinks, from the Northland

Terri Deslaurier

GeoLinks is a computer-based geography curriculum development tool designed by teachers for teachers at every grade level. The program comes on a CD that contains more than a thousand geography lessons, all extra resources needed for the lessons (such as worksheets, charts, maps, photos, diagrams, and drawings), plus a set of outline maps that can be modified as needed.

The CD includes a scope and sequence that ties together grade levels, national standards, the Minnesota geography graduation rule, and Minnesota State University System college entrance requirements. Teachers can search for lessons on GeoLinks by those headings, as well as by learning style, cognitive level, continent, key words, or a combination of these. Once teachers find a lesson they need, they can print it or copy it onto a diskette or their computer's hard drive for later editing and use.

GeoLinks requires a Macintosh with at least 4 megabytes RAM and 5 megabytes hard drive space. For more information, contact the Minnesota Alliance for Geographic Education, Geography Department, Macalester College, 1600 Grand Ave., St. Paul, MN 55105. (612-696-6731)

Encyclopedia of the United States

Martha Sharma

The Kingfisher *Young People's Encyclopedia of the United States* will appeal to elementary students as they investigate a broad range of topics on pages filled with age-appropriate narrative, full-color photographs, maps, and other illustrations.

This volume has brief entries on people, places, events, and other subjects that have played an important role in the evolving story of the United States. One of 12 organizing subject icons marks each entry, and almost every entry has at least one illustration to complement the text. The type size and page format have been selected with young readers in mind. Cross-references printed in small capitals throughout the text, and alphabetical and subject indexes provided at the end of the book, encourage development of basic research skills.

The encyclopedia will be a useful resource in the home, classroom, or library for students in grades 4-6. This hardcover book is available for \$39.95 locally or from Larousse Kingfisher Chambers, Inc., 95 Madison Ave., New York, NY 10016.

Atlas of World Politics

Martha Sharma

Dushkin Publishing Group's *Student Atlas of World Politics* uses full-color maps and statistical tables to define geography's role in understanding the complex events in contemporary global politics.

This 98-page softcover atlas includes 40 thematic maps and 13 tables covering a broad range of topics, such as population, the global economy, environmental issues, modern historical developments, and the military. Detailed text explains the main theme of each map, directing students' attention to important connections and patterns. A companion Instructor's Manual includes exercises that involve students not only in reading, interpreting, and analyzing the atlas maps, but also in applying their findings in the construction and analysis of new maps and graphs.

Although presented as a supplement to courses in international politics, the *Student Atlas of World Politics* would be a useful addition to any course concerned with contemporary issues at the global level, including modern history and economics. It could be used as a complement to a more traditional atlas in geography classes. The atlas is available in a second edition from Dushkin Publishing Group, Inc., for \$9.25. (ISBN 1561342297) Call 800-338-5578. Mention the companion manual specifically.

THE THIRD DOE-FUNDED GENOME MODULE FROM BSCS

It's time to sign up to receive free educational materials from BSCS. *The Puzzle of Inheritance: Genetics and the Methods of Science* is the third DOE-funded genome module being developed by BSCS. This module, a print curriculum designed for high school and biology classes includes effective, classroom-tested activities for teaching about the methods of science. These activities help students assimilate and retain the knowledge and skills they need to be scientifically literate citizens or to study to become scientists. In addition, the module provides up-to-date information about exciting genetics discoveries not yet part of the standard biology curriculum. By experiencing how genetics expands and changes, students see how the rigorous discipline of science produces durable knowledge.

The Puzzle of Inheritance consists of two major components, an Overview for Teachers that discusses the Human Genome Project, the nature and methods of science, ELSI (Ethical, Legal, and Social Implications) of new research, and genetics concepts (both new and traditional) in considerable depth. This material is solely for the benefit of the teachers, and although it broadens the background for the activities, it is not strictly required for teaching the activities. The second major component, Classroom Activities, provides six instructional activities, complete with commentary for the teacher and pages to copy for student use. In addition, the extensive discussions in the Overview for Teachers also provide professional development experience.

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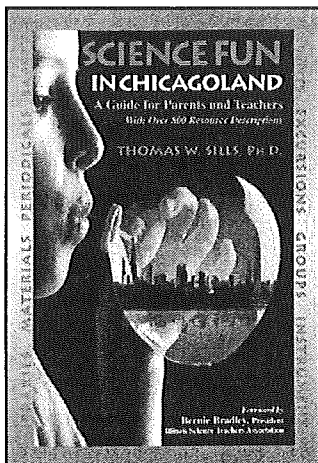
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Activity 1: Standing on the Shoulders of Giants

Students build a conceptually meaningful sequence of milestone explanations of inheritance, evaluate credibility and correlate evidence to milestone explanations. The activity provides a review of fundamental genetics concepts and stimulates discussion of the methods of science.

Activity 2: Puzzling Pedigrees

Students study a collection of pedigrees to identify the inheritance pattern in each. Two pedigrees provide a challenge: they show patterns of inheritance that are not readily explained by traditional Mendelian concepts. Students formulate hypotheses and collect statistical data (coin flips) to test their hypotheses. They also read several short articles that provide information about mitochondrial inheritance, and record their ideas about the nature of science.

Activity 3: Clues and Discoveries in Science

This activity is designed as a mystery. The task is to make discoveries about genetic anticipation. Students sort and analyze clues to build two pedigrees, one for a family with Huntington disease and one for a family affected by myotonic dystrophy. Students look for patterns of disease onset and correlate those to molecular data about trinucleotide repeats, thus building a nontraditional explanation.

Activity 4: Should Teenagers Be Tested for the Mutant HD Gene?

The class reads an article about the policy of withholding tests for Huntington disease from asymptomatic minors and conducts an ethical analysis in the form of a debate about the value of this policy.

Activity 5: What Do We Know? How Do We Know It?

The module concludes with a discussion of the differences between pseudoscience and science, using popular science and health claims. Students focus on observations about the methods of science made throughout the module. This activity provides a performance assessment for the whole module.

These materials were completed and refined for use in a field test at sixteen sites in the United States and Canada. Two sites were at colleges, and the rest were at high schools. Evaluation data combined with direct observation, comments from outside reviewers, and recommendations from a second meeting of the advisory committee then directed the final revision of the materials.

The module is available in fall 1996 and will be distributed by January 1997. To receive a free module, send name, address, grade level taught, and whether you have used BSCS materials before to Dee Miller/HGN3 at BSCS, 5415 Mark Dabbling Blvd., Colorado Springs, CO 80918-3842, FAX: (719) 531-9104. Requests received after 31 December 1996 require a fee of \$4.00 because grant funds will have run out.

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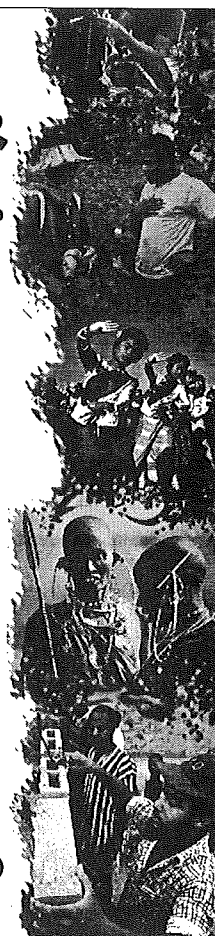
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A free Integrated Pest Management (IPM) Kit will be available for agriculture teachers beginning Fall semester 1996—specifically those whose students are interested in dairy and beef operations. The kit helps teachers illustrate the problem of filth flies on the farm and the solution: Integrated Pest Management (IPM). Kit components include:

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IPM Basics - Review of the basics to learn the hows and whys of an IPM program.

Spot Cards - Tools for counting the number of flies invading a barn before and after implementing IPM.

Fly's Eye View of the Farm - An illustrated overhead view of a farm indicating the typical areas where flies lurk.

IPM Checklist - Provides easy step-by-step instructions for beginning and maintaining an effective IPM program.

Test Your Cattle IPM IQ - Tool for discovering how much students learned about flies and how to control them.

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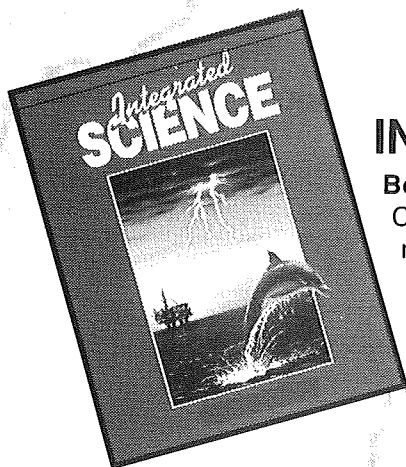
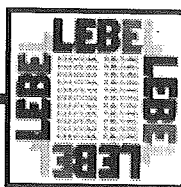
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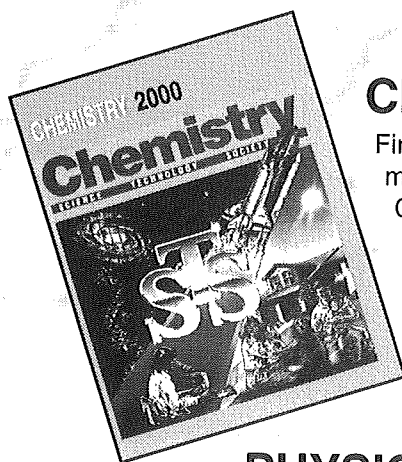
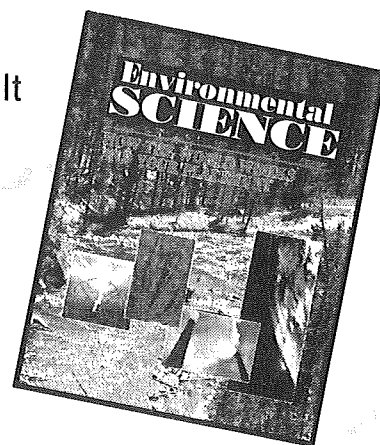
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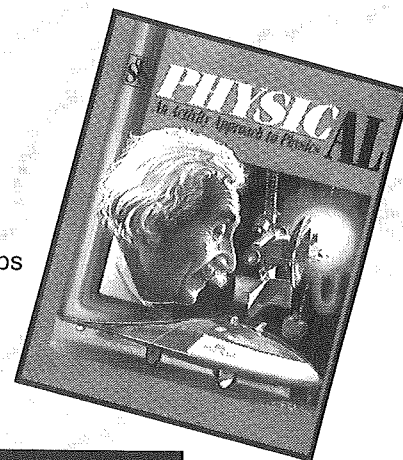
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Karen Meyer
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Kmeyer@isbe.state.il.us

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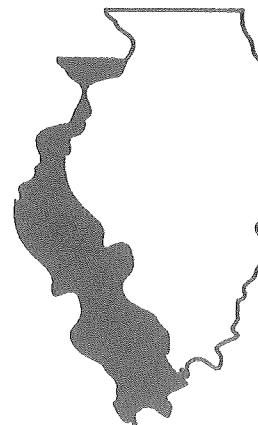
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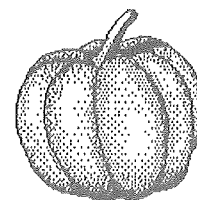
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