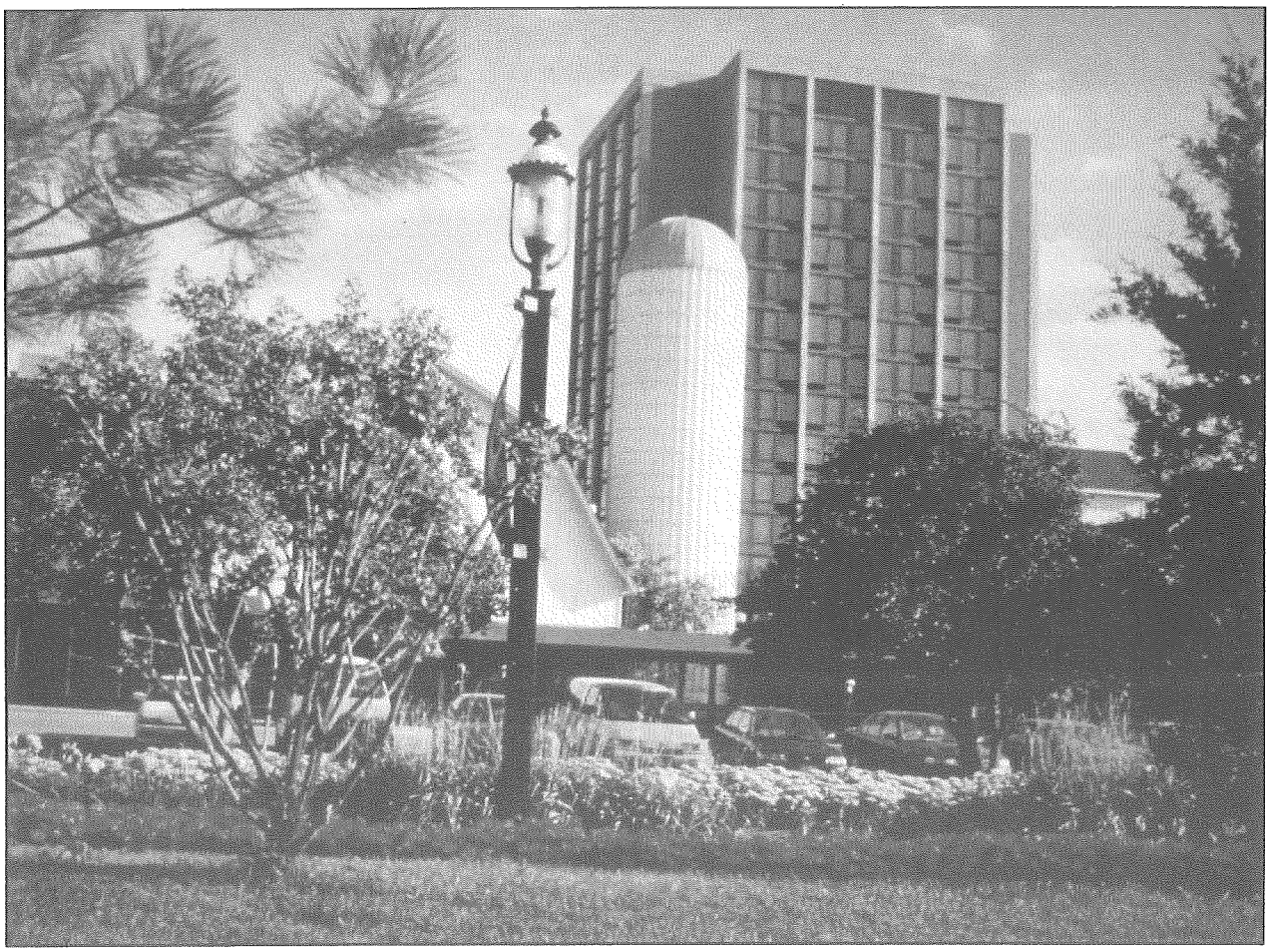
SPECTRUM

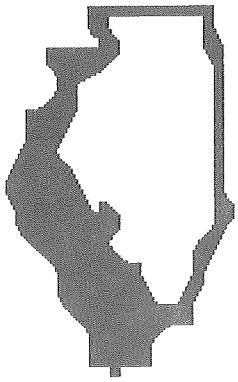
THE JOURNAL OF THE ILLINOIS SCIENCE TEACHERS ASSOCIATION

"THE WORLD IS MY CLASSROOM"



Pheasant Run Resort
St. Charles, Illinois
4-5 November 1994

FALL 1994



ILLINOIS SCIENCE TEACHERS ASSOCIATION

SPECTRUM

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Glen Ellyn, IL 60138

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1994 ISTA Convention Information

Pheasant Run Resort
St. Charles, Illinois
November 4-5, 1994

Teachers, principles, 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 Pheasant Run Resort in St. Charles, Illinois. The convention begins Thursday November 3rd with a special leadership pre-conference on the National Standards and "Benchmarks". Convention sessions begin at 8:00 AM on Friday, November 4 and end on Saturday, November 5 at 4:30 P.M. The exhibits will close at 4:00 P.M. on Saturday .

Hundreds of exciting workshops, demonstrations and other sessions designed to motivate and educate are planned. The exhibit area, full of scientific teaching materials-from bones and books to the best in technology, will enable those concerned with science education to obtain the latest information on new science teaching equipment, textbooks, audiovisual aids, laboratory apparatus, computer programs, supplementary materials, and other services and facilities to help make teaching and learning more effective.

The role of effective science education today dominates the conference whose theme is ***"The World is My Classroom"***. You will not want to miss keynote presentations by TV Journalist Bill Kurtis (Friday), Scientist and Astronaut Kathryn Sullivan (Friday), Physician and Scientist Dr. William McDade (Saturday) and Author and Educator Carol Valenta (Saturday). 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. Enjoy the Pheasant Run Resort at convention discounts. There is something for everyone; restaurants, entertainment, lounges, sports & recreation, and sightseeing. Stay over Saturday night and enjoy the resort's services. Make a giant leap in science education and join us at the 1994 ISTA Convention!

Meeting Location

Convention registration, sessions and exhibits will be at Pheasant Run Resort, St. Charles, Illinois. St. Charles is located on Route 64 approximately 45 miles west of Chicago. Pheasant Run Resort is 3 miles east of St. Charles. See the map of the Advanced Program for travel instructions and a map of the facility.

Advance Registration and Fees

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.

An Advance Registration Form, including requests for field trips and paid workshops appears in this publication. The deadline for Advance Registration is **October 15, 1994**. Any Advance Registration Forms received after that date cannot be processed; it will then be necessary to register on-site. Mail all registrations to:

Judy Whitcomb
P.O. Box 373
848 Dodge Ave.
Evanston, IL 60201

Registration Confirmation

If you register by the October 15 deadline, an advance registration confirmation card will be mailed to you. This card will list your registration category and any special events (field trips and paid workshops) for which an additional fee has been paid. This confirmation card will serve as your receipt. Please bring it with you to the Advance Registration counters at Pheasant Run where you can pick up your registration materials.

Registration Hours

Convention materials may be picked up at the Registration Area at Pheasant Run during the following hours:

Fri., Nov. 4	**7 AM - 4 PM**
Fri., Nov.5	**7 AM - 12 PM**

Hotel Reservations

Approximately 450 hotel rooms are available at the Pheasant Run Resort. Reservations may be made by calling Pheasant Run at (708) 584-6300. In order to receive the special convention rate for rooms, you must state that you are attending the ISTA Convention. The special room rates for single or double occupancy are:

Standard Accommodations $75
Tower Accommodations $85

Transportation

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

Parking: Free parking is available at Pheasant Run. Conventioneers will find ample parking in the lot near the MegaCenter.

Train: Commuters can take Metra from Chicago and the suburbs to the train station in Geneva. From there travel by cab to Pheasant Run.

Air: Pheasant Run is just 40 minutes from O'Hare International Airport. Van service is available to and from O'Hare for $22 per person one way. Van service, which should be arranged 3 or more days in advance, can be ordered by calling Pheasant Run Resort (708) 584-6300. Ask for the transportation Office.

Pheasant Run
RESORT ◆ CONVENTION CENTER
4051 E. Main Street, St. Charles, Illinois 60174

Meals

Lunch: The Pheasant Run complex has restaurants, lunch counters, and snack bars. Numerous fast food restaurants are within a few minutes of the Resort.

Dinner: A list of local restaurants featuring a variety of foods and prices will be available. Meals also will be available at the Resort restaurants.

Special Social Events

After the closing of the last session on Friday afternoon, join us is the Mega Center for a reception and surprises. Friday evening, join your friends to honor award recipients at the ISTA Awards Dinner at Fermi Lab. Enjoy refreshments while you share experiences with other participants during this special event. On Saturday morning, meet and talk to ISTA officers and regional directors while sharing complimentary coffee and rolls. Saturday afternoon, participate in the raffle and join fellow science educators for the ISTA General Membership meeting.

Exposition of Science Teaching Materials

The Exposition of Science Teaching Materials is an outstanding and integral feature of ISTA conventions. 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, located in the Mega Room, will be open during the following hours:

Fri.,Nov. 4	9 AM - 6 PM
Sat., Nov. 5	9 AM - 4 PM

Hospitality

Enjoy complimentary coffee and rolls available each morning in the exhibit area. At the hospitality center, you'll find information on convention activities, local shopping, restaurants, sight-seeing, and entertainment in the St. Charles area.

Persons with Disabilities

ISTA wishes to make the convention accessible to all persons. If you need special services, check the appropriate box on the Advance Registration Form and explain the services you require.

Hometown Publicity Releases

Registrants are urged to help with publicity about science teaching by sending publicity releases to newspapers serving their home areas. News releases available for this purpose will be available at the convention.

Educational Tours

A variety of educational tours are scheduled during the convention. Buses for educational tours trips will depart from the main entrance. To register, please complete the "Educational Tours" requests on the Advance Registration Form or sign up at the convention in the registration area. Educational Tours are filled on first-come, first-served basis. Tickets purchased on the Advance Registration Form will be included in the packet you pick up at the Registration Area.

***Tour #1 Fermi National Accelerator Laboratory* ($10; Friday)**

Visit the world-famous Fermi National Laboratory in Batavia. Tour some of the laboratories and learn about past and current projects. Your will also learn about education programs that Fermi offers for teachers, school-aged children, and the general public.

***Tour #2 American Science and Surplus Shopping Spree* ($10; Friday)**

What has super balls, graduated cylinders, feathers, bug cages? Visit this amazing store for any science equipment and supplies you can think of (and many you can't). You will even receive a $5.00 certificate to spend there.

***Tour #3 Sci-Tech* ($10; Friday)**

Do you know what the Chaos Theory is or what your voice looks like? Sci-Tech is a theme park for the science mind. Don't just read about science; experience it!

***Tour #4 DuPage County Solid Waste Education* ($10; Friday)**

Want to see how a factory can recycle 230 tons in one day? Learn how this modern recycling facility helps 32 different communities with their solid waste problems. This tour ends with a visit to their education research and resource building. Take with you posters, lesson plans, and much more.

The St. Charles and Surrounding Area

Pheasant Run Resort is a *vacation* spot for people from all over the Midwest. from the moment you arrive at Pheasant Run, you'll experience the comforts of a countryside retreat: fresh air, scenic views and good old-fashioned hospitality. Located in the heart of the Fox River Valley, this beautiful resort has maintained its rural charm. The resort boasts an 18-hole golf course, indoor and outdoor tennis courts, racquetball, swimming pools, health spa, three restaurants, a deli, a dinner theater, and a comedy club. Major entertainment acts are booked throughout the year, although November bookings are not available at press time. For decades, Pheasant Run has been known as a place to relax and unwind. The area around Pheasant Run Resort— the communities of St. Charles and Geneva— supports the resort atmosphere. The communities hold a variety of festivals throughout the year that attract people from the Chicago area. Interesting and unusual shops are located in Geneva— St. Charles is known for its many antique shops. Both communities are located on the Fox River and an extensive network of bicycle paths winds along the banks of the river and extends into adjoining communities. Fox River Valley Mall as well as four major shopping malls are located within 45 minutes driving time of St. Charles. A new mall in St. Charles is within walking distance of Pheasant Run. Finally, St. Charles is the home of the Kane County Flea Market—an extravaganza held the first weekend of each month. The flea market, held at the Kane County fairground, attracts people from Illinois and surrounding states. Crafts, collectibles, Victorian antiques, and junk are displayed for purchase. Saturday afternoon or Sunday following the convention will be a great time to look for those treasures to decorate your home or extend your collection.

Bill Kurtis, Keynote Speaker

For Bill Kurtis, the world is his classroom. Not confined by studio walls or the printed page, he takes the show of science education on the road. Recognized in the Chicago area as nightly news anchor on WBBM-TV, Mr. Kurtis is producer and host of The New Explores, a public television series that has carried millions of viewers from their homes and classrooms to the modern frontiers of science. Bill Kurtis has tracked the explorers who have led him down to the bottom of the ocean, to mountain tops, into operating rooms, and many points beyond. Of all the travels of The New Explorers, Mr. Kurtis likes to say, perhaps the most important has been the one into the classroom. Through a unique partnership with the United States Department of Energy, Argonne National Laboratory, and museums, videotapes of The New Explorers and accompanying curriculum guides are available to teachers across the nation.

Carol Valenta

Carol Valenta has entertained audiences across the nation, demonstrating the delights of science with a sense of humor and a warm reality for the classroom. Having served as a teacher, principal, and director of the Los Angeles District Science Centers, Ms. Valenta currently serves as Director of Education for the California Museum of Science and Industry in Los Angeles. Under her leadership, a delicious menu of innovative science activities pleasing to a diverse audience now captivates visitors. Carol Valenta starred in Energize! a television series bringing the delights of science to youngsters in Los Angeles, and she is an author of the forthcoming, Science Anytime, a new elementary science program from Harcourt Brace School Publishers.

Dr. William McDade

Scientist, doctor, professor at the University of Chicago.

Dr. Kathryn Sullivan

Astronaut, geologist, Chief Scientist for NOAA, and first woman to walk in space.

...and Pre-Convention Leadership Conference Speakers

John Staver, Andrew Ahlgren, Rodger Bybee, Audrey Champagne, and Karen Worth.

Convention Committee

Steven S. Pieritz, Conference Chair

Summit Hill School District #161
P.O. Box 173
Frankfort, IL 60423
(815) 469-6993
(815) 469-9201 Fax

Barry Van Deman, Exhibits and Publications Chair
International Museum of Surgical Sciences
1524 N. Lake Shore Drive
Chicago, IL 60610-1607

Phil Parfitt, Program Chair
The Chicago Academy of Sciences
2001 North Clark Street
Chicago, IL 60614

Fred Tarnow, Pre-Conference Chair
North Cook ESC
2701 Central Road
Glenview, IL 60025

Judy Whitcomb, Registration
P.O. Box 373
848 Dodge Ave.
Evanston, Il 60201
312/743-1668

Pheasant Run
RESORT ◆ CONVENTION CENTER
4051 E. Main Street, St. Charles, Illinois 60174

A Message from ISTA President, David Winnett

Join us at the 27th Annual Convention of the Illinois Science Teachers Association, ***"The World Is My Classroom".*** During these two days, you will have the opportunity to enter into many exciting and inspiring science experiences. Featured speakers and scheduled presenters will highlight the applications of science through technology in everyday life by reminding us of the basic concepts and principles of science and math as well as by directing toward the discoveries of the future. Sessions will also be filled with information on how science literacy and effective, real assessment can enhance the instruction our students need in the classroom to be knowledgeable. Vendors and exhibitors will display their most recent developments for educational resources. Print and electronic media, equipment and supplies for all grade levels, as well as opportunities to maximize teaching and learning will be available for our inspection. Look, too, for surprises around every corner. One of the most important aspects of an ISTA Convention is the opportunity it offers us to network with our colleagues. The informal sharing of ideas and experiences with one another is a unique advantage of a gathering of educators at a conference that can provide insight for us and inspiration for our students. I look forward to seeing you and sharing with you at the 27th Annual Convention of the Illinois Science Teachers Association—"The World Is My Classroom".

Pre-Conference Leadership in Science Program

Thursday November 3rd

This year's Leadership Conference offers a very rare opportunity to meet and learn from top national science educators. Your will not find a more complete science education team anywhere at any other meeting. John Staver will Keynote this special Leadership Conference on *National Standards for Science Education*. This team will discuss Project 2061's Benchmarks, the NRC Standards for science content, teaching, assessment, program, and systems. Participants will break into smaller discussion and interaction groups. Principals, Supervisors, Teachers, Professors: Don't miss this opportunity. Space is limited, so register early.

A Final Note

The ISTA convention programs are getting larger and richer in variety each year, and this year is no exception. We are excited about the 1994 edition. No doubt you find more sessions of interest on the program than you will be able to attend. Occasionally, you will arrive at a popular session too late to get a chair. So plan your schedule carefully in order to enjoy the experience to the maximum and get the most out of this year's convention.

ISTA General Membership Meeting
Saturday, November 5
5:00 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 Associations. ALL MEMBERS (including those who have just joined at this Convention) should plan to attend. Be sure to turn in your Convention Evaluations to qualify for the drawing of prizes donated by the Exhibitors.

Benefits and Activities for ISTA Members

SPECTRUM—Spectrum is the quarterly ISTA newsletter. Articles, teaching techniques, exciting ideas and information regarding upcoming meetings, conferences and educational opportunities are featured in each issue.

THE ISTA CONVENTION—For over twenty-five years this annual conference has brought together educators and administrator through the state. Major speakers, group sessions, hands-on workshops, micro-computer labs, and extensive commercial exhibits are a few highlights of this outstanding program of renewal for science teachers.

LEGISLATIVE REPRESENTATION FOR SCIENCE EDUCATION—This function provides a direct line of communication science educators to state officials. It voices concerns and recommends programs and funding for science education.

ISTA HIGH SCHOOL AWARDS—This honor is awarded annually to high school students who excel in science. Awards are available to all public and non-public high schools.

SEARCH FOR EXCELLENCE—ISTA participates in the NSTA Program designed to identify and recognize exemplary science education programs at all levels.

Please note that this program is subject to change. Final programs will be available to all registrants at the convention.

Important Note: The list of Convention Presentations in the following section is incomplete and subject to change! Final listing with times and dates will be included in the Final Program.

Enjoy a Wonderful Dinner And the Pleasure of the Company of Some of the Finest Educators in the State
Join us for the ISTA Awards Dinner

Fermi Lab
November 4, 1994
7:00 PM

Bus shuttle service may be available from Pheasant Run (about 20 minutes away). Cost is $20 per person. Awards to Presidential Awards of Excellence Nominees and the ISTA Awards of Excellence, and Distinguished Service Awards will be presented . Invited guests include winners and guests, state legislators and the governor—not as speaking engagements—but as a listening engagement—to hear about the great things our teachers are doing for our youth. Spouses/guests welcome!

Visit the Exhibit Hall on Friday and Saturday.

Science materials, books, equipment, and teaching tools of all kinds will be on display and for purchase in the MegaCenter of the Pheasant Run Resort. 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

ABC School Supply
American Science and Surplus
AMSCO School Publishers
Arbor Scientific
Bedford Science Supply
Carolina Biological
Carson-Dellosa Publishing
CASL Software, Inc.
Delta Education
Educational Aids, Inc.
Encyclopedia Britanica
ETA
Flinn Scientific. Inc.
Forestry Suppliers, Inc.
Glencoe/McGraw-Hill
Gray's Distributing
Flinn Scientific. Inc.
Harcourt Brace and Company
D.C. Heath & Company
Kendall/Hunt Publishers
J.M. Le Bel Enterprises
Midwest Model Supply
NASCO
Nebraska Scientific
PASCO Scientific
Pencils & Play, Ltd.
Sargent-Welch
Scholastic, Inc.
Scott, Foresman and Company
Showboard, Inc.
Solomon Publishing Company
S.P.A.R.C.
Troll Associates/
The Scope Shoppe, Inc.
OHAUS
VALIC
Ward's Natural Science

Noncommercial

Brookfield Zoo
California Museum of Science and Industry
Chicago Academy of Sciences
Chicago Botanic Garden
Earth Foundation
Environmental Education.....
Fermi National Laboratory
IABT/NABT
Illinois-Indiana Sea Grant
Illinois JETS
Illinois NET
International Museum of Surgical Science
Museum of Science and Industry
Optical Society of America
Parkland College
SciTech
Shedd Aquarium
Teaching Resource Center
University of Hawaii

1994 ISTA Convention Presentations

What's New With NASA?
Barbara J. Victory-Thomas, Dunbar Elementary

Acids and Bases Made Easy!
Laura J. Coirier, Lake Shore South Middle School

Soggy Air
Rafael Rosa, Chicago Academy of Sciences

Eclectic Connections: Practicing Science Process Skills Through Children's Literature
Beth A. Wiegmann, Northern Illinois University

Seeds
Keith Hanson, North Ridge Middle School

Hands-on Activities for Elementary Technology Education
Cindy Evak, Bedford Science Supply

Putting a Global Spin on Science
Ann Rubino, Custer Park School

Yeast: A Bubby and Exciting Student Research
Michelle Karlin and Theresa Knapp, Adlai E. Stevenson High School

Discrepant Events + Concept Maps = Meaningful Learning
Don Powers, Western Illinois University

Biology for the Right Brain II
Beth Giglio and Robyn Thomas, Adlai E. Stevenson High School

Biology Bonanza: Hands-on Activities in Genetics and Biotechnology
Alan D. Hoffman, Downers Grove North High School

Bold EE Initiatives for Illinois? Come Find Out!
Carol Fialkowski, Chicago Academy of Sciences

Science and the Fiction Connection
Judith A. McKee, Central School

Project SEARCH: University Science Students At Work in Elementary Classrooms
Susan P. Bruce, University of Illinois College of Education

The Alaskan Iditarod Sled Dog Race — Mush Your Students on Science
Ginny Lopez, Highland School

Edible Biology
Nola Wilkinson, Johns Hill Magnet School

Explorations With Plants: A Cause for Wonder
Anne Grall Reichel, Chicago Botanic Garden

Stagging Teaching for Student Success: 'Mapping a Strategy for Success'
William C. Beckman, East Peoria Community High School

Hands-on Materials to Expand Science (H.O.M.E. Science)
Jan Cloud, Bunker Hill Community Unit #8

Now See Here!
Sue Berg, David Brown, and Anne Rizzolo, Hawthorn Junior High School

Mag-Lev: It's Uplifting
Kathleen Cochrane, Argonne Community of Teachers

Does Anyone Still Teach About Cells?
Donald Meissner, Kenneth Murphy Junior High School

Volume (Not Mass!) Confusion
Lynne Beauprez, Teachers Academy for Math and Science

Science in a Bag
Junida Nicholas, Dulles School

Velocity: A Day at the Races
Barbara Crum, Teachers Academy for Math and Science

Using Real Data to Solve Student-Sized Problems
Barbara Crum, Teachers Academy for Math and Science

Brookfield Zoo: Suitcase for Survival!
Lanis Petrik, Brookfield Zoo

Interactive Multimedia Instruction for Use in Preservice Elementary Teacher Preparation
Thomas E. Thompson, Beth A. Wiegmann and Lihua Zhu, Northern Illinois University

Family Math/Family Science — Easy as 1,2,3!
Donna Suhre, Alhambra Elementary School

Authentic Assessment & Technology: Two Videodiscs for Teacher Education
Julie Haberer, Sandburg Junior High School; Susan Klipp, Ferson Creek School; Lynn Landberg, Davis School; Jan Rey, Wild Rose Elementary School, and Thomas E. Thompson, Northern Illinois University

Developing a Space Simulation Program
Katrina Fey and Richard Free, North Chicago High School

The Library as a Science Lab
Kathleen M. Luczynski, Downers Grove South H.S.

Writing Techniques You Can Use in Science Class
Fran Hicks and Laurel Hochstetler, North Junior High School District 47

Changes in certification requirements: Your reactions, please
Robert Fisher, Illinois State University

Integrated Science, Mathematics, and Technology: IMaST
Robert Fisher, Illinois State University

Assessment of Integrated Learning in Science, Mathematics, and Technology
Robert Fisher, Illinois State University

Building A Science Curriculum With Full Teacher Participation
Lisa Justis, Galesburg Public Schools

Project Connections: Three-Way Articulation of Biological Sciences
Dr. Carleton J. Phillips, Illinois State University

The Next Step in Biology Curriculum Evolution
Jeffra Nicholson, Holt, Rinehart, & Winston

From Goals to Assessment: Developing a Primary Science Curriculum
Roseann Feldmann and Eileen Palsgrove, Crystal Lake C.C.S.D. #47

From Goals to Assessment: Developing an Intermediate Science Curriculum
Roseann Feldmann and Eileen Palsgrove, Crystal Lake C.C.S.D. #47

The Next Step in Biology Curriculum Evolution
Robert Ratcliff, Holt, Rinehart, & Winston

Science Plus: The Teaching of Middle School Science, an Integrated Approach
Jeffra Nicholson and Robert Ratcliff, Holt, Rinehart, & Winston

Collaboration Within the Science Classroom, Special and Regular Education
Elaine M. Groat, Waubonsie Valley High School

Issue-Oriented Science Using the SEPUP Modules
Harry Hasegawa, Sargent-Welch; Gary Morrisey, Fort Dearborn School; and Fred Pannell, Luther Burbank School,

Pedigrees: More Than Just a Family Tree
Claudine Barnhart and Sandy Lange, Glenn Westlake Middle School

The Chicago Systemic Initiative
Adrian D. Beverly, Eric Hamilton, Telkia Rutherford, and Melanie Wojtulewicz, Chicago Public Schools

Biological Science Applications
Ron Biondo, Facilitating Coordination in Agricultural Education

Physical Science Education Through Application
Richard Treat, Facilitating Coordination in Agricultural Education

Growing Better Everyday: Using Genetics to Improve Our Food Supply
Dean Dittmar, Facilitating Coordination in Agricultural Education

Rain or Shine: Weather's Effect on Planets
Ron Biondo, Facilitating Coordination in Agricultural Education

Plant Science Activities
Richard Treat, Facilitating Coordination in Agricultural Education

Creepy and Crawly/ Soft and Furry
Larry Pfeiffer, Facilitating Coordination in Agricultural Education

Integrating Agricultural Literacy Materials to Your Curriculum
Agricultural Education Field Advisors, Facilitating Coordination in Agricultural Education

New Computer Interface for the Macintosh
Steve, Miller, Pasco Scientific

Constructing a Table Top 'Hydroponics' Classroom Display
Dean Dittmar, Larry Pfeiffer, and Richard Treat, Facilitating Coordination in Agricultural Education

Conservation Education-Children and Our Natural Resources
Kathleen Andrews and Phil Wilson, Illinois Department of Conservation

Dinosaurs and More at The Field Museum!
Peter Laraba and Thomas J. Wickland, Department of Education, Field Museum

Earthquakes, Plate Tectonics, and Illinois
William Gilespie, Memorial Junior High School, and
Peter Laraba, Education Department, Field Museum

Exploring Conservation Issues Through Enrichment Activities
Navana Ahrends and Steve Rapp, Cornell Dist. 426

It's EASI and EASIAR
Susan Hillison, Educational Service Center #1 and Dr. Augden Windelborn, Northern Illinois University,

The Rubric Cube Model
Susan Hillison, and Dr. Augden Windelborn, Northern Illinois University

A Day at the Power House
Rebecca Thomas, Commonwealth Edison Power House

Mysterious Liquids!
Doug Raney, Chicago Academy of Sciences

Body Labs
Thelma Bond, Judy Whitcomb, International Museum of Surgical Science

Innovative & Inexpensive Science Materials
Edwin A. Metzl and Carol Widegren, Lincoln Park High School

ILEED Energizes Your Curriculum
Rich Ammentorp and Marie Lauricella, ILEED/Chicago ENR

Rudy-Toot-Toot
Nanette Cassettari, James Giles School

Catch a Rainbow
Becky Jaramillo, Norwood Grade School and Laura Prescott, Wildlife Prairie Park

Rainforest Rescue Campaign: Turning Students on to Science and More!
Sandy Doss and Cynthia Everage, Earth Foundation

Still Dense About Density?
Barbara Daiker and Terry Pugh, Rich Central High School

A Nature Walk
Chris Engemann, Nystrom

Tasty Science
Connie Taylor, Bethel Christian School

The Illinois Leadership Institute and Systemic Change in Science Education
Bill Conrad, Illinois Leadership Institute

Science is the Pits! (Partners In Terrific Science)
Nancy Clark, Deerpath Junior High School and Deb Myer, St. Peter Lutheran School

A Pocketful of Science
Carol Valenta

SciTech "Museum in a School" Interactive Science and Mathematics Programs
Jim Leonard, Exhibit Developer, SciTech Museum in a School Program

Winds of Change: Interactive Experiences with Illinois Wild Weather
Shannon Lalor, SPARC Collaborative, the Illinois' Wild Weather Project

Kids and Science Museums: SciTech Clubs for Girls
Marina Morrow, SciTech

Using Technology in the Science Classroom
Les Cleveland, Scott Foresman

Food Chemistry
Merilyn Bohm, National Academy of Sciences

Cell Surfaces Explored with Lectins
Norman Mercak and Susan Styler, Illinois Mathematics and Science Academy

The Best of Fermilab's Particles and Prairie Project
Patricia Franzen, Germantown Hills Middle School/Fermilab's Lederman Science Center

Optical Smorgasbords: An Introductory Taste of Light and Color
Chris Chiverina and James Hicks

Learning Strategies for the Biological Sciences
Jim McGuaghey, Eastern Illinois University

The Life Cycle of a Flowering Plant is Elementary
Jim McGuaghey, Eastern Illinois University

Improving the Laboratory Experience
Rick Highbergher, Ward's Natural Science

NEWTON BBS: Cyberspace for Teachers
Tom Buller and Louis Harmisch, Argonne National Laboratory

Presidential Awards for Excellence in Elementary Science Teaching
Gwen Pollock, Illinois State Board of Education

Presidential Awards for Excellence in Secondary Science Teaching
Gwen Pollock, Illinois State Board of Education

Reunion for Presidential Awards and ISTA Awards of Excellence Winners in Elementary and Secondary Science Teaching
Gwen Pollock, Illinois State Board of Education

The ISBE Scientific Literacy Grant Program
Gwen Pollock, Illinois State Board of Education

Science Supervisors Meeting
Gwen Pollock, Illinois State Board of Education

STS in Illinois
Gwen Pollock, Illinois State Board of Education

Guidebook for Science Safety in Illinois Schools Status REprot
Gwen Pollock, Illinois State Board of Education

ISBE Technology Initiative
Gwen Pollock, Illinois State Board of Education

The Maury Project: How Density Differences Move Ocean Water
Russell Hencinski, Lane Tech High School

Cheap Science
Dennis Sievers, Central Community High School

Explorations With Plants: A Cause for Wonder
Alan Rossman, Chicago Botanic Garden

Integrating Mathematics with Science
James Cowden, Chicago Public Schools

Consumer Fairs: A New Twist on Science Fairs
Susan Knorr, Quincy Junior High School

Science IGAP Coach
Dr. Ovid K. Wong, School District #161

A Three-Dimensional Micro Demonstration of Periodic Properties
Cathryn Jana, McAuley High School

SPICA University of Toledo Astronomy Activities for All Grades
Kent Lasik, Lake Forest High School

Earthquakes and the New Madrid Fault Zone
Kent Lasik, Lake Forest High School

Introducing Diffusion Through Inquiry Approach
E. Cannon, Ann C. Hanson, and Catherine Schwab-Kulczycki, Columbia College of Chicago

Developing an Ecosystemical Awareness of the Living Animals in Urban Cities
Dr. Abour H. Cherif, Ann C. Hanson, and Catherine Schwab-Kulczycki, Columbia College of Chicago

Magnetic resonance imaging: from physics to medicine
Prof. Paul Lauterbur, UIUC Department of Physics

Liquid crystals: strange fluids that don't always flow
Prof. Paul Goldbart, UIUC Department of Physics.

Birds of a Feather
Mary Ann Barto, Frankfort Square Elementary School

Tiny Bubbles — CO2: Investigating Chemical Changes with 1st Graders
Anne Kirpes, L. Thomas Moore District #161 Science Depot

The Particle Zoo: Teaching Particle Physics to 4th Graders
Janelle Reese and Steve Sweeney, L. Thomas Moore District #161 Science Depot

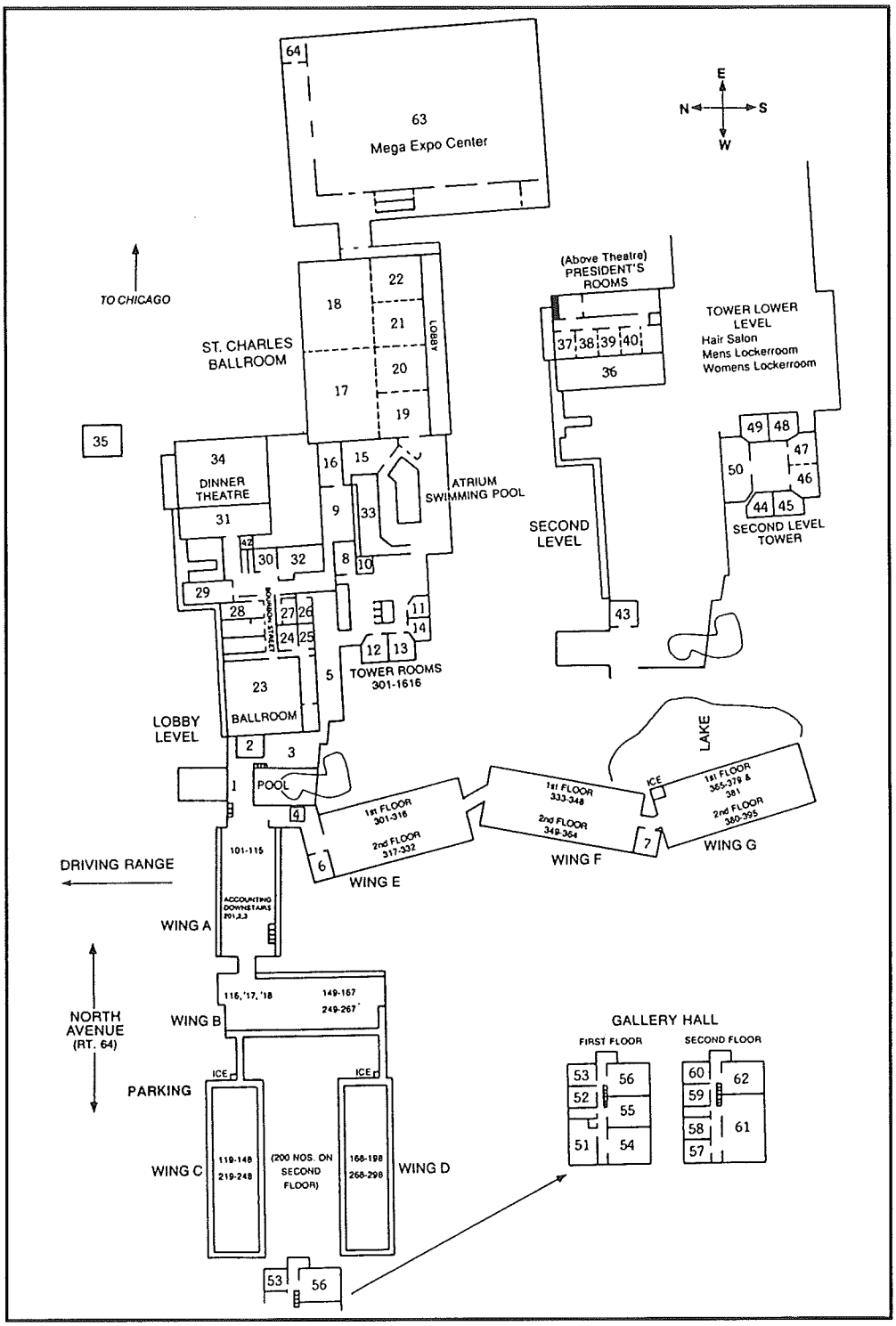
A Look at Child-Centered, Whole-Language Oriented Science Education from 'Down Under'
Michael Bentley, National-Louis University

Building a School-Community Alliance in Urban Chicago: A Model for Reform
Michael Bentley, National-Louis University

Puttin' It All Together
Frana Allen and Miriam Fitzhugh, M.T. Skinner School

Using Satellite Images in the Classroom
Russ Ruswick, Lake Forest High School

Where is 'Away?'
Sylvia Gilbert, Duke Ellington Branch School



Making Hot Air Balloons
Arlene Bennett, District 58 Science Center

More Separation Chemistry: Electrophoresis
Jeanne Domoleczny, Loyola University Chemistry Department

Waves, Gulls, and Submarine Hulls
Alyssa Lyon and Tom Parsons, Evanston Ecology Center

Birds, Birds, and Even More Birds
Billie G. Snell, Snell's Educational Enterprises

Bear Facts and Fun
Jill E. Mitchell, Aunt Jane's Early Childhood

Thematic Teaching Across Disciplines: Generating Ideas
Helja Robinson and Robert,Wolffe, Bradley University

Problem Solving in the Science Classroom
Tom Graika, Allen P. Zak Science Discovery Center

Critters in the Classroom: How to Survive
Greg Van Vleet, Edison School

The Squid Is My Teacher
Allison Nix, Allen P. Zak Science Discovery Center

Water, Water, Everywhere! In the Classroom — Do We Dare?
Cindy Pigatto, Allen P. Zak Science Discovery Center

Simon Says, Touch Your Phalanges
Kelly Post, Julia E. Riley, and Pam Weir, Kingsley Elementary

Design a Dinosaur: An Impact II Award Winner
Robert,Kapheim, Educational Consultant

Update of High School Science, Math, VocEd Assessment Project
John Davison, West 40 ESC #5

Pattern for a Clean-Up
Mary Goodley, Abbott Middle School, District #60

Reading River Sediments: Problem-Solving Activity for Locating Valuable Minerals
Joseph G. Lindquist, Waukegan High School

Project AIMS Workshop - Primary
Diane C. Accardi, Apollo School, District #63

Eliminating Tracking: Establishing Heterogeneous Groupings in Science and Mathematics
Dr. Sharon Wynstra, Rockford School District #205

Motivate Your Students Using Process Skills
Erin Fischer, William Fremd High School

Elementary School Climate, Science Teaching Efficacy, and Student Science Achievement
Marilyn Morey, Illinois State University

Do Students and Teachers Share the Same Concept of Effective Teaching and Learning?
Gerald E. Adams, Charles E. Cannon, Dr. Abour H. Cherif, Ann C. Hanson, Pangratios Papacosta, and Christine E. Somervill, Columbia College of Chicago

Grades K-4 Performance Assessments: Past Whats and Whys to 'How To'
John B. Beaver, Kevin D. Finson, and Maurice G. Kellogg, Western Illinois University

Grades 5-8 Performance Assessments: Past Whats and Whys to 'How To.'
John B. Beaver, Kevin D. Finson, and Don Nelson, Western Illinois University

Chaos in the Classroom: An Interdisciplinary Approach
James Breunlin, William Lederhouse, Jon Orech, and Michele Williams, Schaumburg High School

Jurassic Science
Dr. Ovid K. Wong, School District #89

Networking in a Nutshell
Linda O'Connor, Midlevel Science Teachers' Network

Teaching Stoichiometry Problems
Vincent Zerante, Marian Catholic High School

Integrating Science and Mathematics Through Botany
Margaret Barcani and Hope Martin, Northwood Junior High School

A Constructivist Approach to Teaching the Voyage of the Mimi I
Bill Conrad, Community Consolidated School District #15

BioCom: An Innovative New Biology Curriculum
John Penick, University of Iowa

Acid-Base Workshop for Third to Sixth Grade Teachers
Ann Levinson, Niles West High School

Projects TEAMS (Thematic Experience)
Dr. Marilyn Lisowski, Eastern Illinois University

Schoolyard Science Sharing
Les Edwards and Dr. Marilyn Lisowski, Eastern Illinois University

A Close Look at the New Madrid Fault
Marty Stambaugh, Urbana Middle School

Utilizing Cooperative Learning and Alternative Assessment in Science
Lisa Palacios and Barb Youngren, Wheaton Public School

1-900-CM-STARS
Gregory J. Murphy, Iroquios West Schools

Centennial Park Wetland Project
Joyce E. Stemp, District #21 Discovery Center

Introducing the Peanut Man
Betty Robinson, Lawndale Community Academy

The Prairie: A Multimedia Experience
Lisa Palacios, Wheaton C.U.S.D. 200

It's Simple: Machines Are Elementary
Judith Ball, School District U-46

Using Science Process Skills in the Classroom
Beverly Sussman, Ivy Hall Middle School

Halloween's Coming — Let's Study Bats
Gertrude C. Johnson, Oak Park District #97

The Illinois Middle School Groundwater Project
Bill Donato, Illinois Middle School Groundwater Project

Phases of the Moon: Teaching for Mastery
Harvey Hensley, University of Wisconsin-Platteville

Feathers, Feathers, Feathers
Ann Retzinger, Central School (District #39)

Professional Development Initiatives in Math, Science and Technology Education
Raymond J. Dagenais and Martha,Taylor, IMSA

How Do I Introduce the Concept of Life to My Students Through Scientific Activities?
Dr. Abour H. Cherif, Columbia College of Chicago

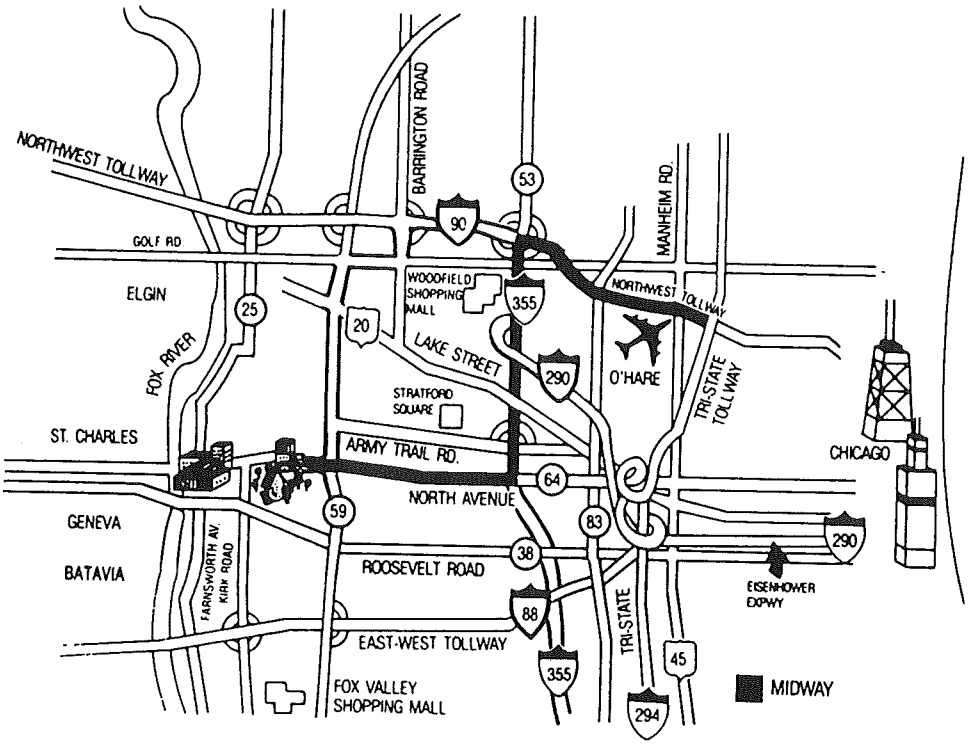
Phreshman Fysics
Greg Freedman and William Mitchell, Teachers' Academy

Hands-on Nutrition Science
Michele Kinzler, Illinois NET

Butterfly Life Cycle on a Stick
P. Diane Chambers, Brook Forest School

Gifted Adventures
Dennis Sievers, Central Community High School

Shareware Science
Dennis Sievers, Central Community High School



PHEASANT RUN RESORT is just 40 minutes from O'Hare International Airport. Take the Northwest Tollway to Route 355. Continue south on Route 355 to North Avenue (Route 64). Go west on North Avenue approximately 12 miles (3 miles west of Route 59 on North Avenue, Route 64).

Hands-on Materials to Expand Science (H.O.M.E. Science)
Denise Hainaut, Bunker Hill Community Unit #8
Craig Baron, Academic Advantage
Gloria Hagerman, Mosby Publishing
Mary Kate Dubiel, Optical Society of Chicago,
Tung H. Jeong, Lake Forest College

What is everything made of?
Prof. Gordon Baym, UIUC Department of Physics

Explorations with Bats
Gertrude C. Johnson, Oak Park District #97
Fran Harty, Department of Conservation

How cold is cold and how cold does it have to get to levitate a train?
Prof. Don Ginsberg, UIUC Department of Physics

The particle zoo and who's behind the bars
Prof. Tony Liss, UIUC Department of Physics

NASA: Teacher Enrichment and Support Programs
Barbara Victory-Thomas, Dunbar Elementary School

Story Book Science
Judith McKee, Central School

The Illinois Science/Mathematics/Technology Teacher Enhancement Network
Kristin Ciesemier, FermiLab Education Office

Program Profiling: An Approach to Formative Program Evaluation
Kristin Ciesemier, FermiLab Education Office

Science and Literature Together
Nancy Chu, Don Nelson, Don Powers, and LaVonne Sanborn, Western Illinois University

1994 IGAP Results
Dr. Richard Walker, Illinois State Board of Education

Introducing Diffusion Through Inquiry Approach
Gerald E. Adams and Dr. Abour H. Cherif, Columbia College of Chicago

Looking into the Brain with a Laser
Prof. Enrico Gratton, UIUC Department of Physics

Magnets: Some 'Attractive' Activities
Dr. Don Nelson, Western Illinois University

Integrated Science - Making All the Right Connections
Sheila Aherin, Addison-Wesley Publishing Co.

The Thematic Inquiry to Science Teaching for Grades 6-12
Jim Pudlewski, University of Hawaii/EMC

The Information Highway - Where's the On-ramp?
William Weiler, Science & Math Education

Operation Chemistry - Hands-on Activities for Elementary Teachers
Betty Barton, Roxana #1 (C.U.S.D.) retired; Dr. Virginia Bryan and Dr. Beverly Friend, Office of Science and Math Education; and Bill Weiler, Office of Science and Math Education

'Real' Science in Your Classroom
David Abler, Kristin Ciesemier, Susan Dahl, and James Jadrich, Fermilab Education Office

Renewing Our Planet: Integrating Academics with Hands on Science
Jay Runner, Facilitating Coordination in Agricultural Education

Eggciting Experiments: Chick Incubation and Embryology
Dean Dittmar, Facilitating Coordination in Agricultural Education

Can You Dig It? Let's Get Soiled
Larry Pfeiffer, Facilitating Coordination in Agricultural Education

Dairy Delights - Integrating Academic Science with Applied Hands-On Science
Jay Runner, Facilitating Coordination in Agricultural Education

Illinois Science Teachers Association
1994 Convention Registration
The World is My Classroom
Pheasant Run Resort, St. Charles, Illinois
November 4-5, 1994

PLEASE FILL OUT FORM COMPLETELY (EACH PARTICIPANT MUST USE A SEPARATE FORM.)

Name: _____ Spouse's Name (if attending): _____

Home Address: _____ Home Phone: (___)_____

City/State/Zip: _____

Affiliation (school, college or organization): _____

Business Address: _____ Business Phone: (___)_____

City/State/Zip: _____

____ CHECK HERE IF YOU NEED SPECIAL ASSISTANCE DUE TO ANY HANDICAP.
____ CHECK HERE IF YOU ARE INTERESTED IN BUS TRANSPORTATION FROM CHICAGO TO THE PHEASANT RUN RESORT AND RETURN TO CHICAGO.

To become an ISTA member for the 1994-95 School Year:
____ ISTA Membership Dues (through 9/95) $20.00 _____

To register for the convention, CHOOSE ONE:
____ Member Registration (dues paid through 9/95) $20.00 _____
____ Member Registration, One Day Only (Circle One): Friday Saturday $15.00 _____
____ Non-Member Registration $40.00 _____
____ Non-Member Registration, One Day Only (Circle One): Friday Saturday $30.00 _____
____ Full Time Student (Includes Membership) $10.00 _____
____ Non-Teacher Spouse $8.00 _____

PRE-CONFERENCE - Thursday November 3 (Fee Includes Lunch)
____ Science Leadership Pre-Conference on National Standards for Science Education* $45.00 _____

EDUCATIONAL TOURS - Fee Includes Transportation
____ Tour # 1 Fermi National Accelerator Laboratory (Friday) Fee $10.00 _____
____ Tour # 2 American Science and Surplus Shopping Spree (Friday) Fee $10.00 _____
____ Tour # 3 Sci-Tech (Friday) Fee $10.00 _____

ISTA Awards Dinner at Fermi Lab (Friday, November 4th) Number of Tickets _____ x each $20.00 _____

ISTA Conference T-Shirt ___ (Large) ___ (XL) ___ (2X) x $10 each each $10.00 _____

TOTAL: _____

PRE-REGISTRATION DEADLINE: Advance registration must be received no later than October 15, 1994 to ensure processing before the convention. Make checks payable to: **ISTA 1994 Convention.**
Send registration form and check to:

Judy Whitcomb
P.O. Box 373
848 Dodge Ave.
Evanston, IL 60201

BY ACTION OF THE ISTA BOARD OF DIRECTORS, REGISTRATION IS REQUIRED FOR PARTICIPATION IN ALL ACTIVITIES OF THE CONVENTION. THE BADGE ISSUED TO EACH REGISTRANT IS THE TICKET OF ADMISSION TO ALL SESSIONS, EXHIBITS AND OTHER ACTIVITIES.
*Don't miss out on this rare opportunity to meet with the key science educators in the nation. Space is limited.

ISTA NEWS

FALL PRESIDENT'S LETTER

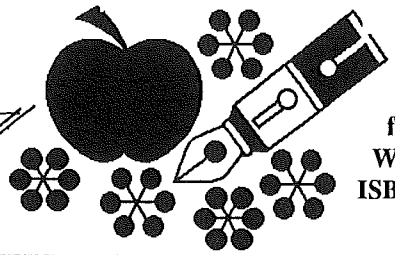
I trust this issue of the *Spectrum* finds all of you well into a successful year of science teaching. Much has taken place in the association since our last issue and I intend to provide you with a brief update of ISTA activities, but first let me call your attention to an important opportunity. For the last two years many of our talented and experienced classroom teachers and administrators have been taking advantage of the early retirement program. As a result we find our schools adding a considerable number of new faculty members to their staff. We need to let those new teachers know about the professional growth opportunities provided by ISTA and inform new administrators of the unique opportunity to send their staff to ISTA conventions. Remember school districts can use their Title II funds to cover conference expenses for their teachers attendance, travel, lodging, and meals. So if you have new staff members or administrators in your school, bring them along to the fall convention or share an issue of the *Spectrum* with them.

Regarding the new developments in ISTA. First, during the summer board meeting, president-elect Bernie Bradley and past president Jenny Grogg facilitated a one day discussion directed at establishing a new vision for ISTA. During this very informative and productive discussion several timely issues were brought to the table for discussion. After several hours of exploring the issues we settled on the idea of focusing on one major outcome and to begin in the most direct path to resolve that single issue. We selected as our first choice, Communication. As a result, several efforts to increase communication within ISTA and outside of ISTA have been initiated. Bernie is investigating the possibility of an ISTA electronic mail service, possibly through the state board and for sure compatible with Internet. I, on the other hand, continue to seek opportunities to link ISTA with other agencies promoting good science, mathematics, and technology education. I will continue to discuss specific collaborations with the Illinois Council of Teachers of Mathematics and the Teacher Enhancement Network.

Finally, I want to encourage you to attend the fall convention at Pheasant Run Resort (program and timetable in this issue). Steve Pieritz and his committee are going to convene the most exciting convention ISTA has ever seen and I know you will want to be part of it.

Good Sciencing,

David A. Winnett
ISTA President



Concerned about the future of education, especially science education? Besides being an active member of ISTA and recruiting other science teachers to join you, here is another idea.

Expressing your opinions to your congressional representatives really can help influence legislative actions. Elected officials do care about their constituents' opinions, so calling or writing letters to them can be quite effective.

The following tips for contacting your representatives on the Hill are excerpts from *Working with Congress: A Practical Guide for Scientists and Engineers*, a guide to communicating successfully with Congress.

For letters:

- Make letters short and to the point. Present your problem, issue, or request without beating around the bush.
- Identify who you are and what role you play in sending the letter.
- Do not assume that the reader of the letter is familiar with your issue. Briefly summarize your concern.
- Make the case for congressional action.
- Demonstrate familiarity with congressional practices. Make it clear that you know how your concern fits into the larger picture and what the opponents' issues are.
- Make your letter meaningful to the member's district or state.
- Do not take a friendly response as an invitation to begin ongoing correspondence, and try not to craft your letter so as to require a written response. (Responding via telephone is easier for staff members.)

For telephone calls:

- Avoid using the phone for complicated subjects.
- Plan your call in advance. Prepare a checklist. Find out beforehand with whom you need to speak.
- Do not be put off if you are referred to a staff member. Senators and representatives vary in their willingness to talk with constituents or are often unavailable. Staffers on the Hill often have very powerful and influential roles.
- Identify yourself immediately, and state your business quickly and clearly.
- Be patient but persistent if your calls are not returned. Staffers are very busy and often do not call back immediately.
- Keep your emotions in check; anger and demands do not go over well with congressional staffers.
- Send a follow-up note.

Copies of *Working with Congress* are available for $12.95 plus $4 shipping and handling from AAAS Books, Dept. A64, P.O. Box 753, Waldorf, MD 20604; (301)645-5643. Ask for ISBN-0-87168-504-3.

PORTRAIT OF A LIFE—ALICE MOSES

Alice Johnson Moses was born March 25, 1929 in Philadelphia, Pennsylvania. She was the daughter of Emma Washington Johnson and Albert Johnson. She peacefully and quietly entered into rest on April 13, 1994. She was baptized at Monumental Baptist Church, and attended Liberty Baptist Church for many years, and was confirmed at St. Phillips Lutheran Church.

Alice was educated in the Philadelphia Public Schools and graduated from Cheyney State University. She went on to the University of Pennsylvania where she received her Master's Degree. Additional studies were taken at Temple University, and at Oxford University in Oxford, England. Upon graduation, Alice taught fifth grade at the Bangs Avenue School in Asbury Park, New Jersey. She then returned to serve as a teacher in District I in the Philadelphia School System, and later became its Science Coordinator. She was selected as a Fulbright Exchange Teacher (1958-9) and taught in Woods Farm primary school in Heddington, Oxford, England.

Alice married Paul Bell Moses on March 30, 1962, and to this union was born a son, Michael. Soon after marriage, Alice and Paul moved to Chicago where he was appointed Instructor of Art History at the University of Chicago. Alice was a teacher and the Summer School Principal at the University of Chicago Laboratory Schools for twenty years. Upon Paul's untimely death, she remained at the Laboratory Schools until she was elected President of the National Science Teachers Association for 1984-85. Following her term as President, she served on the National Science Foundation for a two-year term. At the completion of that term she joined the NSF in a permanent position where she continued until her death.

Alice was recognized repeatedly by her colleagues. She was elected to the Board and Presidency of the Council for Elementary Science International; as a delegate to Section Q, Education, of the American Association for the Advancement of Science; and served as current President of the National Association of Science, Technology and Society. She presented papers and provided workshops primarily in elementary science education, both here and abroad. She received numerous awards, including two recent awards: election as a fellow of the AAAS, and recipient of NSTA's highest honor—the Robert H. Carleton award in 1993. Alice was a committed professional and was recognized in the centennial issue of Instructor Magazine as one of the 100 teachers who made a difference. She was a member of Alpha Kappa Alpha Sorority.

A consummate and recognized educator, Alice taught by example. Her high expectations of others and of herself helped spur that extra effort needed to help us live life to the fullest. Alice was a gracious lady with the heart and fighting spirit of a lioness. She lived her convictions, waiting to assume leadership of the NSTA until her son was grown, and then introducing many new programs and bringing in new people. She educated her colleagues about people, about her culture, about elementary schools and the education going on inside them, and about Washington—its good parts and its difficulties. Alice liked a good joke and she could give as well as take. A warm person, Alice enjoyed people but she also valued her privacy and independence. She was a true friend—"she could look through you and still enjoy the view." Alice was an inspiration to all of us.

Teachers who knew Alice from her Chicago days may wish to make donations to a scholarship fund to allow an African-American student to attend the University of Chicago Laboratory School. Checks should be made out to Alice Moses Fund and sent to Alice Moses Fund, c/o Chicago Laboratory Schools, Development Office-Blaine 199, 1362 E. 59th St., Chicago, IL 60637 (312)702-9450.

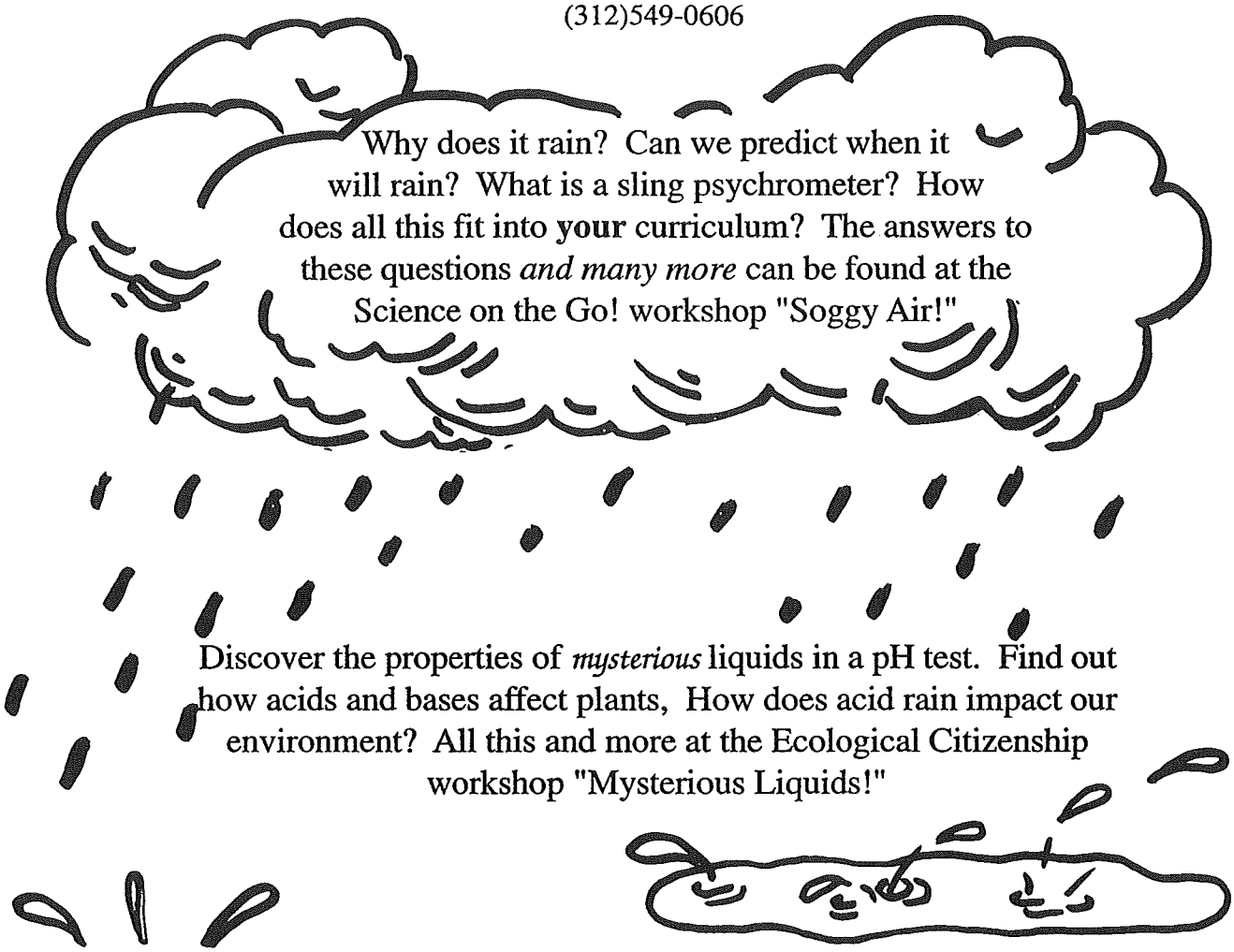
Attention: Membership Chair George Zahrobsky has changed his mailing address.

Send all address changes and membership questions to George at:

George Zahrobsky
P.O. Box 2800
Glen Ellyn, IL 60138

Chicago Academy of Sciences
The Nature Museum

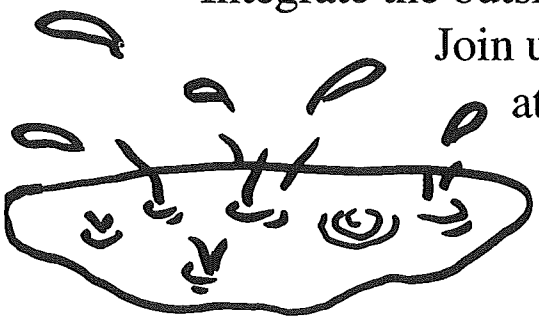
2001 N. Clark Street
Chicago, IL 60614
(312)549-0606



Why does it rain? Can we predict when it will rain? What is a sling psychrometer? How does all this fit into **your** curriculum? The answers to these questions *and many more* can be found at the Science on the Go! workshop "Soggy Air!"

Discover the properties of *mysterious* liquids in a pH test. Find out how acids and bases affect plants, How does acid rain impact our environment? All this and more at the Ecological Citizenship workshop "Mysterious Liquids!"

Integrate the outside world into your curriculum and classroom.
Join us for an informal sharing of ideas
at the 1994 ISTA Convention...



THE WORLD IS MY CLASSROOM

November 4-5
Pheasant Run Resort
St. Charles, Illinois

ARTICLES

John Davison, Ph.D.
Project Director
West 40 ESC #5
Riverside, Illinois

A HIGH SCHOOL SCIENTIFIC LITERACY STAFF DEVELOPMENT PROGRAM

This scientific literacy staff development program is a cooperative effort among teachers of mathematics, science, and vocational education who are employed in the right high school districts within ESC #5. Superintendents were encouraged to send a team representing the three academic areas to embark on a three year effort to develop hands-on performance tests within and across academic lines. Almost all districts participated but some did not send a full set of representatives.

To accomplish our primary goal it was felt that we would need to:

- Identify process skills common to science, mathematics, and vocational education
- Audit current curriculum to identify supportive instruction for the development of process skills.
- Develop increased understanding of assessment techniques.
- Construct and test hands-on performance tests of students' acquired skills.
- Foster increased intra-school communication among departments.
- Foster increased inter-school communication among participating schools.
- Explore the development of interdisciplinary activities and performance tests.

We spent several all day sessions learning more about alternative assessment and invited Judith Arter of the Northwest Regional Laboratory to address our group along with any other interested parties. We found A Practical Guide to Alternative Assessment to be most helpful in our deliberations. Many other articles from a variety of sources were photocopied and distributed. We were fortunate to be able to examine and critique one of the draft copies of the Benchmarks for Science Literacy being developed by the AAAS. This document helped us to reflect on the competency level we should be expecting from our students.

We also spent a significant amount of time on identifying process skills in each of our academic areas and through reporting the results of our thoughts to each other came to the conclusion that the general process skills of science, namely, observing, classifying, measuring, collecting and interpreting data, inferring, controlling variables, developing/using models and theories, hypothesizing, and predicting along with the ever present need to communicate effectively at each level, constituted a workable statement of those skills for each of the academic areas. Initial three-level scoring rubrics were developed for each of the skill areas.

As far as the actual development of hands-on performance tests were concerned, we saw three major options, namely, to develop authentic experiences that would test each of the individual skills, to develop authentic experiences that would test a combination of skills within a subject matter area, and to develop interdisciplinary authentic experiences that would test a combination of common skills. Most of the work this first year was centered around the second and third options. We had a three day workshop in the summer to do the actual writing and preliminary testing of the performance tests. We found the format used by the University of Buffalo to be most helpful.

This format divides most tests into: an open-ended written portion where the student is given a problem situation and the available materials and is asked to devise a method to solve the problem; and a hands-on portion where the student is given detailed instructions to follow but will need to collect, graph, and interpret results. A generic scoring rubric that can be readily modified to fit a particular task is also provided.

The extent to which the project did what it proposed was determined by an external evaluator, Herbert J. Walberg, from the University of Illinois - Chicago. The following are extracted from this year-end report.

- All agreed that their knowledge of alternative theory and method had been improved.
- All indicated that they used or would use their knowledge of assessment practices.
- All agreed they better understood the benefits of having teachers determine the degree to which their students acquire process skills as an effective tool to promote needed curriculum changes.
- All planned to or already conducted classroom research to determine the extent to which their students acquired desired process skills.
- Most agreed that communications among and within schools had improved.
- Most reported that they discussed ideas and methods picked up in the program with their colleagues in their departments who were not part of the project.
- Most disagree that their colleagues had tried some of the ideas or methods they discussed with them that were generated in the workshop.
- Half responded that they became more familiar with the electronic bulletin board.
- Almost all believed that the program identified the process skills common to math, science, and vocational ed.

During the second year of this three year program, 1993-94, the planned objectives are as follows:

- Institute research techniques and CBAM procedures during the training of participants who, in turn, can train fellow faculty members.
- Develop additional assessment tools to be used across the full range of courses offered in each department.
- Submit assessment instruments to validity, reliability, and equity studies after initial trial and revision.

- Increase the knowledge base regarding alternative assessment techniques of the participating faculties.
- Use the assessment tools to measure student acquisition of process skills in each curricula area.
- Begin revision of school curriculum and teaching strategies to increase student acquisition understanding, and utilization of process skills.
- Conduct formative evaluation activities throughout the year.
- Develop summative evaluation of the year's activities for reporting purposes and to assist the refining of the program in year three.

The activities planned for this year are:

- Train project team members in research techniques and CBAM procedures so they can train fellow faculty members.
- Conduct a workshop to update school administrators on the progress of the project.
- Team members will conduct assessment training for their colleagues at each school.
- Conduct seven day-long meetings for teams to continue developing assessment tools and refining and revising tools already developed; in-school training is discussed; base-line data are reviewed; techniques for observing teachers using new procedures and assessment tools are discussed; and preliminary discussions are held regarding permanent record keeping of student assessments.
- Team members and their faculties pilot, evaluate, and revise assessment tools devised during the first year.
- Team members and their faculties develop additional assessment tools to be used across the full range of courses offered in each department.
- All assessment tools submitted for reliability, validity, and equity studies with subsequent revision if necessary.
- Each school pilots the additional and revised assessment tools and develops base line data.
- Under team leadership, each school begins modification of curricula and teaching strategies to increase student acquisition and utilization of the identified process skills.
- Expand the use of the electronic bulletin board to include all members of the science, mathematics, and vocational education faculties.
- At the two-day summer workshop, team members debrief assessment tool development, revisions of curricula and teaching strategies, bulletin board usage, and plan for year three.
- Collect information for a formative evaluation throughout the project year and develop summative evaluation of year two activities for reporting purposes and to refine the program for year three.

Funding for this program as been supplied by the Illinois State Board of Education, School Improvement Services.

Bibliography

A Practical Guide to Alternative Assessment, Herman, Joan, et al., ASCD, 1992, ISBN: 0-87120-197-6.

Benchmarks for Scientific Literacy (Part 1: Achieving Science Literacy) Draft copy, AAAS, January, 1993.

SAMPLE INTERDISCIPLINARY ALTERNATIVE ASSESSMENT

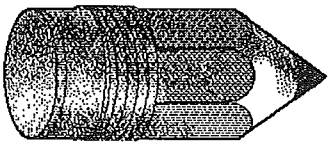
GENERAL ASSIGNMENT PARAMETERS

Your assignment will involve doing some library research on a topic you and a partner will choose. You will be given three class periods to take advantage of the school's library materials. Any extra time you need will need to be done outside of class time. You and your partner will then need to write a report of at least five double spaced pages complete with endnotes and a bibliography listing all materials you have used. You and your partner will also need to plan your presentation to the class. The class will assist in the evaluation of your presentation. Your English teacher will assist in the evaluation of your written report. Your science teacher will evaluate the thoroughness and accuracy of the science content of your written report.

RESEARCH TOPIC

Science is an integral part of many important and significant social problems facing society - sometimes it is part of the problem, sometimes part of the solution, and sometimes part of both. Listed below are some representative problems facing society. Do not limit yourself to this list: it is meant to stimulate your thinking and is not intended to be exhaustive.

You will need to both pick a topic and a partner. The order you use is up to you but you will need to gain your teacher's approval for the topic since each group must have a topic that does not duplicate any other one in the class.



Sample Topics

1. Genetically altered foods - Safe to eat?
2. Chemicals to stimulate growth and/or milk production - safe?
3. Space technology - worth the price?
4. Closing of the Texas super collider - good decision?
5. Releasing of lab produced organisms into the environment - okay?
6. Use of humans to test effects of radioactive materials - ethical?
7. Chemicals used to terminate pregnancy - good idea?
8. What happens when the petroleum supply is exhausted?
9. Electric automobiles - fantasy or fact?
10. Reducing air pollution by limiting number of autos driven to work - practical or unrealistic?
11. Superfund cleanup of the environment - the right decision?
12. Public assistance for those living on the flood plain or on earthquake epicenters - release from personal responsibility?
13. Contamination of the freshwater supply - on the mend?
14. Use of aquifers to irrigate crops - justified?
15. Desalination of ocean water - practical solution?
16. Noise pollution - whose problem?

EVALUATION OF WRITTEN REPORT

Points for the written report many be gained by submitting the following:

Research note cards (5 pts)

- At least 5 independent sources used. Card lists source, author, pages, and notes. (5)
- At least 5 independent sources used. Card lacks only one of the above listed characteristics. (4)
- At least 5 independent sources used. Card lacks two or three of the listed characteristics. (3)
- At least 4 independent sources used. Card list source, author, pages, and notes. (2)
- At least 4 independent sources used. Card lacks one or two of the listed characteristics. (1)

Report Format (5 pts.)

- Report is at least 5 double spaced pages long, is typed or word processed, additional pages contain endnotes, a bibliography, an abstract and a title page. (5)
- Report is at least 5 double spaced pages long and additional pages lack only one of the listed characteristics. (3)
- Report is at least 5 double spaced pages long and additional pages lack two or three of the listed characteristics. (3)
- Report is at least 5 double spaced pages long, word processed or typed. Additional pages not included. All listed characteristics are included. (2)
- Report is at least 5 double spaced pages long, word processed or types. Additional pages not included and lacks one or two of the listed characteristics.

Report Content (5 pts)

- Report describes the background of the problem and at least two sides of the issue. Each side's major concerns and solutions are described fairly and with reasonable completeness. Authors have indicated their position regarding the issue and have justified their choice. The role of science increasing the problem and/or the solution is clearly stated. (5)
- Report lacks one of the listed characteristics. (4)
- Report lacks two of the listed characteristics. (3)
- Report lacks three of the listed characteristics. (2)

Note: Due to space restrictions, we were unable to include several forms with this article. They are: rating sheet, student scoring sheet, student feedback form, and teacher participation evaluation forms. The author would welcome requests for these materials as well as any questions you may have regarding this article. You may write to him at the address listed at the beginning of the article.

REPORT STRUCTURE (15 pts)

[Taken from "Design and development of Performance Assessments,." Richard J. Stiggins, Educational Measurement: Issues and Practice, Fall, 1987]

Organization (5 pts)

(5) The writing organizes material in a way that enhances the reader's understanding or that helps to develop a central idea or theme. The order may be conventional or not, but the sequence is effective and moves the reader through the paper. Details seem to fit where they are placed, and the reader is not left with the sense that "something is missing." The writer provides a clear sense of beginning and ending, with an inviting introduction and satisfying conclusion ("satisfying" in the sense that the reader feels the paper has ended at the right spot). Transitions work well; the writing shows unity and cohesion, both within paragraphs and as a whole. Organization flows so smoothly that the reader doesn't have to think about it.

(3) The writer attempts to organize ideas and details cohesively, but the resulting pattern may be somewhat unclear, ineffective, or awkward. Although the reader can generally follow what is being said, the organizational structure may seem at times to be forced, obvious, incomplete, or ineffective. The writer seems to have a sense of beginning and ending, but the introduction and/or conclusion tend to be less effective than desired. The order may not be a graceful fit with the topic. The writer may miss some opportunities for transitions, requiring the reader to make assumptions or inferences. Placement or relevance of some details may be questionable. While some portion of the paper may seem unified, cohesion of the whole maybe weak.

(1) Organization is haphazard and disjointed. The writing shows little or no sense of progression or direction. Examples, details, or events seem unrelated to any central idea, or may be strung together helter-skelter with no apparent pattern. There is no clear sense of beginning or ending. Transitions are very weak or absent altogether. Arrangement of details is confusing or illogical. There are noticeable information "gaps"; the reader is left dangling or cannot readily see how the writer got from one point to another. The paper is lacking in unity and solidarity.

Voice (5 pts.)

(5) The paper bears the unmistakable stamp of the individual writer. The writer speaks directly to the reader, and seems sincere, candid, and committed to the topic. The overall effect is individualistic, expressive, and engaging. The paper is honest. There is real effort to communicate, even when it means taking a risk. The writing is natural and compelling. Tone is appropriate and consistently controlled. The writer's own enthusiasm or interest comes through and brings the topic to life. The reader feels and interaction with the writer and, through the writing, gains a sense of what the writer is like.

(3) The writer makes an honest effort to deal with the topic, but without a strong sense of personal commitment or involvement. The result is often pleasant or acceptable, yet not striking or compelling in a way that draws the reader in. Writer may seem self-conscious or unwilling to take a risk-may seem to be writing what he/she thinks the reader wants. Paper lacks individuality or the ring of conviction. The writing communicates, but only in a routine, predictable fashion that tends to make it blend in with the efforts of others. Voice may be inconsistent; it may emerge strongly on occasion, only to shift or even disappear altogether. The reader has only an occasional or limited sense of interaction with the writer.

(1) The writer may not have understood the assignment or may have felt indifferent toward the topic. As a result, no clear voice emerges. The result is flat, lifeless, mechanical, and stilted, or possibly inappropriate. The writing his virtually no individual personality or character; there is no identifiable voice behind the words. There is little or no evidence of the writer's involvement in the topic. The reader has no sense that the writer is "writing to be read" and experiences virtually no writer-reader interaction.

Writing Conventions (5)

(5) The writer has a good grasp standard writing conventions (grammar, capitalization, punctuation, usage, spelling, paragraphing). There are no glaring errors. In fact, errors tend to be so minor that reader can easily overlook them unless searching for them specifically. Sentence structure and paragraphing tend to be sound. Agreement of subject and verb is correct. Punctuation is smooth and enhances meaning. Spelling is generally correct.

(3) Errors in writing conventions begin to impair readability. Sentence structure is generally correct on simple sentences, though more complicated patterns may contain such problems as faulty parallelism, inconsistent tense, voice shift, dangling modifiers, or vague pronoun reference. Errors may reflect hasty writing or lack of careful attention to detail in editing. The reader can follow what's being said overall, but errors in conventions may require the reader to pause or reread on occasion.

(1) There are so many errors in usage, sentence structure, spelling, and/or punctuation that the paper is hard to understand. The student shows very limited understanding of, or ability to apply, conventions. Basic punctuation tends to be omitted, haphazard, or just plain wrong. Spelling errors are typically frequent, even in common words. Fragments, run-ons, and awkward constructions abound.

Class Presentation (10 pts)

(1) Presentation to the class is interesting, informative, creative, and is done with a minimum use of notes.

(8) Presentation to the class is interesting, informative, and is done with a minimum use of notes.

(6) Presentation to the class is interesting and informative but heavy use is made of notes.

(4) Presentation to the class is informative but dull.

(2) Presentation to the class is both dull and lacking in information.

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Weatherization Audit Training for Teachers and Students: Students, Teachers, and Professionals Team Together in Writing Grants Totalling Over $500,000

Introduction

The Weatherization Audit Training for Teachers and Students (W.A.T.T.S.) program was fully developed and implemented between 1992 and the present at East Peoria Community High School (EPCHS). Three hundred twenty-three students have participated during each of these school years. Four student energy interns were hired to work full time during the summer of 1993 to perform school energy audits in twelve school buildings. Teachers from around the state in several disciplines are currently writing a W.A.T.T.S. Program curriculum. I anticipate the program will run at EPCHS indefinitely.

Background

In August 1992 I was invited, along with fourteen other student-teacher teams from all around Illinois, to participate in a week-long workshop. My student leader, Daryn Miller, from EPCHS. was also a River Project student leader. The workshop was held at the University of Illinois-Urbana/Champaign. The main concept presented there was the result of a coalition of professionals from: the University of Illinois-Chicago's Energy Resource Center, a consulting engineer, a professor of economics from Illinois State University, and the Illinois Energy Educational Development (ILEED) team from the Illinois Department of Energy and Natural Resources. You might call the W.A.T.T.S. program a constructivism: a springboard for successful energy education.

The significance of the 1992-93 school year, with respect to the W.A.T.T.S. program, lies in the reality that East Peoria students teamed together with agencies, building engineers, administrative teams, and teachers in order to transform this W.A.T.T.S. concept from the idea stage to the full implementation level. I do not have knowledge of another school in Illinois which is presently running an energy educational program as complete as this one.

The Outcome

The global outcome of W.A.T.T.S. is improving the quality of instruction and learning at the school. This achievement has resulted from teamwork among the students, teachers, professional engineers, administrators, university staff, and E.N.R. professionals. The main goal of the student teams is to identify energy waste within their schools, and to develop energy conservation measures (ECM's). The expected outcomes are to improve the environmental education program at EPCHS and to reduce the participating school districts' expenditures for heating, lighting and cooling.

Sequencing

There are three phases to this program. Phases I and II are prerequisites to reaching Phase III. Phase III is a competitive grant phase to help finance the W.A.T.T.S. team's ECM's and hopefully to realize the actual conservation of energy. Follow-up studies are scheduled through the 1999 school year.

I am a general science teacher with strong emphasis in earth science and biology. I started Phase I at the school along with teachers from: math, physics, industrial technology, and computer applications classes. During Phase II, three sections of English were added to the W.A.T.T.S. team. Mr. Dan Corray, the technology coordinator, and I serve as program co-leaders.

During the early stages of the program, we made a decision to disseminate the program to other schools. A meeting was held with three additional school districts' superintendents, building principals, students, and building engineers. In just two months elapsed time, arrangements were made for a total of four school districts and twelve contiguous neighborhood school-communities to fully participate in the W.A.T.T.S. program. Each school team submitted their own phase one energy audits by December 1992. Students measured and performed calculations, teachers wrote the grant applications, and superintendents advised and eventually signed-off on the paper work.

Funding

By springtime 1993, EPCHS district 309 and the three additional school districts received notice that Phase II had been funded on an 80% to 20% basis. This meant nearly $47,000 was forthcoming from the U.S. Department of Energy (DOE) to contract a professional engineering firm to perform the technical energy audits on the school buildings. A breakdown of the grants received by each participating school district is as follows:

East Peoria Community High School District #309:	$12,706
East Peoria Elementary School District #86:	$23,136
Creve Coeur School District #76:	$ 6,875
Robein School District #85:	$ 4,075

The teachers' plan was to use these funds to hire an engineering/architectural firm which would in turn permit students from our cadre of W.A.T.T.S. students who participated during phase one of the energy audits. In May the Energy Resource Center (ERC) from the University of Illinois at Chicago was contracted to perform the required technical audits for Phase III. The ERCstaff donated an amount which helped to defray the wages of four EPCHS student interns who will perform most of the legwork during Phase III energy audits.

In May 1994 the labor of the students, engineers, teachers, and administrators produced additional funding revenue. Dan Corray and I received notice from the Department of Energy that our school W.A.T.T.S. program would receive Institutional Conservation Program (ICP) grants of $280,149.00. The total grant funding received for the W.A.T.T.S. Program to date is $342,149.00 for fiscal years 1993 and 1994.

Interns

The energy interns moved up the learning curve as they worked from school to school throughout the summer. Some of their duties included: researching the blueprints of the buildings, working with architectural scales to calculate total square footage, identifying the type of construction, identifying materials used in the walls and the roofs, and climbing onto the roofs to collect data from the heating, ventilation, and air conditioning systems. They worked side-by-side with building engineers in the boiler rooms, and they interviewed school superintendents when necessary. They made nametag-badges identifying themselves as "student engineers".

Assessment

This program is very unique. I am currently developing a new *portfolio assessment system for students* (P.A.S.S.) to assess the learning of the students. The following list of math-science skills summarizes the skills which the W.A.T.T.S. students either acquired or enhanced during the past twenty-four months: *observing, comparing and relating, communicating, measuring and calculating: collecting, organizing and classifying data; formulating, hypothesizing, experimenting, inferring, applying and analyzing, graphing, and mathematical manipulation.* Intensive use of the personal computer as a tool was reinforced daily throughout the program cycle. Strong emphasis was placed on enhancing the students' interpersonal communication skills and fostering self-discipline in a workplace environment.

Conclusion

Because our school, and all of the eleven other schools qualified for Phase III funding, a maximum of eighty-five thousand dollars may be made available on an eighty percent to twenty percent funding ratio to each of twelve school buildings. Our energy conservation measures (ECM's) which require revenue are now possible. Our intent is to use the funding to make retrofitted HVAC building improvements, which range in cost from next to nothing to the total dollars made available. Our projected goal is to institute the ECM's with a payback between a two and one-half and a three year period. Because these efforts were successful, the students' work has made the schools eligible for grants for many years to come. Our cadre of energy interns are already looking to a better future, when students will also perform energy audits on the local library or the small museum in the community. I have also inquired at the possibility of students working on energy audits at a nursing home and a hospital.

Recognition

Awards alone don't necessarily mean a program works well. It is usually only good student work, facilitated by focused teachers, which makes successful programs of learning-instruction. Although awards may serve as an indicator of successful educational programs. The W.A.T.T.S. program and the Illinois River Project at East Peoria thus far have received the following recognition: The Take Pride in America Award for first place in environmental education in Illinois, the Illinois Energy Educational Development Award (ILEED), the Connections 2000 Award and the Pioneering Partners Award, given for promoting technology in the classroom.

As the lead teachers, Dan Corray and I have volunteered to facilitate the programs throughout the summer. I received the J.C. Penney Golden Rule Award and $1000 was given to the school honoring my volunteer efforts to spearhead the school's environmental education programs. I was also presented the Izaak Walton League Good Neighbor Award honoring my volunteerism in environmental education. My work with The River Project from Southern Illinois University-Edwardsville was a key ingredient to my receiving the Outstanding Earth Science Teacher Award in Illinois for 1994 and the school received $10,000 from Amway in 1992 to enhance our educational program. W.A.T.T.S. Program co-leader Dan Corray and senior Chris Schmidgall also received the J.C. Penny Golden Rule Award and a $1250 award to the school in 1994 for the W.A.T.T.S. Program. The Program was recognized in 1994 by the IL DENR and the US DOE as the best energy educational program in Illinois. From this article, it should be evident that now is the right time to develop your good ideas into classroom programs. It is a fact that grassroots educational programs are effectively educating students and the greater community. My experience is that both the financial resources and the support from agencies and industry are readily available to the regular classroom teacher. The state agencies have been particularly resourceful to our educational programs.

Dissemination

East Peoria Community High School has established both a printed newsletter and an electronic bulletin board system to disseminate the W.A.T.T.S. program. By establishing these communication links, our students and teachers will maximize dissemination of the W.A.T.T.S. program. The Ameritech Corporation has provided funding of $150,000 to develop ENERGYNET, a classroom curriculum energy educational project. Mr. Dan Corray is an author of this ambitious project intended to disseminate the W.A.T.T.S. type of educational project statewide.

Further Reading:

"Building Energy Audit Workbook." *Institutional Conservation Program.* Title 111, Public Law 95-619, Illinois Department of Energy and Natural Resources (ILDENR). ILDENR/IC-86-619.

"Technical Assistance Program Manual." *Report Guidelines and Required Forms*, ILDENR, 1992.

"Energy Conservation." *Guidelines Manual for Heating, Ventilation, and Air Conditioning (HVAC) Systems*, ILDENR, 1992.

"Lighting Efficiency." *For Better Energy Cost Control: Lighting Standards for State Buildings*, ILDENR/BE-86-01.

SPECIAL INTERESTS

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SEA GRANT OUTREACH PROVIDES GREAT LAKES EDUCATION

The mission of the Illinois-Indiana Sea Grant Program is to foster stewardship, conservation and appropriate use of the resources of the Great Lakes region, with an emphasis on Lake Michigan, develop leadership, and enhance the quality of life in Illinois, Indiana and throughout the region. This mission is accomplished through research, education and advisory services.

The National Sea Grant College Program, created by Congress in 1966 follows the model of the land-grant college system. Illinois-Indiana Sea Grant is one of 29 programs that respond regionally to current issues. Funding is provided by National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

Now in its second decade, Illinois-Indiana Sea Grant continues to expand its role as a significant partner among those seeking solutions to Great Lakes issues. The bi-state program combines the resources of both the University of Illinois at Urbana-Champaign and Purdue University at West Lafayette, Indiana, and provides outreach services through the Cooperative Extension Services of both universities.

Outreach Activities

Marine Advisory Services and Communications jointly provide outreach activities. These activities encourage appropriate conservation and management of coastal resources and the establishment of sustainable coastal economic development on the Great Lakes and inland waters and enhance the economic impact of this development. The program provides education and public information on emerging issues. A quarterly newsletter, *The HELM*, addresses a wide range of interconnected issues that affect the entire Great Lakes region. Training is provided to educators, Extension staff, industrial and municipal water users, small businesses, and aquaculture producers.

Focus Areas

Through research and outreach activities, the program addresses current issues on water quality, wetlands, aquaculture, coastal business and tourism and nonindigenous species. Sea Grant developed curriculum is in classrooms around the country. Illinois-Indiana Sea Grant's *Wetlands are Wonderlands* is

used extensively both in the United States and in such far-away locations as Thailand. Teacher training on wetlands has been provided, and Sea Grant will offer Great Lakes curriculum teacher training workshops next year.

Cooperative Projects

Cooperative projects are developed with other state and federal agencies. As part of the Great Lakes Sea Grant Network, made up of the six Sea Grant programs in Great Lakes states, the program participates in cooperative projects. Recent projects include the following:

- Education outreach on Lake Michigan Lakewide Management Plan (LaMP) developed by U. S. EPA
- Zelda Zebra Mussel, an education exhibit available for loan
- *Life of the Lakes*, an education package on the Great Lakes
- Traveling trunk nonindigenous species education exhibit

Research Project Sampling

- Lake-level Variation in Southern Lake Michigan
- Identification of Near-Shore Lake Trout Spawning Sites in Southwestern Lake Michigan
- Osmoregulatory Physiology of the Zebra Mussel
- Efficient Protection of Fisheries Habitat in Great Lakes Tributaries from Agricultural Pollutants

Publications Sampling

- *The HELM* (quarterly newsletter)
- *Sea Grant's Role in a Decade of Change* (Tenth Anniversary Report)
- Lake Michigan LaMP Education Summary Report
- Breakers: LaMPs, RAPs and Lake Michigan Remediation
- A Basic Overview of Basic Aquaculture
- Developing a Bed and Breakfast Businesses
- *Wetlands are Wonderlands* (youth curriculum)

A complete publications list is available upon request.

For information on Sea Grant programs, contact us at the above address.

The Groundwater Gazette
September 1993

A RIVER RUNS BENEATH IT?

Underground rivers are rarely hidden streams running through solid rock tunnels. The Mahomet "river" beneath east-central Illinois is a good example, as is the eastern part of this "river" called the Teays (rhymes with "days").

The Mahomet-Teays river system was discovered fifty years ago, when many wells were drilled in the eastern and midwestern U.S. The tale of this underground river was derived from records of those well drillings.

Before the Great Ice Age, over a million years ago, a river as big as the mighty Mississippi River flowed west from the mountains of West Virginia. This large river (often called the "Pre-glacial Ohio River") flowed across east-central Illinois from Hoopeston to Havana. At Havana, it met up with another ancient river (the Pre-glacial Mississippi) that flowed through what is now the Illinois River Valley. Together, these two mighty rivers cut deep paths into the bedrock.

When successive glaciers bore down on Illinois, the fringes of the ice melted during warmer periods, and the meltwater carried away great quantities of sand and gravel from the ice. This *outwash* was deposited in thick layers in the Mahomet Valley. As later glaciers advanced southward, the valley and the outwash were buried beneath the ice. When the glacial ice finally melted away, enormous amounts of rock debris (pebbly, sandy clay - *till*) buried the landscape to depths of 50 to 100 feet. (The *outwash* and *till* are collectively called *drift*). The Mahomet River Valley was embedded within this drift. The river no longer existed, and the river patterns of today were formed.

The porous sand and gravel of the buried Mahomet Valley act as vast underground sponges. Water flows easily through the sand and gravel. In contrast, glacial till is too fine grained to allow for the easy passage of water and cannot supply large amounts of water to wells. Towns such as Hoopeston, Champaign-Urbana, Mahomet, Monticello and Clinton are situated above the buried Mahomet Valley and have large groundwater supplies available, but towns away from the valley have more difficulty obtaining water.

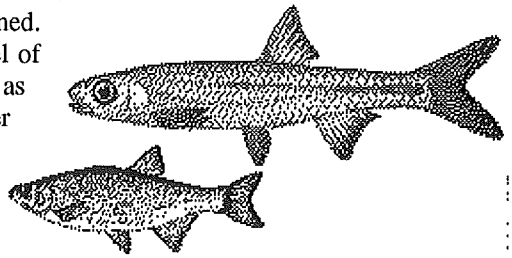
The Mahomet Valley has been traced for about 150 miles across Illinois. It lies at an average depth of 200 feet below the land surface, and its bottom is at an average of 300 feet above sea level. The valley varies in width from 5 miles near the Indiana line to almost ten miles near Clinton.

Another major "underground river" is the Princeton Bedrock Valley in the north-central part of Illinois. Many smaller bedrock valleys in the state contain sand and gravel deposited by glacial meltwater. The Mississippi, Illinois, Kaskaskia and Wabash Rivers also contain beds of outwash deposited by glacial meltwaters, but their courses were not obliterated by the glaciers, and their valleys have remained open as drainageways.

Out of the more than 3.5 billion gallons of water a day used in Illinois, over 450 million gallons are pumped from sand and gravel deposits, which are mainly glacial in origin.

These ancient underground river beds of groundwater provide us with the exquisite treasure of plentiful water, which is so necessary to life.

(Adapted from *Geogram 6*, October 1975-Myrna M. Killey: Illinois State Geological Survey and Leland Horberg, ISGS. 1950. *Bulletin 73: Major Bedrock Valleys.*)



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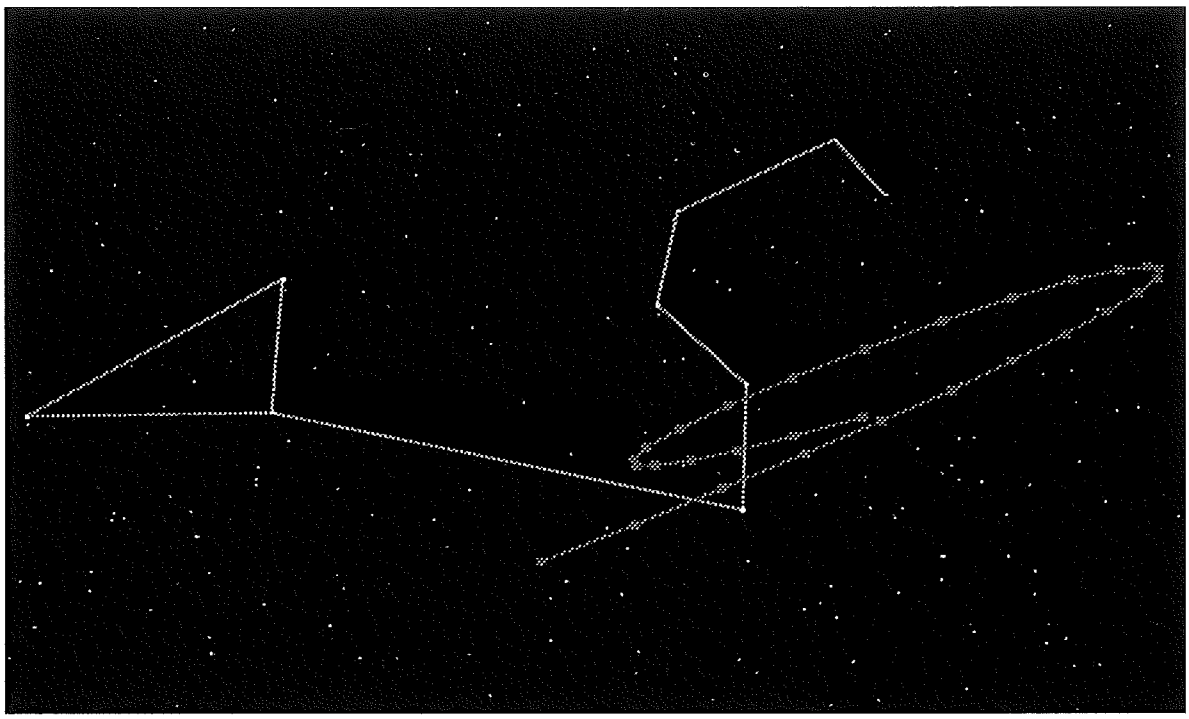
LEO AND MARS — A SCHOOL YEAR OBSERVING PROJECT



During the 1994-95 school year students and teachers alike will have the opportunity to observe Mars as it rapidly brightens and performs a loop among the stars of Leo, the Lion. Enterprising individuals might attempt to record this "cosmic dance" by taking photographs every two weeks.

The accompanying picture shows the apparent motion of Mars relative to the constellation Leo at weekly intervals beginning December 1, 1994. The motion begins with Mars tracking eastward (left in the diagram) until January 2, 1995, when Mars reaches its turning point northeast of Leo's heart, marked by the bright star Regulus. At this point, Mars begins it westward or retrograde motion. The motion will carry the red planet some 19 degrees westward into some of the dimmer stars of Cancer, the Crab.

This backing up or retrograde motion is only apparent. It results from the faster-moving Earth overtaking slower-moving Mars. Earth passes between Mars and the Sun on February 11. At this time Mars is seen opposite the Sun from the earthbound perspective. On March 24 Mars will end its retrograde motion and resume eastward or prograde motion.

As Mars goes back and forth among the stars of Leo, it will pass Regulus three times. This series of conjunctions — a triple conjunction — will occur on the following dates: December 10, 1994, January 21-22, 1995, and again on May 24, 1995.

Mars will appear just as bright as the zero-magnitude star Arcturus in mid-December. Mars will continue to brighten until it nearly equal Sirius — the brightest star in the sky. This will occur when the planet makes it closest approach to Earth on February 11, 1995. At that time the planet will lay 62,700,000 miles (101,000,000 km) distant. Mars will again match Arcturus in brightness by April.

Mars will be visible low in the east just before the start of morning twilight in early December. From late December to mid-February Mars will be visible in predawn darkness hours. On the night of February 11 it rises as the sun sets and becomes an "evening star." From mid-February until early April the red planet will be visible during evening darkness hours. Near the end of the school year it will be visible just after the end of evening twilight.

Melanie Wojtulewicz
State Representative
National Association of Biology Teachers

BIOLOGY STANDARDS: A GLOBAL PERSPECTIVE

The Commission for Biological Education of the International Union of Biological Sciences met in Colorado Springs from August 30 - September 5, 1992. The fact that the United States had an opportunity to host this illustrious group of educators was seen as a unique opportunity to explore the experiences of other countries in establishing and implementing precollege life science education standards. A symposium was organized in conjunction with the CBE meeting to try to determine whether there are similarities in what various countries feel are the core elements of precollege biology education at various grade levels. Thus the symposium, "Basic Biological Concepts: What Should the World's Children Know?" sought to bring together educators from around the world to share their countries' experiences in the design, adoption and assessment of curriculum and teaching standards. Papers were submitted and individuals were assigned responsibilities to report on commonalities and differences within continents.

The final task was to investigate four basic questions:

- What is a concept and what criteria can be used to define a biological concept?
- Are there commonalities among countries regarding curriculum standards and/or core concepts that are essential knowledge for all students?
- Are there commonalities among various countries of the world regarding the teaching strategies that work best in the classroom?
- What assessment mechanisms have worked well in other countries, and are there any characteristics that can be identified as being essential in selecting appropriate assessment instruments?

Working groups were formulated to try to teach a consensus of understanding on these major questions. An enormous amount of information was processed and shared and the results were presented in the volume *BASIC BIOLOGICAL CONCEPTS: What Should the World's Children Know*? The publication is available from the National Association of Biology Teachers. A companion volume from the American Federation of Teachers, *What College-Bound Students Abroad are expected to Know About Biology*, is also available.To orderthese materials, contact National Association of Biology Teachers, 11250 Roger Bacon Drive #19, Reston, VA 22090-5202.

William J. Cook
Reprinted from *The Texas Science Teacher*

BINOCULARS: HELPFUL HINTS TO MAKE THE RIGHT CHOICE

Over the last couple of years, I've come across a number of articles designed to evaluate current models of binoculars and aid the consumer in making a good buying decision. I've been concerned by the fact that many things I've seen in print aren't true and, in some cases, may have caused poor buying decisions. Because of this, I feel the need to contribute my two cents.

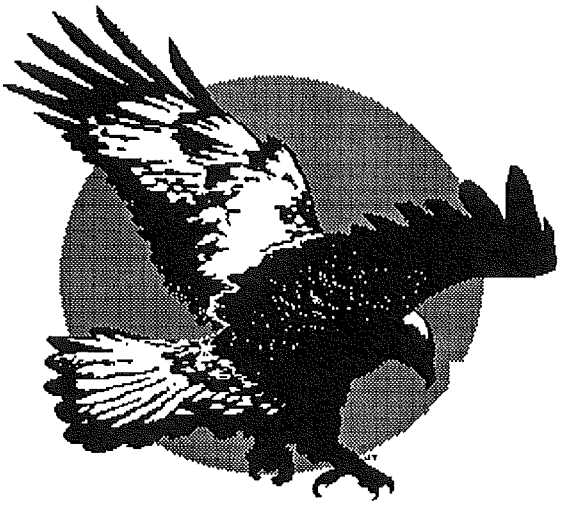
As manager of one of the busiest optical shops in the United States, I often have the pleasure of repairing some of the world's finest binoculars. Much more often, I have the odious task of telling a customer the binoculars he purchased (in some cases less than a year prior) aren't cost effective to repair and that, while a particular instrument may be a "best buy" within a magazine evaluation, the same may not hold true once a basic repair or adjustment is required.

A severely truncated portion of an article I wrote in 1990, this piece deals with some of the more common misconceptions concerning the purchase of binoculars and may help you in the future.

I want an auto-focus binocular

Most binoculars, when focused for a distance between 70 and 80 yards, will provide reasonably good imagery up close and at infinity. However, you must refocus them for optimum performance at either extreme.

Some companies are marketing binoculars that don't even have focus mechanisms. This helps convince the consumer that no focusing is required. The real magic here is that the instrument forces the user's eyes to adapt to its permanently focused (if you're lucky) setting. This can lead to eyestrain, headaches and less than perfect imagery at all distances. Further, without the ability to focus, there's no way for an individual to compensate for differences in the dioptric strengths of his eyes.



I want a night vision (infrared) binocular

While these instruments are available, they're most useful for military and law enforcement applications, and if you have to ask the price, you can't afford them.

What you probably really want (since the human eye can't see infrared light anyway) is a binocular which will allow the observer to have viewing time extended into twilight, and any 7x50 binocular can accomplish this.

The term "night glass," which originated during World War II to describe the 7x50 binocular, can be used to describe any binocular that will provide a 7mm exit pupil. You can determine the exit pupil by dividing the magnification into the size of the objective lens measured in millimeters.

The pupils of our eyes normally expand from about 2.5mm in sunlight to a maximum of about 7mm at night. When the binocular exit pupil is the same size as the pupils of your eyes, you can get the most from the instrument's light grasp.

The next time you're with a friend using a 7x50 binocular in daylight, take a look at his eyes. You'll notice they're bathed in sunlight with only a small portion entering the constricted pupil. During the day, only about 19 percent of the light received by a 7x50 instrument is utilized, with the remaining light falling on the iris.

As we age, the iris loses some of its elasticity and won't dilate as it did when we were in our 20's and 30's. It's rare for an individual in his 60's to be able to take advantage of an exit pupil greater than about 5mm. So, for an older person to take full advantage of the 50mm aperture, he would need to use a 10x50 binocular.

However, this may not be practical because a 10 power instrument is more difficult to hold steady. What can you do? Consider a 7x35 or perhaps an 8x40. These instruments generally have a wider field of view, cost less (all else equal) and have the right size exit pupil.

I want your most powerful binocular

It's unfortunate that many consumers tend to want power in an optical instrument over all other considerations. Power is one of the least attractive and least important features in an instrument. Whether you're using a telescope or binoculars, you shouldn't use more power than is necessary to do the job for which it was selected.

When you increase magnification, you:

- decrease image brightness by spreading available light over a greater field;
- decrease your field of view, making objects harder to find and keep centered;
- introduce more vibrations (you may need a tripod);
- accentuate atmospheric disturbances; and
- accentuate imperfections in the objective lenses and prisms.

I want the best money can buy, so I'm going to buy a German instrument

For many years, this was true. Zeiss, for example, was producing instruments of the highest quality 50 years before many of todays optical giants were ever conceived. Zeiss took us away from the field glass to the prismatic binocular we know today. And based on this fine reputation, Zeiss can command a retail price well into four figures.

A good investment? Probably, depending on how much discretionary money you have.

Can you find an instrument of equal performance for less money? Probably, unless your dealer is willing to offer you a deal on a Zeiss well below suggested list.

I want a good ol' American binocular...none of that cheap Japanese stuff

I'm afraid I have some disturbing news. To my knowledge, there are no truly American binoculars. The vast majority in America today come from the Orient. The "good ol' " American companies you've been dealing with over the past few years are virtually all importers.

Of course, some binoculars have "Made in America" stickers. However, close observation may show that many of these instruments are, for the most part, assembled or manufactured by Asian companies with a plant on United States real estate.

Please don't suppose Japanese optics are inferior. Yes, most of the bubble-wrapped junk you see in department stores comes from Japan, but this is just good business. The Japanese will provide us with all of the junk we're foolish enough to buy.

On the other hand, Japanese standards for optical glass production are much tighter than those in Europe, and many Japanese instruments are without rival. For example, the Fujinon 7x50 FMTR-SX is the highest quality 7x50 I've ever had the pleasure to use.

I'm opting for the 10x70 because I want a wide field of view

One of the most common misconceptions I encounter is that the size of the object lens determines the field of view. This isn't so.

Field of view is primarily a property of magnification of the instrument along with the size and position of the field stop. All things being equal, field of view decreases as magnification increases.

You might see "wide field" or "ultra-wide field" on binoculars of almost any magnification. Why? Because the factors that determine a "wide field" are objective, and a field of view some manufactures might consider "wide," others might consider "ultra-wide." The benefit of a large aperture is found in increased light grasp. Consequently, if you consider a larger aperture instrument solely to gain width of field, save your money and avoid the extra weight.

I don't need a waterproof binocular

If your observing needs are such that your binocular only comes out of your sock drawer a few times a year, there's a good chance you don't need a waterproof instrument. However, if you're a boater, hunter, hiker or biker, the chances are you do.

Why? Because most moisture damage occurs when temperature changes create a vacuum within the instrument. This vacuum, in turn, will draw in moisture and particulate matter, thus taking the instrument out of service.

I want an armored binocular, so I don't have to worry about it getting knocked

Wrong! You can rubber-coat an egg, but it's still an egg. Likewise, a binocular, rubber-coated or not, is still a relatively fragile instrument.

The armor does offer some degree of shock resistance, but if you drop your $800 binocular on something harder than a soft grassy lawn, chances are good that, you'll be in for a costly surprise.

Is it wise to get a built-in compass?

I can't answer this question as a navigator. However, from the stand-point of a repairman, I must state that the compass is usually the weakest link in the system. It "sticks out in the way" and is usually the first part of the binocular to be damaged.

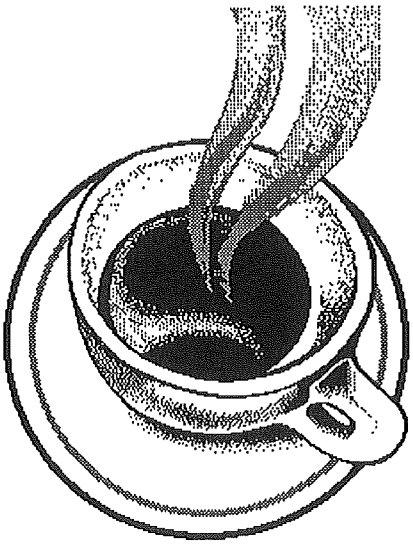
Another point of concern to certain users is that the range finder reticle "always seems to lean." This is because the reticles are oriented for individuals whose eyes are closer together than the average American. Of course, you can compensate for this with a slight tilt of the head. However, some people find it annoying.

So, what's the bottom line? If you want a binocular to capture a beautiful piece of scenery, you might find the compass distracting. If you're using binoculars as a navigational tool, you might find it an invaluable piece of gear.

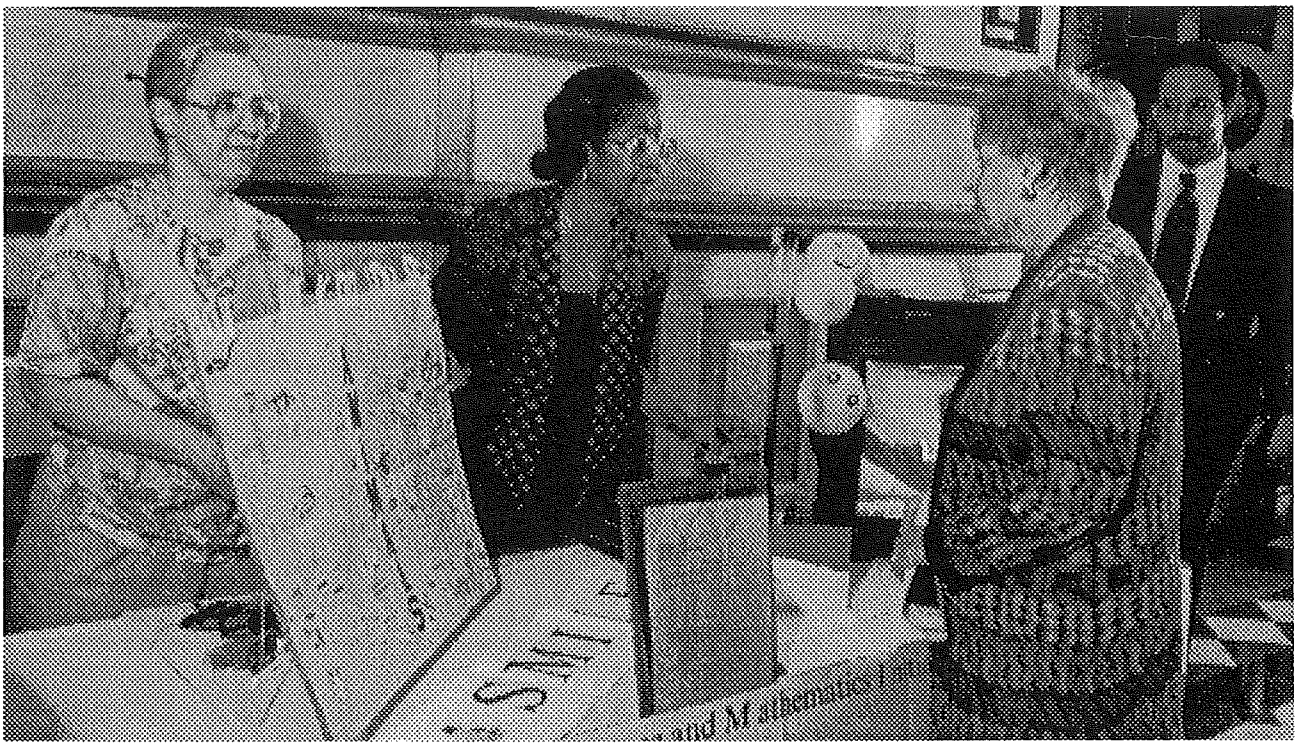
Note: A former Navy Opticalman and now an Optical Chief in the Naval Reserve, William J. Cook manages the Precision Instruments Division of Captain's Nautical Supplies.

The Groundwater Gazette

RIVER WATER NOT DECAFFEINATED



According to a United States Geological Survey (USGS) study of the Mississippi River, caffeine is so abundant in the muddy Mississippi it can be used as a tracer of domestic waste water. According to a USGS report presented at the annual American Chemical Society meeting, caffeine was present in each of over 450 samples from the Mississippi. The USGS sampled water from Minneapolis to New Orleans. The Illinois River contained elevated levels of caffeine found in coffee and soft drinks. This concentration of caffeine was attributed to the large population of Chicago.
(Source: U.S. Water News. May 1994)



National Science and Technology Week was celebrated officially in Illinois this year with a Scientific Literacy Showcase at the State Capitol on April 27. Over 90 displays were arranged through the halls of the Capital demonstrating the efforts in and for our schools toward the goals of improving scientific literacy. Projects funded through the Center of Scientific Literacy of the Illinois State Board of Education, Board of Higher Education, as well as several of the programs supported by the Governor's Science Advisory Committee were highlighted. The displays for ISBE represented many of the Pilot Programs, Staff Development projects and the ESC Target Schools. A proclamation signed by Governor Edgar recognized Scientific Literacy Week. Many legislators were able to visit with the project participants from their districts. The media was alerted throughout the state about the goals of NSTW and the potential for special focus at local levels. Perhaps one of the greater benefits of the showcase was the networking and camaraderie that developed through the day's exhibits. More people were able to learn about some of the many excellent projects going on throughout the state due to the genuine dedication of many teachers and administrators. Their efforts are to be commended. The Showcase was overwhelmingly successful

William C. Beckman, Coordinator
The Central Groundwater Education Project 1994-1999,
Funded by The Kellogg Foundation

AN EDITORIAL ON THE 1994 CLEAN WATER CELEBRATION

The 1994 Clean Water Celebration was held at the Peoria Civic Center on March 21st. This annual event serves as a model for people the world over to show how school children, agencies, industry, and citizens-at-large can work together, to accomplish major public educational goals and objectives regarding the impact of the U.S. Clean Water Act and the Illinois Groundwater Protection Act of 1993. Over 2,000 school age children from across Central Illinois fully participated in this day long event. It should be noted that students were in attendance from five states in the Midwest. A tremendous dialogue was exchanged regarding our region and our country's water resources: now and into the future.

This event was sponsored by private donations from individuals and industry, and by several state agencies. The leadership for this event came largely from a citizens committee drawn together by two well-known and long-established organizations: The Sun Foundation at Washburn, Illinois and The Illinois Rivers Project at Southern Illinois University-Edwardsville. The steering committee consisted of people with diverse interests. The team members developed a network among a large group of Central Illinoisans having anything to do with the use of and conservation of water. The project leaders steered this project from the idea stage to the full implementation level.

Postconference evaluations clearly show the Clean Water Celebration committee that although things ran smoothly, there is room for improvement. Meetings are presently underway to insure that all of the 1994 participants' concerns are addressed prior to the next annual Clean Water Celebration scheduled to be held in Peoria at the Civic Center in March of 1995.

Much of the Earth's population does not enjoy the relatively clean drinking water that we enjoy in America today. Students attending this event learned that since World War II, we Americans have collectively and systematically, diminished our chances for conserving our nation's water supply. Starting now, and into the next decade this trend must be reversed: before it is too late.

Cleaning a contaminated water supply is inordinately expensive, and sometimes nearly impossible to accomplish. Educating citizens is probably the only plausible method to head off this potentially worsening situation. Making this goal a part of the junior high school science curriculum is a good place to begin. Clean water is everybody's responsibility, and the surest way to accomplish this goal is through large scale educational initiatives. I congratulate Joan Eriksen of the Sun Foundation and Professor Robert Williams, along with their staffs for their interest and very effective educational outreach approach towards conserving one of Earth's most precious resources: Clean Water.

It's the Thoug

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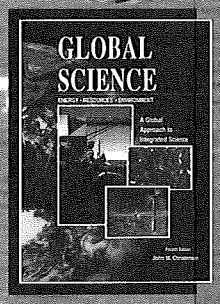
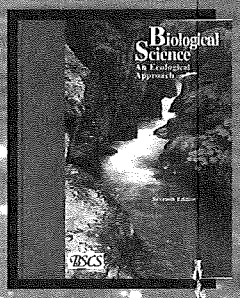
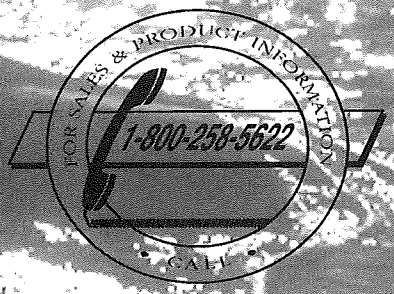
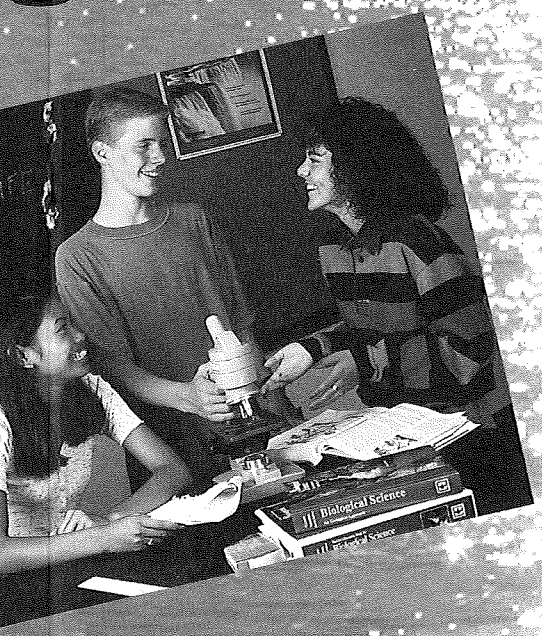
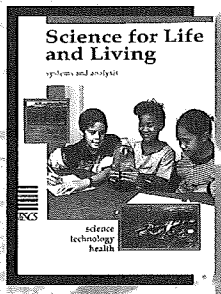






ght That Counts.





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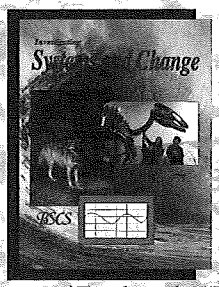

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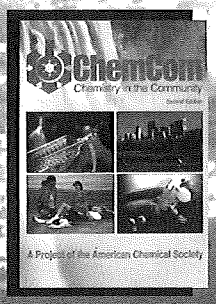
- Labs Woven into Chapters
- Comprehensive Teacher's Resource Book



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Kendall/Hunt: Bringing Science to Life

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MINI IDEAS

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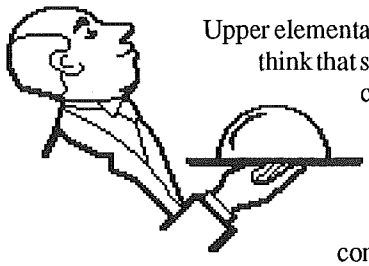
Reprinted from *Iowa Science Teachers Journal*/Spring 1992

THIS SPUD'S FOR YOU!



Upper elementary students often seem to think that saving energy is limited to car pooling, turning off the lights when leaving a room and turning down the thermostat in the winter. Seldom do they consider energy as critical in the manufacturing, packaging, transporting, storing and distributing of products. Rarely is energy recognized as being involved in eating a sack of potato chips, buying fast-food carry-out French fries or preparing frozen hash-browned potatoes in the kitchen. Although my students list sources of energy as "electricity" or "fossil fuels," they often do not relate such sources to food production and marketing.

In order to help students attain and comprehend concepts in energy, nutrition and consumer research, potato labs were instigated at Meeker Elementary School. The labs were designed to further the students' progress in utilizing process skills, controlling and manipulating variables, interpreting data and formulating hypotheses. The learning from the labs was then applied towards better consumer choices for energy-saving and more nutritious food.

The students began by identifying the number of calories, nutritional value and cost for a sack of brand-name potato chips. This led to discussions of food selections, choice-awareness and consumer decision-making. As the children began to think about highly processed foods, they compared them to home-grown products. As choices are being made about foods to consume, choices are also being made about energy consumption.

Students recognized that food is eaten to give the body energy. However, most children had not considered the tremendous amounts of energy used to get that food ready for them to eat. "Energy" to them meant oil wells in Texas or solar heated homes in Arizona. How much energy is used in canning potatoes? freezing potatoes? preparing chips? As they discussed these questions, many students failed to consider the energy used in fertilizing the growing products, treating the solid wastes, warehouse storage, product packaging and transportation to keep the edible products fresh.

As discussions about nutrition and energy concepts continued, students wanted to expand their comparisons. Would it be possible to compare the energy required to prepare different products? What about comparing home-grown boiled potatoes cooked in a kettle of water on the stove with store-purchased potatoes baked in a microwave? How about frozen french fries reheated in a conventional oven compared with school-made potatoes baked in the class's solar oven? Ideas increased together with the experimentation, and, as ideas grew, so did the level of process skills. No longer limited to simple observing and classifying, students began to think of variables, ways of recording data and predicting. They talked about energy sources, nutrition, use of time for food preparation and environmental concerns.

The students listed the kinds and forms of potatoes they wanted to compare, including:

1. whole (with skins)
   a. whole (w/ skins)
   b. whole (w/o skins)
   c. French fries
   d. diced/sliced
2. Frozen
   a. French fries
   b. hash browns
   c. potato rounds
3. Dehydrated
   a. flakes
   b. granules/buds
4. Canned
   a. whole
   b. diced/sliced
5. Ready-to-eat
   a. chips

Students then identified energy sources available for use at school to cook the potatoes for their experiments:

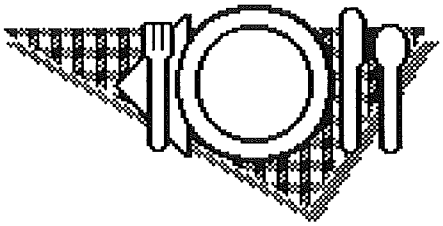
1. Hot plate with kettle and water
2. Electric skillet or fry pan
3. Deep-fat fryer
4. Conventional oven in the school kitchen
5. Microwave oven in the teachers' lounge
6. Solar oven built by the class

Basic safety and hygiene rules were listed and learned. It was agreed that the following procedures would be incorporated into their labs:

- Wash hands before handling food
- Use cutting boards and knives (or potato peelers) carefully and with adult supervision
- Wear safety goggles when working with hot grease and liquids which might spatter and cause eye damage
- Use hot pads and racks when working with heat sources
- Have a fire extinguisher available and know how to use it
- Proceed with lab activities only with adult supervision

Students wanted to compare the preparation of various he students identified the following questions and procedures:

1. What is the change in mass of the potato products due to the cooking process?



a. Use a triple beam balance to measure the mass of the potatoes before and after cooking.

b. Record the mass in grams and determine if mass was gained or lost.

2. How much energy was used in cooking the potatoes?

a. Record cooking time in seconds.

b. Identify the watts used for the heat source. (Some sources required other computations.)

c. Multiply (watts) x (seconds) to determine the joules used.

d. Use the formula 1 Kcal = 4200 joules to determine amount of Kcal used.

3. How much energy was used in marketing before the potato was cooked?

a. Use information from the *Journal of Food Science*, Vol. 42, No. 3, 1977, pp. 768-74 (see Table 1). (The article "Total Energy to Produce Food Servings as a Function of Processing and Marketing Modes" by Hamilton Olabode was the only one available.)

b. Include Kcal used in manufacturing, distribution and preparation before cooking per potato serving for fresh, flaked, canned and frozen potatoes.

4. How much energy was used in preparing each form of potato from "soil to supper"?

a. Use information obtained from questions number 2 and 3 listed above.

b. Recognize that figures are only approximate and that variables are not well controlled.

5. What is the cost per serving for each potato product?

a. Record the package amount and cost.

b. Compute the potato product serving amount and cost.

6. What is the nutritional value of the potato product?

a. Use "Nutritive Value of American Foods," Ag. Res. Service handbook 456, USDA, November 1977.

b. Recognize that serving sizes may not be exactly the same but may be used for comparison.

Table 1
ENERGY USED IN STEPS OF POTATO MARKETING
Energy In Kcal Per Serving for Various Kinds of Potatoes[1]

Marketing Area:	Fresh	Flaked	Canned	Frozen
Manufacturing[2]	29	237	508	329
Distribution and Retail[3]	127	49	93	264
Domestic[4]	330	264	369	1144

[1]Olabode, H. 1977. Total energy to produce food servings as a function of processing and marketing modes. *Journal of Food Science* 42(3):768-74.

[2]Includes energy used in space conditioning of storage bins and plants; washing, grading and sizing of the potatoes; processing; freezing or chilling; packaging/packing; manufacturing of equipment for potato processing; transportation of potatoes from the farm to the plant; and treatment of solid waste.

[3]Includes energy used in transportation from plant to warehouse; transportation from warehouse to retail store; transportation from retail store to consumer's home; storage in warehouses; and retail store utilities.

[4]Includes energy used in household storage (e.g. refrigerators/freezers); preparation of potatoes; dishwashing after eating; manufacturing of kitchen equipment/utensils; and treatment of solid wastes.

Students then conducted the potato labs, plotting information from their results onto a large chart. From the accumulated data, students were able to make both general and specific comparisons. For example, they discovered that highly processed foods lose a lot of nutritive value. They also learned that potatoes are a good, inexpensive source of vitamin C. Students compared the energy used with various types of food processing using a variety of heat sources.

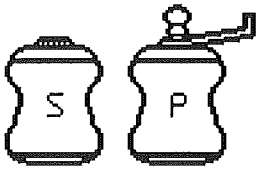
The basic concepts involving nutrition and energy were used in other "spin-off" experiences. One class of sixth graders gathered information on apples. Some students became quite interested in the use of commercial dehydrators and experimented with using the solar oven to dehydrate fruits (i.e. bananas). The process skills and critical thinking skills which were involved in the potato labs had high carry-over in other science experiments and related learning experiences throughout the year.

The hands-on labs provided meaningful learning experiences involving materials and equipment that were readily available. The consumable materials used (potatoes) were relatively inexpensive. With proper safety precautions, the labs were conducted with the sophistication of "science research" and the practicality of "kitchen chemistry."

How do students feel about the potato lab? They really "dig" them!

References

Olabode, H. (1977). Total energy to produce food servings as a function of processing and marketing modes. *Journal of Food Science* 42(3):768-74.



IRON IN CEREAL

Many breakfast cereals boast that they contain iron, an essential part of our daily diet. But is this iron the same stuff that is used to make hammers, nails, automobile engines...? If so, why do we not see it or at least feel it when we bite into the cereal? Can our cereal rust if it's left out long enough? And would the flakes be attracted to a magnet? The following activities will explore some of these questions.

Chemistry concepts

1. Physical properties are maintained by the individual components in a mixture.
2. This conservation of properties may often be taken advantage of to separate out components in a mixture.
3. A homogeneous mixture is one in which the components are evenly distributed. A heterogeneous mixture has uneven distribution of its components. Breakfast cereals serve as good example of heterogeneous mixtures.

Materials

high-iron cereal (such as Total)
blender
clear plastic cup
strong magnet (such as a cow magnet)
white plastic spoon

Procedure

1. Place approximately one cup water and one cup cereal in the blender, then blend to make a smooth slurry.
2. Pour the cereal slurry into a clear, plastic cup.
3. Hold one pole of the magnet against the outside of the cup about midway up, and use a plastic spoon to gently stir the flurry for a minute or so.
4. Lift the magnet aside and observe. On the inside of the cup, just behind where the magnet was positioned, you should be able to observe a dark concentrated spot of iron powder.

Tips

1. If no spot is appearing, it may be due to the slurry being too thick (viscous), or it may be due to the magnet being too weak.
2. The longer the slurry is stirred, the darker the spot. When the magnetic field is removed, the spot gradually falls and disperses back into the slurry.
3. To accentuate the spot and to keep it from dispersing too quickly, press the back of the plastic spoon up against the spot from behind then lift the magnet aside.
4. If you wish to remove the iron, re-position the magnet then slowly lift it up (while stirring) to bring the spot up to the surface of the slurry. Then scoop the iron spot out with the tip of the spoon.
5. To "reset" the slurry for the next class, simply stir the iron back into the cereal with no magnet applied.

Variation

Rather then separate out the iron, you may wish to simply show the attraction of a cereal flake to a magnet. Place a Petri dish on an overhead projector stage and pour in enough water to fill it completely—then add a little more so that the surface of the water is domed slightly above the rim of the dish. When the water has stopped swirling, place a small cereal flake in the center. Bring the pole of the magnet nearby. You should be able to observe a definite migration of the flake toward the magnet.

Note: Try a variety of cereals, but be warned: even with a rather strong magnet, the attractive force is rather weak, for there is very little iron present in just one flake. Furthermore, because the iron is not distributed homogeneously, some flakes, by chance, will have a higher iron content than others, and will therefore be considerably more responsive.

Lee Summerlin, Dept. of Chemistry
University of Alabama Birmingham
ICE '92

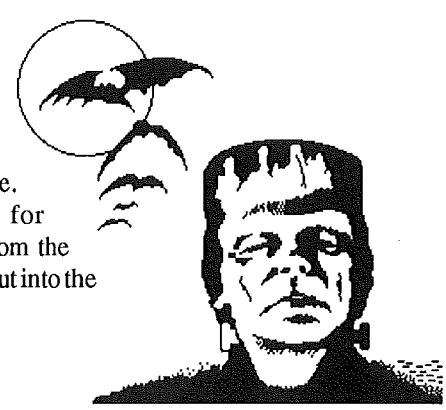
CHEMICAL DEMONSTRATIONS FOR A HALLOWEEN SHOW

Witch's Brew

Add some water to a large cylinder or beaker. Drop in a few small pieces of dry ice and a squirt of liquid dishwashing detergent. Copious bubble will form and pour over the side of the container. Many will burst with a puff of "smoke".

The Fire-Breathing Jack-O-Lantern

Carve a Jack-O-Lantern from a large pumpkin. Place a short, fat candle inside. Stick a plastic funnel through the bottom of the pumpkin and attach a 6 foot piece of rubber tubing to the stem of the funnel, sticking out of the pumpkin. While a student holds the end of the rubber tubing, place two spoonsful of LYCOPODIUM POWDER OR CREAMORA in the funnel. Light the candle. Place the top on the pumpkin and instruct the student to blow hard into the rubber tubing-as if they were blowing out the candles on a Birthday cake. Be prepared for blast of fire from the openings you cut into the pumpkin!



Michael Funk
(Montana 1992 Presidential Award Winner)

VECTOR TREASURE HUNT

SUMMARY

This activity is an integrated mathematics/physics vector map activity. We use it in physics and college prep mathematics to introduce vectors. The class is divided into teams of two people each. Each team will prepare a displacement vector treasure map to locate a hidden treasure. Teams will then exchange and use the map prepared by another team to locate the treasure.

RATIONAL

Many students fail to see connections between mathematics and science. Students enjoy this activity; the cooperative effort between math and science teacher also provides them with an opportunity to see application of math in science.

MATERIALS

Large open field [football field], 100 m tape, compass, ruler, pencil, paper, protractor, and a treasure.

PROCEDURE

1. We will measure distances by pacing them off. Therefore, each student will need to know the correspondence between his/her and an equivalent distance in meters. Mark off a known straight distance of 10 m or more and walk the distance while counting the paces. A longer distance helps correct for slight differences in each pace. Pace the measured distance more than once. This will provide information needed to convert paces to meters and vice versa.
2. Next you will need to measure [in paces and degrees] three displacement vectors that will result in locating your treasure. You and/or your partner need to record each displacement in order to produce a map. It is best to use simple directions such as 0 degrees, 90 degrees, 270 degrees, etc. and have each displacement terminate at some obvious marking point such as a tree, fence, or corner of a building, so another team can follow your directions. Be sure to walk in straight "compass" lines for each displacement by selecting some object in line with your desired direction and walking towards it. Have your partner keep you on course. The treasure can be a small coin like a nickel, dime or a note with "words of wisdom."
3. Draw a treasure map to scale, using vectors to represent displacements. The map should be drawn to scale in meters. the starting point and scale must be indicated and the displacements represented by the length of each vector and a direction measured from 0 degree [use 0 degrees as North]. Once the maps are completed, they are to be exchanged among the teams.
4. Each team now has to interpret a map written by another team and follow it to find the treasure.
5. Complete the data tables.

* Data from the map builders and treasure finders is required for evaluation.

EVALUATION

MAP TEAM DATA	TREASURE FINDERS DATA
Partner 1	Partner 1
Partner 2	Partner 2
Pace to meter conversion	Pace to meter conversion

VECTOR DATA

MAP TEAM	TREASURE TEAM
VECTOR 1: Angle =	VECTOR 1: Paces =
Paces =	
Meters =	
VECTOR 2: Angle =	VECTOR 2: Paces =
Paces =	
Meters =	
VECTOR 3: Angle =	VECTOR 3: Paces =
Paces =	
Meters =	
TREASURE XXXXXX	TREASURE

The following questions are to be answered by the treasure finders:
Please evaluate the following.
1.Were you able to find the treasure? Did the map lead you directly to the treasure? If not, approximately how far from the treasure did you end up?
2.If you encountered problems finding the treasure, what do you feel was the major problem?

Teacher Check List

1. [5] Instructor's observation of your "hiding" the treasure
2. [10] Scale drawing of treasure map
3. [5] Data table complete [both team's data]
4. [5] Treasure map accurate [pace conversion, scale, degrees]

[25] TOTAL

Rediscovering Science
Nahum Kipnis, Science Educator
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Minneapolis, MN 55416

LABS ON OPTICS AND VISION

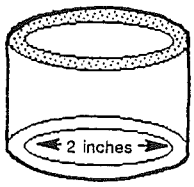
Individual projects completed by teachers who participated in the 1992 Bakken summer institute on "Optics and Vision." Copies of the complete labs may be obtained from the Bakken free of charge.

Variable Lenses (Physical Science) Fred Baker (Route #1, Motley, MN 56466)

Previous Knowledge: Refraction, focal point of a mirror.
Purpose: An introduction to lenses.

3 inch watch glass
(or whatever size you have)

2 inch PVC pipe connector



Apparatus: A concave or convex lens is made out of two 3" (or 2.5") watch glasses and a 2" PVC pipe connector. By cutting it in two you can make two lenses out of each connector. Sand the edges of each half-connector and drill a 3/8" hole in the middle (this size fits a triple zero rubber stopper). Attach the watch glasses to both sides of the half-connector (first one and then the other) with an epoxy glue. When the apparatus is dry, fill it with water and check for leaks.

Procedure: Fill lenses with different, preferably water-soluble liquids (water, syrup, alcohol, etc.). if all lenses of the same type are identical in their dimensions, students can save time by trading the lenses filled with different liquids instead of emptying them and refilling again.

Investigation: Part 1. Use a lens to project a distant source of light on a paper screen. If you obtain a bright image, measure the distance from the middle of a lens to the screen: This is an approximate focal distance of the lens. While holding the lens before your eye look at distant and close objects and describe what you see. Repeat both experiments with similar lenses filled with different liquids. Compare the results. **Part 2.** Repeat these experiments with another type of a lens and record the results.

Conclusion:

1. How do concave and convex lenses differ in forming images of objects viewed at different distances (enlarged or reduced, direct or inverted)?
2. How do these two types of lenses differ in projecting images?

Home lab: Find household objects which act as lenses. What sort of tests do you need to determine whether an object works as a convex or concave lens? (Tips: Can you find its focus? Can it burn paper? Does it reduce the image? Does it invert the image?)

Comments by Dr. Kipnis: Fred Baker's apparatus is too good to be used as an introduction to lenses, where any lens can do the job with less expense of time and money. Where this apparatus is indispensable, however, is in proving that focal distance of a lens depends on its material. When studying refraction students may be given the index of refraction for the liquids to be used for the Variable Lens lab. By comparing focal distances of different lenses students can determine that an increase in the index of refraction reduces the lens' focal distance. In a physics course, the teacher can give the lens-maker equation, and students will find that their results agree with this equation. The agreement may be only qualitative, though, since the lens is too thick for a "thin lens" model. Perhaps, the lens can be made thinner by using a narrow ring cut out of a PVC pipe rather than a PVC connector.

Correction from the Summer 1994 issue:

On page 14, Carol Hotz's name was inadvertently misspelled.

Sorry Carol!

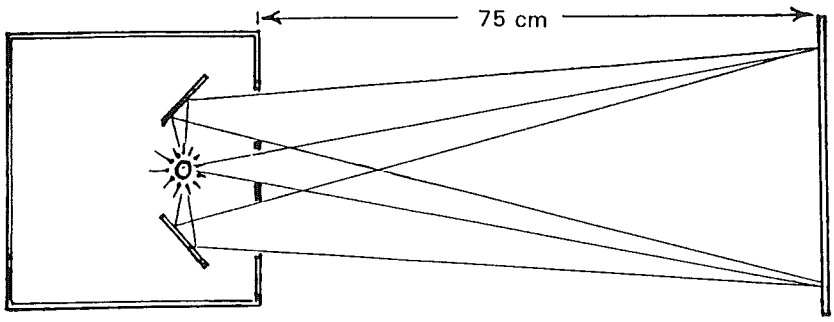
Colored Shadows (Physical Science) Paul Lombardi (1026 N. Oakridge, Centerville, UT 84014)

Previous Knowledge: Something about shadows, ray diagrams, and color filters.

Purpose: To create an inexpensive and versatile apparatus for investigating colored shadows. Students are expected to predict the color of a shadow given the colors of light beams.

Background: Colored shadows produced by sunlight were first observed by the French scientist Georges-Louis Buffon (1707-1788) shortly before sunset or after sunrise. This phenomenon is important in visual arts, in particular for painters.

Apparatus: To produce colored shadows one needs two beams of colored light. This can be achieved by using a single light source combined with two plane mirrors set so as to produce two intersecting beams. A 100-watt incandescent lamp in a desk-top fixture attached to a wooden base is placed inside a cardboard box provided with 3 windows (1.5" in diameter). Two 3" x 3" plane mirrors are set in lens-holders (with reusable adhesive putty) behind the bulb. The holders can be adjusted so as to let three beams out through the windows and illuminate a white screen The windows are covered with either opaque lids or color filters in photographic slide mounts. The shadow is produced by a 1.5" disk held with a thick wire and an alligator clip.



viewed from above

Procedure:

1. Darken the room. Block two windows and alternate filters in the third one. For each color filter, students should record what color shadow they expected and what they actually observed.
2. Block the central window and use two different filters in the side windows. Record the colors of the shadows.
3. Install three color filters. Record the colors of the shadows.
4. Have two windows open but only one filter installed. Change the filter and note the color of the shadow.

Investigation:

1. Compare the shadows produced by different filters. Students are expected to conclude that whatever the color of light, the shadow is always black.
2. Which shadow is produced by each of the two beams and how to prove it? What is the relation between the color of the shadow and that of the beam? Does the color of a shadow depend on the distance between the object and the screen? Can the shadow be made black? Caution students to change only one variable at a time. Challenge them to devise a ray diagram to prove which beam is responsible for a particular shadow. Can they use this method to predict the color of the shadow given the object's location, so as conform to observations? Repeat the experiment with different pairs of filters. Compare the results of different groups for the same pair of filters.
3. What is the difference between the shadows created by three beams and those produced by two? Can you investigate the reason for the colors you observe? Can you turn the shadows black?
4. How does the color of the shadow correspond to the color of the colored beam when another beam is white?

Home Lab: Buffon observed that a few minutes before sunset the shadow of his finger cast on white paper turned bluish. Repeat this experiment indoors and outdoors with different objects. Investigate whether the color of the shadow depends on the color of the body and its distance from the screen (other variables). Is this experiment related to those conducted in the classroom?

Comments by Dr. Kipnis: The three-beam part of Paul Lombardi's lab is actually an experiment on color mixing. For this reason, it should be separated from the experiment with color shadows. Paul's apparatus is very proper for color-mixing experiments, first with two beams and then with three. To change a bean's intensity one can play with the mirror's angle and its distance from the bulb. When using the ray diagrams, teacher should be aware that different students will come up with different results because they don't know which angle between the extreme rays to use to represent a beam, and what size should be the object on the diagram. To succeed in predicting the color of shadows, this method needs a number of trials and takes a lot of time. Better give the idea of the diagram in class and leave its practical application for home. This method is easier to use for explaining the experimental findings rather than for predicting them. To some extent, the color of a shadow can be predicted by comparing it with the color seen on the object creating the shadow (use a piece of cardboard covered with white paper). Fir instance, if the beams are blue and red and the object appears red, students will reason that the object prevents red light from reaching the screen but not the blue one, thus this spot on the screen (the shadow) will be colored in blue.

The experiment with two beams, one of which is uncolored, should be moved to senior high school, for it is more complicated and students should know some physiology of color vision. In this case, the color of the shadow is complementary to that of light (see, for instance, N. Kipnis, Rediscovering Optics, pp. 176-180). Strictly speaking, the same effect is also present in the "simple" experiment with two colored beams. It is hidden when the two beams have complementary colors (red-green or blue-yellow). however, if you combine red and yellow light, you may obtain "strange" shadows, for instance, green and purple at the center and blue at the periphery. Thus, if you don't want your students to become totally confused, either control their choice of filters or do this experiment as a demo, or move it to a physics course where you will base the explanation on physiology rather than on geometry. In the latter case, you can replace this experiment with experiments on color mixing done with the same apparatus.

Rediscovering Science
A Publication of The Bakken
A Library and Museum of Electricity in Life
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The Bakken is a center for education and learning that furthers the understanding of the history, cultural context, and applications of electricity and magnetism in the life sciences and their benefits to contemporary society.

REVIEWS

FERNBANK SCIENCE CENTER
156 Heaton Park Drive, N.E.
Atlanta, Georgia, 30307-1398
Reviews by Judy Cutchins
Submitted by April Witt

***I am the Ocean*, by Suzanna Marshak; illustrated by James Endicott. Published by Little, Brown and Company, 1991, 32 pages, ISBN 0-316-54719-0.**

This book is for anyone familiar with and loving of the sea and coast. Very appealing and artistic illustrations represent the lyrical text, although somewhat abstractly for younger readers. It might be a good choice to use with enrichment or art activities during an ocean unit. Because of its abstract references and concepts which are not always clarified by the illustrations, the book is best suited to adults and precocious youngsters with some prior experiences with the ocean.

***Magic Beach*, by Alison Lester. Published by Little, Brown and Company, 1992, 32 pages, ISBN 0-316-52177-9.**

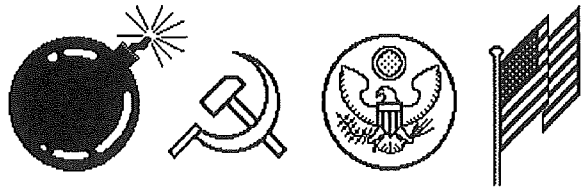
This is a beautiful and imaginative book for the "child of the sea," one with free spirit and imagination. Readers join children at the seashore, each real activity followed by a fantastic one, such as searching for animals in a tide pool, then riding sea-dragons' tails into the Kingdom of the Fishes. Delightful illustrations picture both the real and the imaginary. *Magic Beach* offers a daydream of ocean fantasy for children who have vacationed at the seaside and experienced the ocean, surf and beach for days at a time.

***Life In the Oceans*, by Norbert Wu; a Planet Earth Series book for Little, Brown and Co., 1991, 96 pages with index, ISBN 0-316-95638-4**

Norbert Wu's photographs must truly be admired by all other undersea photographers. He has captured ocean life in a most artistic and definitive way. Mr. Wu's combination of understandable, readable text and dramatic photographs make *Life In the Oceans* an impressive science reference for any school library.

***Whales*, by Seymour Simon. Published by HarperCollins, 1989, 39 pages, ISBN 0-690-04758-4.**

Beautiful photographs depict whale physiology and behavior. However, with dozens of different species of whales, from dolphins to the great blue, generalizing and oversimplification in the text occasionally lead to misconceptions. For example: "In one day, a baby whale drinks more than 100 gallons of milk and may gain as much as 200 pounds." This kind of statement can be very misleading, since only the great blue whale gains 200 pounds in a day. Vivid, well-chosen photographs complement the text very well, making the book an attractive and enjoyable one overall.



Teachers Clearinghouse for Science and Society Education
Newsletter
Spring 1994

RECOMMENDED SCIENCE AND SOCIETY EDUCATIONAL RESOURCES

1. "Science After the Cold War," *Science*, 263, 620-635 (4 February 1994).

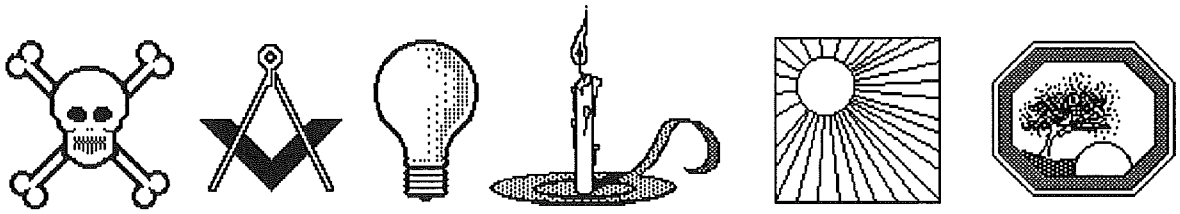
This special section of *Science* discusses various aspects of the conversion of military R&D to peacetime uses—from the $33 billion spent on SDI (Strategic Defense Initiative) over 10 years (as depicted on a bar graph) to sophisticated remote sensing technology developed for military intelligence. Systems once used to ascertain nuclear weapons developments in the former Soviet Union are now targeted on such nations as Iraq and North Korea to guard against nuclear proliferation, while the U.S. and Russia wrestle with finding a place for the plutonium "pits" (each the size of a grapefruit) from the 4000 nuclear warheads they dismantle annually. Profiles of four scientists who have refocused their formerly defense-oriented skills show new applications to medical and environmental sciences.

2. "Comparisons Across Cultures, Women in Science '94," *Science*, 263, 1467-1496 (11 March 1994).

This third in the continuing series of annual reports on women in science focuses on the advances (if any) that women scientists have made in cultures such as Germany (where women are probably worst off as far as achievement is concerned), and Italy, and Sweden. Rather surprisingly, women have achieved greater success in southern European countries like Spain, Portugal, and Turkey, than in northern European countries. Women scientists in the U.S. are much better off than in any other country surveyed.

3. Joel Kaplan and David Aronson, "The Numbers Gap," *Teaching Tolerance*, 3(1), 20-28 (Spring '94). For a free subscription, send name, educational position, institutional affiliation, and disciplinary interest to *Teaching Tolerance*, 400 Washington Ave., Montgomery, AL 36104.

This article in this semiannual publication of the Southern Poverty Law Center reviews the gender equity biases faced by female math and science students and what can be done to eliminate them. Sidebars highlight more substantive gender equity resources. Of special interest is the fact that young women who have taken eight or more mathematics classes in college earn virtually the same amount as their male counterparts.



4. David Bones (ed.), *Getting Started: A guide to Bringing Environmental Education Into Your Classroom*, National Consortium for Environmental Education and Training (NCEET), School of Natural Resources and Environment, Univ. of Michigan, Ann Arbor, MI 48109-1115, (313)-998-6726, and The National Environmental Education and Training Foundation, 915 15th Street, NW, Suite 200, Washington, DC 20005, (202)-628-8200, 1994.

This book, which features Bernice Hauser's lesson on garbage in the park, contains short portrayals of lessons from experienced environmental educators and "provides guidelines to teachers just 'getting started' in initiating environmental education efforts in their classroom."

5. National Biological Impact Assessment Program, *NBIAB News Report*, Information Systems for Biotechnology at the Virginia Polytechnic Institute, 120 Engel Hall, Blacksburg, VA 24061, (703)-231-3747.

This report, available in print or on Internet, includes articles on such topics as bacterial and fungal diseases of plants, somatotropins, cell adhesion molecules, agricultural biotechnology, research on the development of environmentally acceptable alternatives to toxic substances, and control of plant diseases and pests using resistance genes.

6. Jon R. Hendrix (ed.), *The Genetic Messenger*, Human Genetics and Bioethics Laboratory, Ball State University, Muncie, IN 47306.

For biology teachers with a special interest in genetics or teachers of genetics at the secondary level, the Winter 1993 issue of this publication concludes that "Teachers are more successful in developing and implementing new and effective ways of teaching when they are part of a network of colleagues." Also of interest are a brochure, *What's Ahead? Careers in the Human Genome Project*, from the Education Program of the University of Michigan Human Genome Center, Ann Arbor, MI 48109-0674, a listing of research opportunities for secondary and middle school teachers from the American Society for Cell Biology (301-530-7153), and a report on *The Human Genome Project: Information Management, Access, and Regulation*, the second genome module now being field tested and available from BSCS, 830 N. Tejon St., Suite 405, Colorado Springs, CO 80903.

7. *Electric Vehicles and the Environment*, Electric Power Research Institute, 3412 Hillview Avenue, P.O. Box 10412, Palo Alto, CA 94303, (510)-934-4212, 1992. 6 pp.

This brief full-color booklet is a concise brief of the electric power industry's argument that electric vehicles offer environmental benefits over conventional vehicles.

8. *Renewable Energy Fact Sheets*, Solar Energy Industries Association, 777 North Capitol Street, NE, Suite 805, Washington, DC 20002, (202)-408-0660. 30 pp.

Produced by the Solar Energy Industries Association, in cooperation with the American Wind Energy Association, National Wood Energy Association, and American Ocean Energy Industries Association, with funding provided by Sandia National Laboratories, this booklet provides information about biomass and biofuels, high temperature solar thermal power, passive solar energy, photovoltaics, renewable energy from the ocean, solar water heating, and wind energy—and, with one exception, a student activity about each of these renewable energy sources. .

9. Marsha Lake Matyas, *Criteria for Equitable Life Sciences Activities*, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814, (301)-530-7164.

This resource guide, based on a workshop presented at a meeting of the National Association of Biology Teachers, contains a four-page listing of 11 important guidelines, activity examples (such as a model of the human knee joint and a ratchet and pulley system to demonstrate how striated muscle works), and a table of how to apply the criteria for equitable science activities through laboratory exercises on muscle, bone, and cartilage. Some valuable guides for laboratory activities in human physiology are included.

10. *The 2050 Project* (Winter 1994), World Resources Institute, 1709 New York Avenue, NW, Washington, DC 20006 (ATTN: Ms. Stacy Gills). free.

This is the first issue of a quarterly newsletter about the project of the same name—a four-year collaborative venture of the World Resources Institute, The Brookings Institution, and The Santa Fe Institute to explore the possibility of achieving a sustainable existence by the middle of the next century. Among the work projects undertaken are seven *Base Studies* which will be carried out with the collaboration of research facilities throughout the world. Topics addressed include population and human capital, food and agriculture, energy and climate, environmental toxification, ecosystems, water systems, and industrial structure and activities.

The newsletter describes a computer program named "Sugarscape," which examines artificial social life (ASL). A working group of the Project focused on the current literature on holistic projections for the future and fleshed out a possible scenario, one of many which this group will be presenting at regional policy workshops worldwide. The newsletter lists related research efforts not affiliated with Project 2050, including projects in South Africa, the Netherlands, Canada, and the United States (Sustainable Seattle).

11. McDonald's, *Resources*, P.O. Box 8002, St. Charles, IL 60174-9871, (800)-627-7646.

This catalog covers a wide range: reading, history, especially Black history, and career planning. Of special interest are their offering on nutrition and on the environment. *Balancing Your Act*, for example, has Michael Jordan and Jackie Joyner-Kersee teaching kids about nutrition and fitness in a program developed with *Sports Illustrated for Kids*. This comes with a teachers' guide and a 15-minute sports video for $11.25. Offerings on the environment include a *Save the Rain Forest* poster, *Settings Up a Solid Waste Recycling Program in Schools*, a *Rain Forest Imperative* video, a *WEcology* magazine, and an *Environmental Action Pack.*

Read a good (or bad) science book recently? Purchased a valuable (or overpriced) program, curriculum, or set of resources? Share your positive and/or negative comments with our readers! Write or e-mail them to *Spectrum* at the address on the inside front cover.

OPPORTUNITIES

LAMOTTE COMPANY 1994 PHOTOCONTEST

The LaMotte Company Environmental Education Photo Contest is an opportunity to win free LaMotte equipment for your school or other educational program and a chance to appear in upcoming LaMotte Environmental Science Education Products catalogs and publications.

ENTRY GUIDELINES

1. Photo(s) must show current LaMotte testing products being properly used by students in the classroom, lab, or outdoors.
2. Please include a brief description of how LaMotte products are used in your program.
3. Photo(s) should be good quality black and white, color slides, or color prints (please include negatives, if possible).
4. All submissions must be accompanied by a completed entry form (below) and signed photo release (over).
5. Submissions must reach the LaMotte Company advertising office by **Wednesday, November 30, 1994**, to be eligible for prizes.
6. Prizes will only be awarded to educational institutions.
7. All submissions become the property of LaMotte Company. Please send original photos (please include negatives, if possible) or slides. Make copies for your use before submitting. Sorry, but submitted photos and slides cannot be returned.
8. Winners will be notified by the end of January 1995.

PRIZES

First Place - $500.00 Merchandise Certificate
Second Place - $250.00 Merchandise Certificate
Third Place - $100.00 Merchandise Certificate
Honorable Mentions (3) - $50.00 Merchandise Certificate (each)

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LaMotte
PO Box 329
Chestertown, Maryland 21620
800-344-3100
410-778-3100

SCIENCE TEACHERS SUMMER RESEARCH IN PHYSIOLOGY PROGRAM $5,000 SUMMER STIPEND

The American Physiological Society is pleased to announce the continuation of a program aimed at providing high school and middle school science teachers with experience in physiology research. Each teacher selected for the program will:

- receive a stipend of up to $5,000 to support his/her full time involvement in physiology research in the laboratory of an APS member for 8-10 weeks during the summer;
- attend a 1 week seminar on translating research activities into teaching activities at the APS headquarters in Bethesda, Maryland (suburban Washington, DC); and
- receive a $750 travel allowance to attend the annual APS meeting, *Experimental Biology '96*, April 14-18 in Washington, DC. At the meeting, a special luncheon for the teachers and their research sponsors will be held so participants can share their experiences. Cost sharing of the teacher's stipend or travel award by the APS member's institution is encouraged but not required.

Proposals are submitted jointly by a teacher and researcher. **The APS Education Officer can assist teachers in making connections with APS members in their geographic area.** Grant awards will be based on the overall quality of the proposed research experience for the teacher, including: the proposed level of laboratory work in the activities; the background and teaching responsibilities of the teacher; the quality of the research program as indicated by the publication record and financial support of the APS member; plans for other activities in which the teacher will take part; plans for continued interaction between the teacher and the APS member or the respective institution; and an indication of the expected impact of the teacher's participation in his/her own classroom and/or school.

For information concerning the Science Teachers Summer Research in Physiology Program and application forms contact APS at the above address.

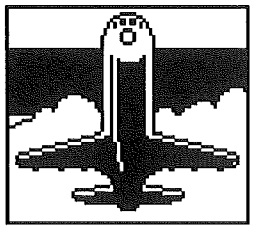
The program encourages the participation of minority groups by making special efforts to include science teachers who are members of underrepresented minority groups or who teach significant numbers of minority students.

Application Deadline: January 4, 1995

Dr. Marsha Lakes Matyas, Education Officer
American Physiological Society
9650 Rockville Pike
Bethesda, MD 20814-3991
Phone: (301) 530-7132
FAX: (301) 571-8305
email: marsha@aps.mhs.compuserve.com

Fred H. Lewis
Illinois State Coordinator
Space Science Student Involvement Program
Marissa High School
300 Schoolview Drive
Marissa, IL 62257
(618)295-2393 (school)
(618)295-3384 (home)
FAX: (618)295-3446

SPACE SCIENCE FOR YOUR STUDENTS



NASA, in cooperation with NSTA is offering a series of Space Science Competitions open to all students in grades 3-12. All competitions conform to the new National Science Standards. They meet all criteria for the Illinois School Improvement Plan. These are performance based activities with objectives, activities, evaluation, outcomes all ready to be integrated into your curriculum. Teachers can use the activities in a variety of different ways from classroom instruction units to individual student projects.

Summary of S.S.I.P. competitions for 1995

- Interplanetary Art (Grades 3-12)
- Future Aircraft/Spacecraft Design (Grades 3-4-5)
- Mission to Planet Earth (Grades 6-7-8
- Mars Scientific Experiment Proposal (Grades 9-12)
- Aerospace Internships (Grades 9-12)

NASA awards special certificates to all entrants. Medals and ribbons are awarded to state winners in each category. All national winners and teachers are invited to Washington D.C. for the NASA/NSTA Space Science Symposium. In addition, national elementary winners are given scholarships to SPACE CAMP. High School national winners and their Teachers are awarded internships at the various NASA Space Centers across the country.

Teachers — Your school should receive the 1995 brochure in early September. Ask your principal, department chair, or mail person to watch for it. This is a first semester project. Entries are due in early January 1995.

As Illinois State Coordinator, I can provide the following services:

- Supply brochures if more are needed or not received
- Supply a list of resources
- Provide additional and more detailed judging information
- Loan copies of papers from former national winners
- Loan video of 1994 student presentations at the National Space Science Symposium
- Arrange for a traveling Interplanetary Art Show to visit your school
- Conduct staff and/or student workshop presentations on Space Science Activities

Mary Vieregg
Glenbard West High School
670 Crescent
Glen Ellyn, IL 60137
(708)469-8600

AUTOCLAVE

We have a used autoclave that is in working condition and may be of value to another school. It is Market Forge Model #208 (12 volts) The only cost would be either shipping or pickup of the machine.

CHANDLER FORMAN, syndicated travel writer for the CHICAGO SUN-TIMES for 30 years, died almost two years ago. He was an accomplished photographer as well as writer. Some of his equipment has been donated to the Charles Darwin Foundation of the Galapagos Islands but some of it is for sale. This equipment is in excellent shape and represents a rare opportunity for a school, nature club or individual to acquire worthwhile equipment at a very reasonable price. For more information contact:

Katherine D. Taft
609 W. Stratford Pl
Chicago, IL 60657
(312) 281-8422

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AWARDS AND RECOGNITION

GUSTAV OHAUS AWARD
National Science Teachers Association
1742 Connecticut Avenue NW
Washington, DC 20009

THE NATIONAL SCIENCE TEACHERS ASSOCIATION PRESENTS THE GUSTAV OHAUS AWARDS PROGRAM

GUIDELINES

The Gustav Ohaus Awards Program is designed to recognize innovations which have the potential to improve science teaching, at the elementary, middle level, high, and college levels. These innovations may be in the form of, but not limited to the following areas: curricula design, teaching strategies, administrative and/or organizational patterns, and laboratory utilization. Innovations may or may not have been implemented at the time of application for this reward.

The OHAUS Awards Program offers a set of awards of $1000, and $750 for each of the elementary, middle level, high school, and college level divisions. Winners are presented their awards at the annual National Science Teachers Association Convention. Winners are encouraged to attend.

CRITERIA FOR JUDGING

(1) Originality—Is this a new idea or model or one that has been modified?
(2) Utilization—Can this idea or model be implemented in other schools?
(3) Benefit—If implemented, will this idea or model benefit many science educators or students?
(4) Consistent—Is this idea or model consistent with current trends and accepted principles of science teaching?

FOR AN OFFICIAL ENTRY FORM AND GUIDELINES, CONTACT OHAUS AT THE ABOVE ADDRESS. YOUR COMPLETED ENTRY FORM MUST BE POSTMARKED NO LATER THAN NOVEMBER 15, 1994

1994 Ohaus/NSTA Awards Program for Innovations in College-Level Science Teaching Winner $750 Award

Foundations of Science-An Interdisciplinary Introduction to Science
Presented by: Peggy Tilgner, Wartburg College

Tilgner redesigned an introductory science program based on students' opinions about what they dislike about science class. The new course includes one lecture (called "encounter") a week instead of two. A team of educators leads the class through spirited discussions, including Socratic dialogues, panel presentations debates, and question-and-answer sessions.

On another day each week, students address "hot" and pertinent science topics, such as AIDS, radioactive waste, or gene therapy. Students discuss, write about, or watch movies on these topics.

Reformatted labs, or "explorations," allow students to act as scientists, exploring problems and testing new solutions, not simply validating hypotheses stated in the textbooks.

The course moves away from textbooks, substituting independent readings that expand on ideas from students' explorations and encounters. Reading materials include works by Charles Darwin and Isaac Asimov.

1994 Ohaus/NSTA Awards Program for Innovations in College-Level Science Teaching Winner $1,000 Award

A Useful Model for the Structure of Science Knowledge
Presented by: Victor Showalter, Center for Unified Science

Because Showalter found that many students perceive science as an incredibly large and complex collection of unrelated and trivial facts, he developed a conceptual model of science knowledge that helps students separate trivial from more important science knowledge. His hierarchically arranged model shows how things we perceive in reality ultimately end up as abstraction.

1994 Ohaus/NSTA Award Program for Innovations in High School Science Teaching $1,000 Award

The Use of Archaeological and Forensic Simulation in Science: An Interdisciplinary Teaching Method
Presented by: Linda Wygoda, Sam Houston High School

Wygoda developed two simulation activities that allow her students to act as forensic scientists and archaeologists to solve fictional crimes: one at a Greenland mummy archaeological site; the other at a Florida Windover archaeological site. To solve the mysteries, students work in teams at different lab stations analyzing soil, water, hair, simulated blood, fibers, and other remains.

Ohaus/NSTA Awards Program for Innovations in Middle School Science Teaching $750 Award

Labs Using Toys That Teach the Concepts of Measurement
Presented by: Arlene Hicks, Pierce Middle School

Hicks uses a variety of toys to teach measurement in creative ways. Transformer toys, which turn into different shapes (e.g, a hamburger into an animal, a truck into a robot), teach about mass, volume, and density. When the shape changes, the mass remains the same; but the volume changes, which in turn changes the density.

1994 Ohaus/NSTA Awards Program for Innovations in Middle School Science Teaching $1,000 Award

School-Parent-Community-Business Partnership: A Winning Combination in Teaching Strategies
Presented by: Hector Ibarra, West Branch Middle School

Because Ibarra believes that school and home are invariably linked, many of his programs involve students working with their parents. In one program, students researched the efficiency of water use in their homes and throughout the community, shared their results with their parents, created a database of the data they collected, and gave presentations to the city council and school board about the inefficiency of water use in the school and throughout the city. In another program, students tested their household water for chlorine, nitrate, iron, pH, and hardness levels and their soil for nitrogen, potassium, phosphorus, and pH levels. Results were entered into a database they shared with their parents. Students also taught their parents how to test water and soil.

Throughout the year, Ibarra sponsored family field trips to a space center, quarry, radio telescope, and a local radio station's meteorology center. Parents also regularly attend student-run open houses, where the adults get to do science experiments. Students also monitored and compared the efficiency and costs of new and old lighting systems in their school and reported the results to their school board. Currently, students are designing, building, and racing solar-powered cars.

Ohaus/NSTA Awards Program for Innovations in Elementary Science Teaching $750 Award

Earth Rangers
Presented by: Mark Levin Carolina Day School

Levin developed the earth Rangers program to help his students become more aware of the importance of preserving the environment. Each year for the past three years, students have undergone weekly "training" sessions to become certified Carolina Day "Earth Rangers." These sessions range from going on litter hikes and nature scavenger hunts to planning environmental campaigns, such as letter writing or school recycling. At the end of the program, students "graduate" and become model Earth Rangers for next year's class of future environmentalists.

Ohaus/NSTA Awards Program for Innovations in Elementary Science Teaching $1,000 Award

Project Preserve: An Innovative Approach to Science
Presented by: Judith Ann Atkins, Scott Libby Elementary School

On 20 acres of land donated by Litchfield Elementary School, Atkins is building an outdoor environmental education center. The center consists of a simulated Hohokam village; a Native American vegetable garden; a cactus garden; other vegetable and flower gardens; a pond habitat; and an archaeological dig site. The outdoor lab will be linked to an indoor technology lab complete with a Macintosh computer with a modem and CD-ROM, a laserdisc player, a VCR and monitor, and a weather FAX program.

Accompanying units have been developed and used by all teachers at Scott Libby Elementary School. Next year, the units will be available for outside groups visiting the site, and students will lead tours of the center.

THE ILLINOIS SCIENCE TEACHERS ASSOCIATION ANNOUNCES THE 1994 ILLINOIS PRESIDENTIAL AWARDS OF EXCELLENCE AND ISTA AWARDS OF EXCELLENCE IN SCIENCE TEACHING

SECONDARY SCIENCE TEACHING

Presidential Awards

Alan Hoffman
Community High School-North

Downers Grove

Beverly Sussman
Ivy Hall Middle School

Buffalo Grove

William Lederhouse
Schaumburg High School

Schaumburg

ISTA Awards

Nathan Unterman
Glenbrook North High
Northbrook

Brian Poelker
Midwest Central Jr. High
Manito

Nancy Kawecki Nega
Churchville Jr. High
Elmhurst

Judith Kosarek
Maine East High School
Park Ridge

Katherine Konyar
Buffalo Grove High School
Buffalo Grove

Carl Koch
Riverside/Brookfield High
Riverside

Paula Herron
Whitney M. Young Magnet High School
Chicago

THE ILLINOIS SCIENCE TEACHERS ASSOCIATION ANNOUNCES THE 1994 ILLINOIS PRESIDENTIAL AWARDS OF EXCELLENCE AND ISTA AWARDS OF EXCELLENCE IN SCIENCE TEACHING

ELEMENTARY SCIENCE TEACHING

Presidential Awards

Sylvia Gilbert
Edward Kennedy "Duke"
Ellington School

Jim Zimmerman
Thomas Paine Elementary
Urbana

Kathleen Donelan
Concord School
Darien

ISTA Awards

Elizabeth Trummel
Husmann Elementary
Crystal Lake

Julia Riley
Kingsley Elementary
Evanston

Mary "Sue" Kerr
Washington School
Belleville

Valerie Lyle
Lincoln Elementary
Marion

William Fraccaro
Johnson School
Warrenville

Karen Dozier
Pawnee Elementary
Pawnee

Sandra Cornwell
Deer Creek-Mackinaw Middle School
Deer Creek

Georgiean Benson
Washington School
Monticello

NABT (NATIONAL ASSOCIATION OF BIOLOGY TEACHERS) OBTA (OUTSTANDING BIOLOGY TEACHER AWARD) 1993/94

Barbra Burdett
Brown County High School
Route 24 East
Mt. Sterling, IL 62353

In addition to being recognized as the 1993/94 OBTA from Illinois, Mrs. Burdett's credentials include:
B.S. Millikin University
Project Wild Conference Participant
Recycling Conference Participant
Advanced Placement Teacher
Drama Club Sponsor
Science Fair Sponsor (solar car project - presented on Ch. 7 news)
Biology Club Sponsor
Who's Who Among American Teachers - 1992, 1994
Who's Who of American Women
Who's Who in Science & Engineering
Marquis Who's Who in the Midwest
Marquis Who's Who in the World
Contributor Phi Delta Kappa Newsletter
Unpublished novelist, poet, and playwrite
Sponsor of Children in the Appalachians

Mrs. Burdett has been characterized by her administrators and colleagues as being very innovative, cooperative, eclectic, and resourceful. She is a great believer in hands-on teaching and her number one priority is her students. She does everything in her power to insure student success, often at personal cost and is never stopped by failure. In her classroom, she has created a mini rainforest from a bathtub, has set DNA to music, and had students writing in ink from a squid's ink sac. She presents thoroughly researched units on diseases associated with Abraham Lincoln and Woodie Guthrie, even brining her guitar to sing Guthrie songs with her students. In short, "Barbra Burdett is certainly an award winning Biology teacher by anyone's standards."

YOUTH INCENTIVE AWARD

The Coleopterists Society, an international organization of professionals and hobbyists interested in the study of beetles, has established a program to recognize young people studying beetles. The Society has pledged to provide up to $250 each year for the Youth Incentive Award Program. In addition to monetary grants of up to $125, award recipients will receive a one year subscription to the society journal, The Coleopterists Bulletin, and a special certificate of recognition.

The objectives of the Youth Incentive Award are to:

- provide encouragement and assistance to young beetle enthusiasts (grades 7-12).
- promote the study of beetles, the most diverse group of insects, as a rewarding lifelong avocation or career.
- provide opportunities for young people to develop important life skills such as leadership, cooperation, communication, planning and conducting a scientific study and managing funds.
- provide some financial support to enrich activities or projects.

A three person committee from the Coleopterists Society will evaluate the applications and will select up to two winners annually; one each in junior (grades 7-9) and senior (grades 10-12) categories. Suggested topics include field collecting trips to conduct beetle species inventories or diversity studies, attending workshops or visiting entomology or natural history museums for special training and projects on beetles, studying aspects of beetle biology, etc. Proposals will be evaluated on creativity, educational benefit to the applicant, scientific merit, feasibility and budgetary planning.

For additional details and application forms contact **Dr. Philip Perkins, Department of Entomology, Museum of Comparative Zoology, Harvard University (phone: 617-495-2464). Deadline for Applications is 15 November 1994.**

Toshiba NSTA ExploraVision Awards
1840 Wilson Boulevard
Arlington, VA 22201
Contact: Amy Kosko, NSTA, (703) 312-9248
Rebecca Cradick, Toshiba, (212) 596-0617

ILLINOIS SEMIFINALISTS OF THE 1994 TOSHIBA/ NSTA EXPLORAVISION AWARDS SELECTED

World's Largest Science Contest Promotes Kids' Technology "Visions of the Future"

"Carbon of the Future—Buckyballs"
Students: Christina Riley, Nina Arora. Carissa Murphy (grade 6)
Lincoln Elem. School, Monmouth
Teacher: Penny Wagher
Community Advisor: Wayne Green
Carbon molecules called buckyballs can make ovens stay hotter, bank vaults almost indestructible, computer and television screens glare-free, and toys and sporting equipment unbreakable.

Extra! Extra! Plastic Newspaper for the Future
Students: Jamie Weiss, Jennifer Roberts, Sabina Leung (grade 8)
Madison Jr. High School, Naperville
Teacher: Joseph Cave
Community Advisor: Yusen Chen
To Save millions of trees, print news on thin recycled plastic sheets with a special ink rather than paper.

Mindlink—The Computer That reads Your Mind
Students: Paul Nash, Alan Silverman, Alizah Rotramel (grade 1-2)
Naperville North H. S. Naperville
Teacher: William Petersen
This helmetlike computer can read and interpret your thoughts.

Congratulations to all!

COUNCIL FOR ELEMENTARY SCIENCE INTERNATIONAL

SPONSORED BY Ciba-Geigy Corporation

Exemplary Elementary Science Teaching Award

The Exemplary Elementary Science Teaching Award is presented by the Council for Elementary Science International, a Division Affiliate of the National Science Teachers Association, and sponsored by the Ciba-Geigy Corporation. The Award is bestowed annually at the elementary luncheon of the NSTA Annual Convention to an elementary teacher who has demonstrated exemplary science teaching performance creating science materials; and/or using science materials; and/or designing teaching plans and ideas; and/or fostering student, school, and school-community or schoolwide instructional programs in science. Criteria for eligibility for the competition and procedures are described below.

Composition of the Award

The Winner's Award consists of a $1,000 prize from Ciba-Geigy Corporation, complimentary membership in NSTA and CESI, an expense-paid trip (up to $500) to the NSTA National Convention, and publication of a report describing the awardee's work in *Science and Children.*

Eligibility and Procedures

1. Entrants must be full-time classroom teachers with all the responsibilities of such a position. Teachers in preschool through grade six may enter. The exemplary teaching described must be the entrant's original work.

2. A description of the exemplary elementary science technique(s), innovations, and/or program(s). Not to exceed four (4) typewritten pages, approximately 1,000 words.

3. Provide three letters corroborating the description from individuals or groups who are familiar with the exemplary elementary science teaching of the applicant. Supplemental sample materials, documents, and/or photographs are encouraged. Send a self-addressed, stamped envelope if you want materials returned.

4. Submit the application and the supporting documents to: Mr. Steven S. Pieritz, P.O. Box 173, Frankfort, IL 60423.

Calendar

Deadline for entries must be postmarked no later than November 15,1994. The winner will be informed as soon as possible after judging. The presentation of the award will be made at the NSTA National Convention in Philadelphia, Pennsylvania, March 23-26, 1995.

Judging

Final judging is by a panel of outstanding science educators selected by the Council for Elementary Science International, a Division Affiliate of the National Science Teachers Association.

CESI Exemplary Elementary Science Teaching Award

Presented by the Council for Elementary Science International, a Division Affiliate of the National Science Teachers Association and sponsored by the Ciba-Geigy Corporation.

Application 1995

Name of Entrant

_____

Home Address

_____

_____

School Address

_____

_____

School Telephone

_____

_____

Grade(s) Taught

_____

_____

_____

Number of Teaching Years

_____

Submit application and supporting documents to:

Mr. Steven S. Pieritz
P.O. Box 173
Frankfort, IL 60423

FIELD TRIPS AND WORKSHOPS

Dr. Harold W. Myron
Argonne National Laboratory
Division of Educational Programs

National Science Technology Council (NSTC) 1994 Summer Teacher Enhancement Institute

Twenty Chicago-area high school science teachers participated in the NSTC 1994 Summer Teacher Enhancement Institute at Argonne National Laboratory.

"The purpose of this four-week institute and follow-up activities," according to Dr. Harold W. Myron, Institute Director, "is to develop experiments and demonstrations for classroom use in the multidisciplinary area of forensics. A major emphasis is to strengthen the teaching of basic science concepts through 'hands-on' laboratory activities using demonstrations and research quality equipment. The participants will have access to the equipment during the academic year via Argonne's Instructional Van. This van will make scheduled stops at each participant's school."

Much of the institute utilized the research facilities and personnel at Argonne National Laboratory. Off-site tours, guest lecturers, and the shared resources of the 20 participating teachers also comprised an important part.

The four-week institute was composed of lectures in the area of forensic science, laboratory sessions using research grade instrumentation, and the development of written laboratory exercises which the participants will utilize with their students during the academic year.

Follow-up sessions will take place during the academic year and will focus on preparing participants for using the instrumentation in their classrooms as well as other related science topics.

Topics introduced at the institute included crime scene analysis, toxicology, DNA fingerprinting, arson investigation, light microscopy, and electron microscopy. Instrumentation introduced included the scanning electron microscope, Fourier-transform infrared spectrophotomteter, X-ray fluorimeter, gas chromatograph, mass spectrometer, and visible spectrophotometer. Participants were also introduced to various laboratory techniques used in forensics, and the use of computers and telecommunications. A highlight was a mock crime scene analysis. During the academic year, participants will share their experiences with their students in the classroom, as well as with their teaching peers.

Argonne National Laboratory is operated by The University of Chicago for the United States Department of Energy.

Participating teachers included:
Karen Bellissino, Hyde Park Career Academy, Chicago Public Schools
Margaret Flynn, Aqsa School, Bridgview
Scott Gonzalez, Bowen High School, Chicago Public Schools
Deborah Ann Granskog, Huntley High School, Huntley
Kathleen Greenawalt, Morton East High School, Cicero
Arnold Guttman, Waukegan High School, Waukegan
June Hagberg, Polaris School for Individual Education, Oak Lawn
Deborah Hughes, Roosevelt High School, Chicago Public Schools
Joseph Kerke, Hillcrest High School, Country Club Hills
Robert Krupp, St. Patrick High School, Chicago
Timothy Leffler, Lemont High School, Lemont
Aryliss Lisner, Kelly High School, Chicago Public Schools
Sharon McCoy, Conant High School, Hoffman Estates
Christine Olsen, Mather High School, Chicago Public Schools
Harold Patterson, Hyde Park Career Academy, Chicago Public Schools
Carl Schaumburg, Von Steuben Metropolitan Science Center, Chicago Public Schools
Roger Schoob, Bolingbrook High School, Bolingbrook
JoAnn Tunt, Community High School District #94, West Chicago
Joselita Velasco, Sullivan High School, Chicago Public Schools
Cari Ann Weber, Sandburg High School, Orland Park

For further information contact Dr. Harold W. Myron at (708) 252-5767.

Beyond Indiana Jones: Archaeology as a Focus for the Interdisciplinary Curriculum: A One-Day Workshop for Classroom Teachers

Saturday, November 19, 1994

Oriental Institute Museum at the University of Chicago

The aura of mystery and adventure that surrounds archaeology makes this subject inherently interesting to students of all ages. The interdisciplinary nature of archaeology and its hand-on approach to problem solving, can provide students with real-world adventures in scientific investigation. At the workshop, teachers from across the nation will present ways they have used archaeology to teach biological and physical sciences, as well as mathematics and the enhancement of computer skills. Others will show how archaeology can enrich the curriculum in language arts, social sciences, and the fine arts. Representatives from local and regional museums and cultural organizations will share the archaeology resources they have developed for classroom use. Cosponsored by the Outreach Education Committee, American Schools of Oriental Research, and supported by the Society for American Archeology and the Chicago Chapter of the Archeological Institute of America, the workshop is free to all participants, but space is limited and preregistration is required. For more information, call the Oriental Institute Museum Education Office at 312-702-9507.

MEETINGS AND CONFERENCES

THE ILLINOIS ASSOCIATION OF CHEMISTRY TEACHERS

Mark your calendar today for the 1994 Annual IACT Meeting to be held at Illinois State University—**OCTOBER 21.** Even though we had 224 registrations last fall, plan again to invite a physics or physical science colleague to join you. As a result of your work last fall, we now have 50 new members. Watch for your copy of the Fall Annual Meeting program in September.

NATIONAL CHEMISTRY WEEK NOVEMBER 6-12, 1994

For information about opportunities to broaden the public's awareness of chemistry during NCW 1994, contact Denise Creech in the NCW office at ACS headquarters. 800/227/5558. (At the menu, press 9-5-1)

1994 Midwest Environmental Education Conference

Eagle Ridge Conference Center Galena, Il.

Environmental Education Association of Illinois

October 27-29, 1994

Conference Sponsors:
Environmental Education Association of Illinois
U.S. Environmental Protection Agency, Region V
Illinois Department of Energy and Natural Resources
Illinois Conservation Department

The theme is Environmental Education: "Making the Right Connection."

Features of the conference:

- **Over 96 concurrent sessions offer educational materials on Recycling, Energy Education, Tropical Rainforests, Dreama in the Environment, Solar Electircity, Prairie Restoration, Music, Art, Pollution Studies, and Native Americans and the Environment**
- **Field trips includding Geology in a Driftless Region, the Mississippi River, and Galena History**
- **Keynote addresses by Joseph Bruchad, story teller and coauthor of "Keepers of the Earth"; and Dr. Thomas Dunstan, zoologist and conservation biologist with over twenty years of reserach on raptors including eagles.**
- **Special workshops for Project Wet, Project Air and Groundwater: Illinois' Burried Treasure will be offered.**
- **Entertainment on Friday night will be Jim Post presenting "Galena Rose"**

In additon, many exhibits, a bookstore, an auction, and a raffle will be part of the conference.

Midwest Environmental Education Conference • October 27-29, 1994 • Eagle Ridge Resort, Galena, Illinois

PLEASE, FILL OUT THIS REGISTRATION FORM COMPLETELY

Name: _____ Spouse's Name (if attending): _____

Home Address: _____ Home Phone (AC) _____

City/State/Zip: _____

Occupation/Affiliation _____

Business Address: _____ Business Phone (AC) _____

City/State/Zip _____

☐ CHECK HERE IF YOU NEED SPECIAL ASSISTANCE DUE TO A HANDICAP.

REGISTRATION: CIRCLE ONE

Member for Conference (EEAI* or MEEC affiliate)	**$50**
Member - One Day (EEAI* or MEEC affiliate) **Circle One - Thu, Fri, Sat**	**$30**
Non-member Conference	**$60**
Non-member - One Day Circle One - Thu, Fri, Sat	**$40**
Student for Conference	**$20**
Student - One Day Circle One - Thu, Fri, Sat	**$10**
Spouse for Conference	**$20**
Spouse - One Day Circle One - Thu, Fri, Sat	**$10**

(A) **Total Registration** ☐

NOTE: Prepaid Early registration will qualify you for the door prize drawing.. Registration must be postmarked by June 15, 1994 to qualify

Meals: Please Circle Your Choice
(Eagle Ball Room or The Galena Rooms (See Schedule)

Th.	Lunch	Sandwich Buffet or Vegetarian	$10.25
		or Box Lunch	$10.00
	Dinner	Western B-B-Q or Vegetarian	$26.00
Fri.	B'fast	Continental	$4.00
	Lunch	French Dip or Vegetarian	$7.50
	Dinner	Chicken Breast/pasta	$21.00
		Vegetarian	$21.00
Sat.	B'fast	Buffet	$10.00
	Lunch	Box Lunch	$10.00
		Box Lunch from Grill	$9.75

(B) **Total Meals** ☐

* If you are not a member of the Environmental Education Association of Illinois, but would like to join, please, include a **separate membership check for $10 made out to EEAI.**

Field Trips (Please check , See Field Trip Information for times and details. NC = no charge)

Thurs.	__ Camp Atwood, Rockford, IL.	NC	__ Regional Environmental Ctr., Pecatonica	NC
	__ Byron Forest Preserve, Byron, IL.	NC	__ Self-Guided Walks at Eagle Ridge	NC
	__ Hiking Trails of Eagle Ridge	NC	__ E.B. Lyons Nature Ctr., Iowa	To receive info.
	__ Illinois State Park Interest ?			
Fri.	__ Galena History Tour.	$5.00	__ Vinegar Hall Historic Mine	*$4.00
	__ Prairie Tour	NC	__ Canoe Miss. River Backwaters	To receive info.
	__ Soil & Water Conservation	$5.00	__ Whistling Wings Duck Hatchery	*$5.00
	__ Early Morning Bird Hike	NC		
Sat.	__ Horseback Riding / Eagle Ridge	$16	__ Canoe Miss. River Backwaters	To receive info.
	__ Apple River Canyon 10:30 am	NC	__ Spring Lake Birding Trip	NC
	__ Apple River Canyon 1:00 pm	NC	__ Birds of Prey: Falcon	NC

*** Pay on-site**

(C) **Total Trips** ☐

Environmental Education Workshops (Please Check, To be held Thursday)

___Project Learning Tree Facilitator 9-12 noon
___Project WET
___Illinois' Groundwater
___Project WILD/Aquatics
___Project Learning Tree
___The CLASS Project
___Project WILD

Housing: See Housing Information
Participants should make their own arrangements.

Return this **Registration Form** and your **check** payable to **EEAI** to:

TOTAL ENCLOSED (A) + (B) + (C) = ☐

Dr. Don Nelson, MEEC, 49A Horrabin Hall, Western Illinois University, Macomb, IL 61455

EDUCATIONAL MATERIALS

Flinn Scientific, Incorporated
P.O. Box 219
Batavia, Illinois 60510 U.S.A.
708/879-6900

"GHOST CRYSTALS"

Samples of "Ghost Crystals" are now available from Flinn Scientific, Inc. This water absorbent material is used to teach the concept of light refraction.

A vial appearing to contain only water and a small string noose, surprisingly also contains an "invisible" "Ghost Crystal"! Pull the string noose out of the vial and the crystal can be seen inside the noose! Lower the noose back into the vial and the crystal "disappears."

If you would like to receive a free Ghost Crystal sample, please write to the above address. Note: Ghost Crystals can only be sent to teachers at school addresses. One sample per customer please.

GROW YOUR OWN RAINFOREST!! A "Grow Box" Of Rain Forest Seeds For Planting Or Displaying!

Each **"Grow Box"** contains 6 types of seeds from the tropical rainforests of Costa Rica. The seeds were selected for ease of growth, high germination rates, and ecological interest. Growing instructions and plant species information are included.

Species included in the **"Grow Box"** are: Flame of the Forest (Delonix regia), Elephant's Ear (Enterolobium cyclorapum), Chumico, Carao, Rainforest Pearls, and Ox-eye Liana. There is one Ox-eye Liana, and 4-5 of each of the other seeds.

The seeds were harvested by Costa Rican farmers who receive an income from the sale of the seeds. By purchasing the seeds, the buyer will help promote sustainable products from rain forests, thereby saving them from destruction.

COST: $9.95 + $2.50 shipping.

TO ORDER, contact:
ecol-o-kids
3146 Shadow Lane
Topeka, KS 66604
1-800-423-7202
Or send $9.95 + 2.50 shipping to the above address.

Destination Discovery, a guide to The Discovery Channel, has information about programs educators can assign as extra-credit or after school viewing. The guide is available for a special educator discount of $14.95 for 12 issues. To order, call 800-347-6969, or send a check to *Destination Discovery* Subscription Dept., 7700 Wisconsin Ave., Bethesda, MD 20814.

Single copies of **C-Spectra**, a teaching aid that helps students view the light spectrum and flame tests of various materials. Free!. Request the sample on school letterhead, and send to: C-Spectra, Flinn Scientifics, Inc., PO Box 219, Batavia, IL 60510.

The New Madrid Earthquake Project has prepared an **educational videotape** with funding from the NSF. The 50 minute tape provides a brief history about the New Madrid fault zone, including the massive earthquakes of 1811-12. California earthquakes, explanation for intraplate earthquakes, and more are presented. The tape is available for $21.29 (including shipping and handling) from Lloyd H. Barrow, Project Director, New Madrid Earthquake Project, Southwestern Bell Science Education Center, 108 Townsend, University of Missouri, Columbia MO 65211. Make checks payable to the University of Missouri-Columbia. (*NSTA Reports!*, Dec./Jan. 1994).

Great Lakes Educators of Aquatics and Marine Science (GLEAMS) now encompasses all states bordering the Great Lakes. This year's fall symposium was held behind the scenes at Sea World in Oho where "we slept with the sharks!" Just $10.00 for membership! Contact Jim Millen, President, Schoolcraft College, Dept. of Biology, 18600 Haggerty Rd., Livonia, MI 48152.

Biotechnology-Careers for the 21st Century is a 14-minute video that highlights various aspects of biotechnology professions for middle school and high school students. This tape is part of NABT's array of biotechnology educational materials. It is available to members for $8 and nonmembers for $10. To order the video, send your name, address, and phone number along with a check made payable to NABT to: 11250 Roger Bacon Drive #19, Reston, VA 22090. Other items of interest from NABT are: *Teaching Critical Thinking Skills in Biology* ($15 for members or $20 for nonmembers plus $2 for shipping); *Favorite Labs From Outstanding Teachers-Volume II* for grades 7-12. ($18 or $24 plus $2 for shipping); *Order & Diversity in the Living World: Teaching Taxonomy & Systematics in Schools* ($12 plus $2 for shipping)

PARKS IN PERIL PROGRAM

Sponsored by the Earth Foundation for K-8 students who want to help save rainforest plants and animals from extinction. Curriculum packages tailored to each grade level are offered. Contact Earth Foundation, 6003 N. Shepherd, Houston, TX 77091.

ON THE ROCKS

Earth Science activities for grades 1-8, published by the Society for Sedimentary Geology, is available at cost. Order for $9.00 per copy plus $1.90 shipping within North America from SEPM, P.O. Box 4756, Tulsa, OK 74159.

IDEAS AND ACTIVITIES FOR PHYSICAL SCIENCE

A 400-page resource full of activities for physical science courses. Contains background information, paper and pencil exercises, demonstrations, and laboratory exercises for chemistry and physics. The paper/pencil and laboratory exercises include a teacher's version with explanations and answers, and a students' version without these details. Experienced and successful science teachers developed the activity. The manual also contains teaching tips and a questionnaire to assess students' attitudes toward their science courses. **Send a check, payable to University of Houston, for $15 plus $1.50 shipping and handling for one manual to:**
Dr. Eugene L. Chiappetta
Dept. Curriculum and Instruction
University of Houston
Houston, TX 77204-5872

From *NSTA Reports!*

The American Plastic Council has a **curriculum package** for grades 7-12 which is most complete with classroom activities and technical information. Most of their publications are free on a single issue basis, or very inexpensive in class lots. Call (800) 243-5790.

For the middle level student, **Synergistic System**, has a benchmark brochure which describes the Learning Environment, Learner Organization, Module Curricula, and Instructor Enablement components of the system. Write them at P.O. Box 1707, Pittsburgh, KS 66762; Tel. (316) 231-1333; FAX (316) 231-2466.

Grants: Where to Look and How to Win - For copies contact: Eisenhower Mathematics and Science Technical Assistance and Leadership Development Project, Triangle Coalition, 5112 Berwyn Road, College Park, MD 20740-4129; (301) 220-0817.

A truly fine resource for all ages in the sciences is the **1994 Steck-Vaughn Catalog**. To order call (508) 369-2888.

One of the best kits for water tests is the **miniKit Water Tests.** Save class time, virtually error-proof, safe to use, fast, easy, accurate, and only $12.00 for each kit for Cl_2, O_2, Cu, NH_3, PO_4-, NO_2-, FE^{+++}, S-. Order from CHEMetrics, (800) 356-3072.

Free Copy of the **Aerosol Adventure Education Package.** Call Modern Talking Pictures at (800) 243-6877. Be sure to use the following digest number when ordering: #K-1078.

Great chemistry and physics kits from **ESHED ROBOTEC.** Simple, but elegant and inexpensive. To order their catalog, call (800) 777-6268.

Did you know that **Crayola** is into new things besides crayons? Write for a sample of their modeling clay, and their new products catalog. Binney & Smith, Inc., Easton, PA 18044-0431.

NASA has so much material for every grade level that it would take a dozen in-service school days to just sort it all. Obtain the information you need for your grades by writing to NASA CORE, Lorain County JVS, 15181 Route 58 South, Oberlin, OH 44074.

Lab Safety Supply is devoted to lab safety only. Order their free catalog today; (800) 356-2855.

Order a superb **environmental catalog** from Acorn Naturalists, 17300 East 17th Street, #J-236, Tustin, CA 92680; Tel. (800) 422-8886, Fax (800) 452-2802.

Kindergarten and primary grade teachers can obtain **free Smithsonian Institution/USDA Forest Service learning kits** that celebrate Smokey Bear's golden anniversary. The full-color kits contain 11 hands-on activities for children, a poster, a puzzle, a reading list, and additional classroom resources. The lively materials on forests, Smokey, and fire safety will help young students learn about woodland habitats and what they can do to protect our natural resources.Teachers can obtain the kits by writing to: Smokey Bear Kit, Office of Elementary and Secondary Education, Smithsonian Institute, Arts and Industries Building 1153 MRC 402, Washington, DC 20560.

The Bureau of Land Management has recently published: ***Intrigue of the Past: A Teachers Activity Guide for 4th-7th Grades, A Heritage Education Program's Project Archaeology Initiative***. The entire program supports existing elementary and secondary school curriculum by using examples from archaeology, history, and paleontology to facilitate the teaching of science, math, social studies, and cognition skills. Contact: U.S. Department of the Interior, BLM, Office of Public Affairs, 1849 C Street, NW, Washington, DC 20240-0001; Tel. (202) 208-5717.

Re-actions is the newsletter of the American Nuclear Society for teachers interested in the **nuclear sciences**. Contact: Re-actions, 555 N. Kensington Ave., LaGrange Park, IL 60525.

The National Research Council's National Academy of Sciences, which is overseeing the development of national science education standards, has released what it calls a "**Headline Summary**" of the standards. The eight-page summary) provides an organizational framework of the final standards document, which will include standards for K-12 science programs, content, teaching, assessment, and systems (policies and practices). To request the most recent version of the "Headline Summary," contact the National Committee on Science Education Standards and Assessment, National Academy of Sciences, National Research Council, HA 486, 2101 Constitution Ave. NW, Washington, DC 20418; Tel. (202) 334-1399.

The National Science Foundation (NSF) recently released two new publications: **Grant Proposal Guide** (NSF 94-2), formerly *Grants for Research and Education in Science and Engineering*, is the guide to use in preparing unsolicited proposals to NSF, including proposals to NSF's Directorate for Education and Human Resources (EHR). **User-Friendly Handbook for Project Evaluation: Science, Mathematics, Engineering, and Technology Education** (NSF 93-152) describes various

aspects of the project evaluation process for project for projects supported by EHR. The handbook is aimed at people who need to learn more about both what evaluation can do and how to do an evaluation. For free copies, contact NSF, Forms and Publications Unit, 4201 Wilson Blvd., Rm. P15, Arlington, VA 22230; Tel. (703) 306-1130.

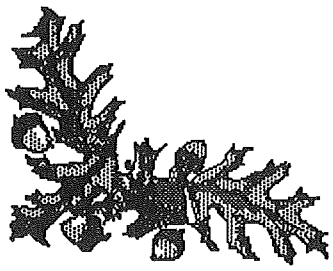
Many resources are offered through the U.S. Department of Education. For further information on programs, request a free copy, while supplies last, of ***A Teacher's Guide to the Department of Education*** from the Goals 2000 Office, U.S. Department of Education, 400 Maryland Ave., SW, Washington, DC 20202; Tel. (202) 401-3673.

Balloons and Science Kits are available for three dollars a piece. The kits include a packet of 30 balloons and four experiments. The experiments were developed by Dr. Arthur Livermore, former director of education for the AAAS. While the activities were originally designed for fifth and sixth graders, they can be adapted for any age group. Write: The Balloon Council, 512 11th Street, SE, Washington, DC 20003; Tel. (202) 544-0967.

Tapes by the late Tik L. Liem are some of the most ingenious available. Very low prices for terrific science - featuring a variety of discrepant events. Write or call: Science Inquiry Enterprises, 14358 Village View Lane, Chino Hills, CA 91709; Tel. (909) 590-4618.

For catalog of **UNESCO publication** since 1980 contact UNIPUB, 4611-F Assembly Dr., Lanham MD 20706; Tel. (800) 274-4888.

Mars Observer Preview Packets containing activities, images, and data about the surface, interior, and atmosphere of Mars each month. Write to Marsink, The Planetary Society, 64 N Catalina Ave., Pasadena, CA 91106.



Great Ideas in Education: a professional resource catalog featuring hard-to-find books and videos on innovative teaching approaches in elementary and secondary education. Contact: Resource Center for Redesigning Education, P.O. Box 298, Brandon, VT 05733; Tel. (800) 639-4122.

Student Portfolios: a book of teachers' stories about examples of student portfolio assessment. Reproducible samples included. $9.95 from NEA Professional Library, P.O. Box 509, West Haven, CT 06516; Tel. (800) 229-4200. Request stock no. 2901-1-00.

Whales of the World Teacher's Kit, grades 2-4. Whale growth chart and reproducible activities on a variety of topics. Send $2 to International Wildlife Coalition, Dept. 93IN, 70 E. Falmouth Hwy., East Falmouth, MA 02536.

Middle Grades Education in an Era of Reform, proceedings from a seminar. Order for $5 prepaid from Don Kelley Academy for Educational Development, 1255 23rd St. NW, Washington, DC 20037.

The *American Association of Immunologists* offers **free educational materials** developed in the High School Teacher Internships in Immunology Program. *Allergic Reactions* is a 12-minute video with an instructional handbook, *Rockets into the Unknown-Diagnosing Multiple Sclerosis*, a self-contained classroom exercise, provides teacher preparation background material. Other materials will be available through this internship program. To order the above materials, or for more information, contact The American Association of Immunologists, Education Committee, 9650 Rockville Pike, Bethesda, Maryland 20814; Tel. (301) 530-7178.

The Plastic Bag Association has developed a new **environmental education program** targeting grades two through five. The five lesson plan, entitled *Don't Let a Good Thing Go To Waste*, includes multi-disciplinary activities that help children understand concepts related to solid waste and the 3 R's (reduce, reuse, recycle). Teachers may request a free kit by calling the Plastic Bag Information Clearinghouse at 1 (800) 438-5856.

The Annenberg/CPB Math and Science Project is asking educators and researchers nationwide to submit information on current activities aimed at science and mathematics educational reform in grades K-12, to be included in a ***Guide to Science and mathematics Reform.*** The guide is being designed as a comprehensive national database to support communication among educators and others interested in reform. To submit or obtain information, or to be included on the guide mailing list, call (301) 907-6510 or E-mail on Internet at TLCI@access.digex.net.

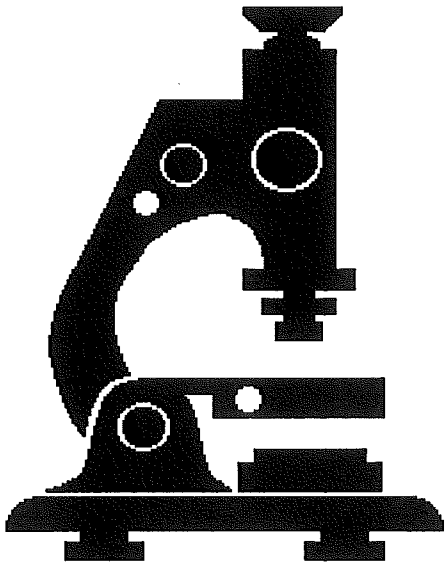
The American Phytopathological Society (APS) has released a new ***Careers in Plant Pathology*** full-color brochure that highlights the job opportunities in the field of plant pathology. To order copies of the brochure, cotnact the APS Headquarters, 3340 Pilot Knob Road, St. Paul, Minnesota 55121-2097; Tel. (612) 454-7250. Receive up to 10 copies free; additional copies are available at $.50 each. The publication may be ordered in English or Spanish versions.

Safety in the Elementary School Classroom, a newly revised 22 page guide from NSTA, offers detailed, practical tips on how to ensure the safety of young scientists.. Designed as an easy-to-read flip chart, the guide is intended to be hung in the classroom and referred to frequently. The guide costs $7.95 plus $3.75 for shipping and handling. To order, contact NSTA Publication Sales, 1840 Wilson Boulevard, Arlington, Virginia 22201; Tel. 1 (800) 722-NSTA or (703) 243-7100.

A 59-page, full-color report, ***Blood: Bearer of Life and Death***, describes advances in understanding how blood cells develop and function and may cause human disease. The report touches on the AIDS epidemic, sickle-cell disease and other inherited disorders of red cells, the high death toll from blood clots, and gene therapy research for blood disorders. There is no charge for the report. Contact Howard Hughes Medical Institute, 4000 Jones Bridge Road, Chevy Chase, Maryland 20815-6789; Tel. (301) 215-8500.

Young Environmentalists' Action (YEA) is a monthly environmental newsletterfrom Global Response, a nonprofit international environmental education resource and action network. YEA provides information about international environmental emergencies and names and addresses of officials involved. To order (no mandatory fee), contact YEA Program, P.O. Box 7490, Boulder, Colorado 80306-7490.

A **DEMOSLIDE KIT** for convenience, safety and results; designed to simplify the preparation of living protozoans for microscopic examination in the classroom. Very inexpensive and easy to use: uses the famous DAVSTAR CEN-SLIDE as both culture chamber and examination chamber. You must see one of these in action. A kit which includes 50 slides, microscope adapter and rack is only $50.00. Order from: Resolution Technology, 26000 Avenida Aeropuerto #22, San Juan Capistrano, CA 92675; (714) 661-6162.



The National Safety Council offers free catalogs of all their materials: The National Safety Council, 1121 Spring Lake Dr., Itasca, IL 60143; Tel. (800) 621-7615.

New Flinn Scientific, Inc. Safety Video

A new safety video entitled "Practical Solutions To Common Laboratory Problems" is now available to help science teachers and administrators improve the safety profile of their laboratories.

"Practical Solutions to Common Laboratory Problems" is a fast paced two hour video tape which is an excellent safety training tool for all teachers at all levels.

Topics include:

- Teacher Liability
- Laboratory Ventilation
- Safety Equipment Use Training
- Spill Control
- Organization And Clean Up Of A Chemical Storage Area
- Chemical Inventory And Disposal
- "How To Get Action"
- And Much More

"Practical Solutions to Common Laboratory Problems" offers many inexpensive and common-sense solutions to the safety problems science teachers face in their laboratories. This videotape (catalog #AP8825) is now available to science teachers for $84.95. To order or for additional information please call or write to:

Safety Video
Flinn Scientific, Inc.
P.O. Box 219
Batavia, IL 60510
1-800-452-1261

Science teachers at school addresses only please.

David M. Antonacci
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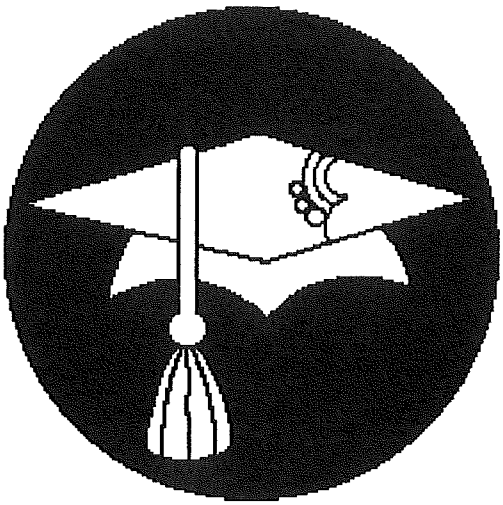
(816) 524-2701

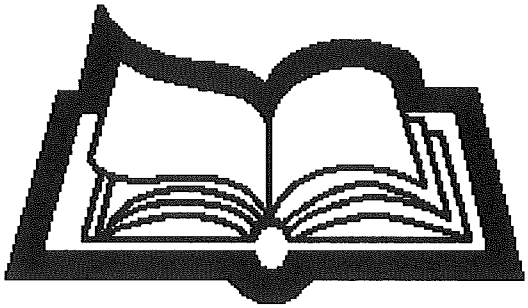
THANKS-FOR-TEACHING PROGRAM

The Higher-Order Thinking Company is extending our *Thanks-for-Teaching* Program to all science and math teachers (grades 6-12). Our program recognizes the contribution teachers make to our society and offers them one copy of our popular educational game, Vector Adventure, for only a $5 shipping and handling fee! Or, they may purchase both Dynamics in Space and Vector Adventure for only $29.95...both programs for the price of one! This offer is for the complete program package, not just a demonstration version. It includes the manual, program disk, backup and 30-day satisfaction guarantee.

Vector Adventure is an educational game requiring the application of vectors and vector addition. By selecting appropriate velocities (both magnitude and direction), students steer their simulated ship toward long-lost pirate treasure while avoiding shoreline rocks and compensating for existing currents. In Dynamics in Space, students apply their knowledge of kinematics and dynamics. Using the force from small retrorockets, students control the acceleration, velocity and position of their spaceship as they dock with a variety of space stations. These programs are available for Apple II computers.

To order, send appropriate payment or purchase order to the Higher-Order Thinking Company, 1733 NE Patterson Drive, Lee's Summit, MO 64086, (816) 524-2701. This offer ends June 1, 1995! (Orders under $10 must be prepaid. Missouri residents add 6.457% sales tax or include a copy of tax exemption letter.)





USGS OFFERS NEW TEACHER'S PACKETS

The US Geological Survey has produced two teacher's packets that can help upper elementary and junior high school students understand and use maps and introduce them to the concept of global change.

The packet *What do Maps Show?* contains a teaching poster, background information and four lessons plans for the teacher, and reproducible maps and activity sheets for student packets.

The poster shows one location, Salt Lake City, in several pictures and symbolic representations, including aerial photography; shaded-relief, topographic, and road maps; and a (three-dimensional) terrain model created from computerized data. It provides visual support for the major points of the lessons; that there are different types of maps; what information is needed to read maps (such as direction, latitude, longitude, scale, and map legend); and how two-dimensional maps can represent three-dimensional surfaces.

The packet *Global Change* contains a teaching poster, background information and three lesson plans for grades 4-6, introducing this relatively new area of scientific study under the concepts of "time," "change," "cycles," and "Earth as home." The activities include learning how to read tree rings, how to understand concentration and measurements in parts per million, and how to consider "Earth as home" as an ecosystem in which changes in one part can cause changes to other parts. For each of the activities, illustrations on the poster can provide large-scale support.

The packet are available through the Earth Science Information Centers (ESIC), including the Oregon Department of Geology and Mineral Industries nature of Oregon Center, Suite 177, 800 NE Oregon Street, Portland, OR 97232; and the USGS ESIC at W. 904 Riverside Ave., Spokane, WA 99201, phone (590) 353-2524.

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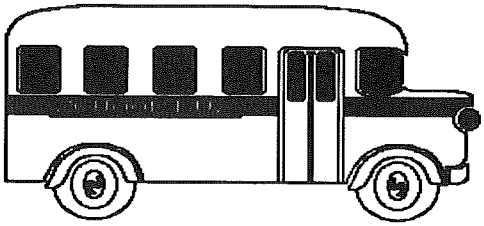

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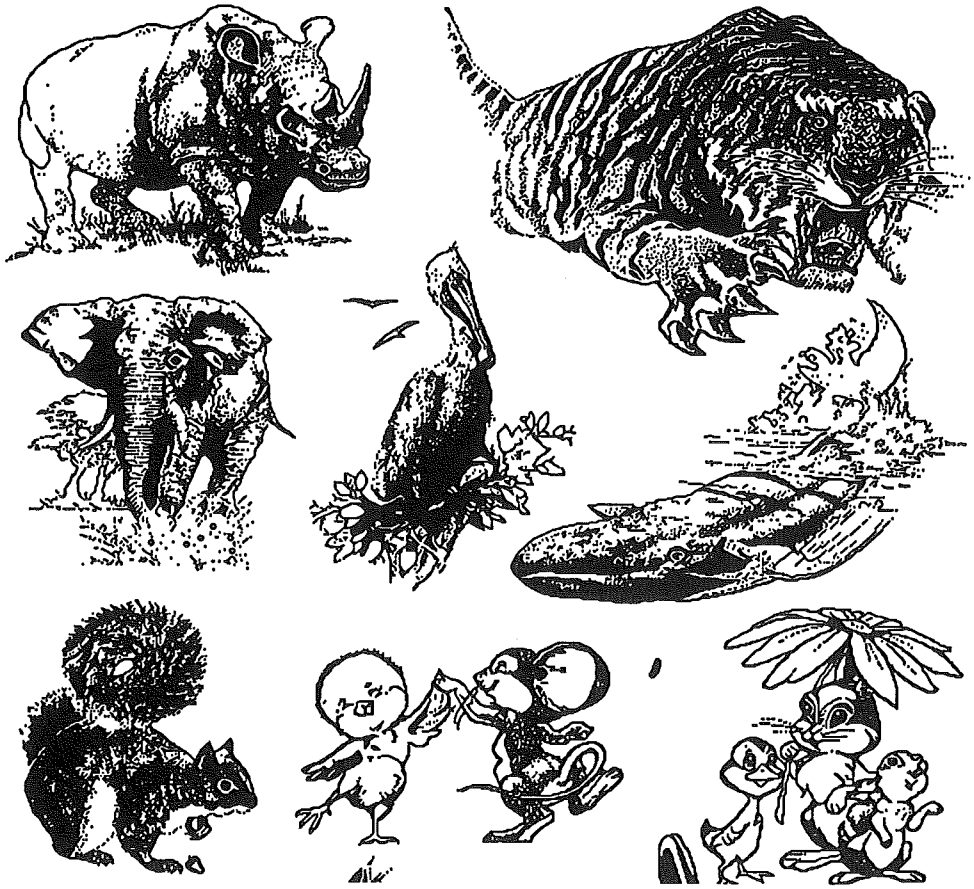
Teachers at school addresses only please.



INTERESTED IN CONTRIBUTING TO THE ISTA SPECTRUM?

SPECTRUM welcomes contributions from its readers. Won't YOU submit some of your GOOD IDEAS for one or more sections of the SPECTRUM?

ARTICLES
- Thought provoking ideas or commentary about science or science education
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IN FOCUS appears in every third issue of SPECTRUM. Topic is chosen by the editorial staff. Submissions are invited.

SPECIAL INTEREST
- .Important news for specific audiences
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MINI IDEAS
- Instructional pieces
- Demonstrations
- Lab activities
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Your reaction to science-related books, films, audio-visuals, computer programs, curriculum materials, etc.

MEETINGS
Business and pleasure gatherings for science educators

AWARDS/RECOGNITION
Any legitimate honor bestowed upon educators or students of science

POTPOURRI

FIELD TRIPS/WORKSHOPS
Any relevant offerings by not-for-profit organizations

EDUCATIONAL MATERIALS
Free or inexpensive items offered by not-for-profit organizations

SUBMISSION DEADLINES

Fall	June 1 (to members in September)
Winter	September 1 (to members in December)
Spring	December 1 (to members in March
Summer	March 1 (to members in June)

GUIDELINES FOR SUBMISSIONS
- Copy should be typed or word processed in double-space format. SPECTRUM accepts word processed submissions on disk in either, Macintosh, or IBM format. All submissions on disk should be accompanied by a printed copy.
- Line drawings, glossy black and white photos and/or computer generated graphics are welcome. Receipt of all submissions to ARTICLES, IN FOCUS, MINI IDEAS, REVIEWS and POTPOURRI will be acknowledged by the associate editor.
- Submitted items, including computer disks, will not be returned unless accompanied by a self-addressed, stamped envelope.

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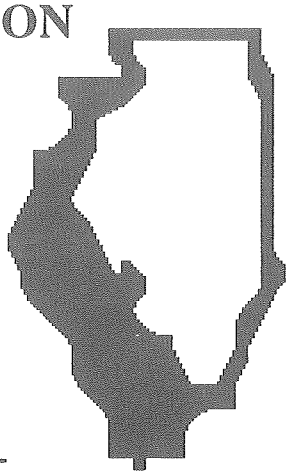

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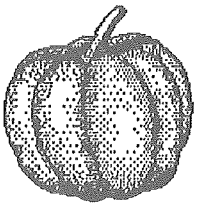

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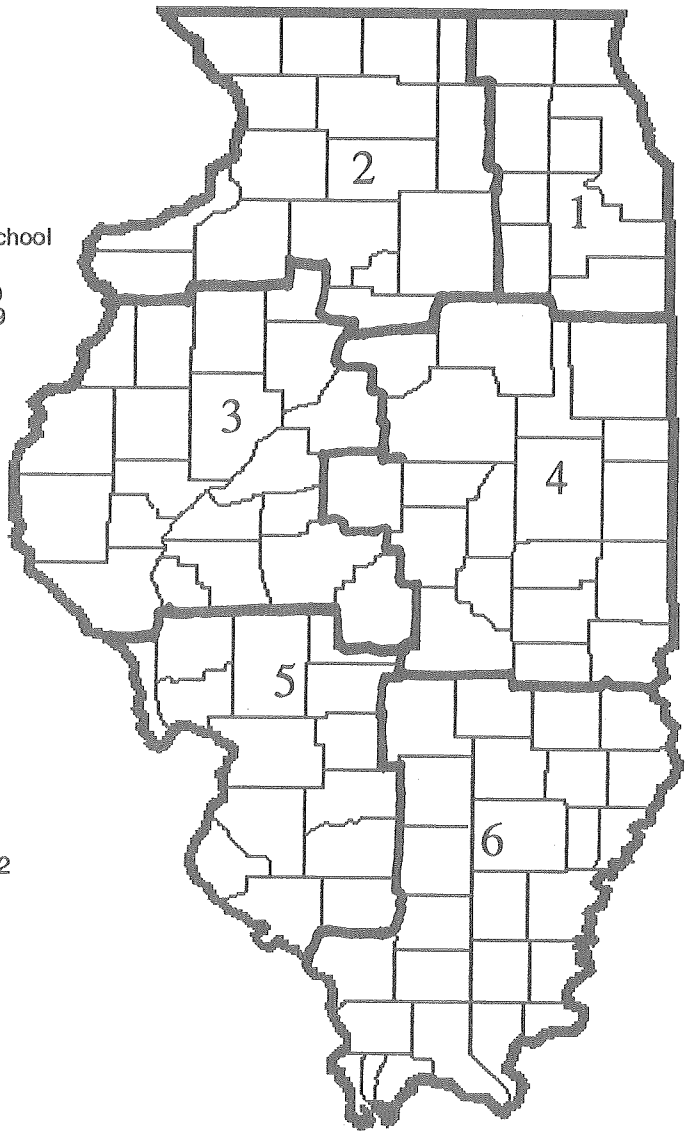

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