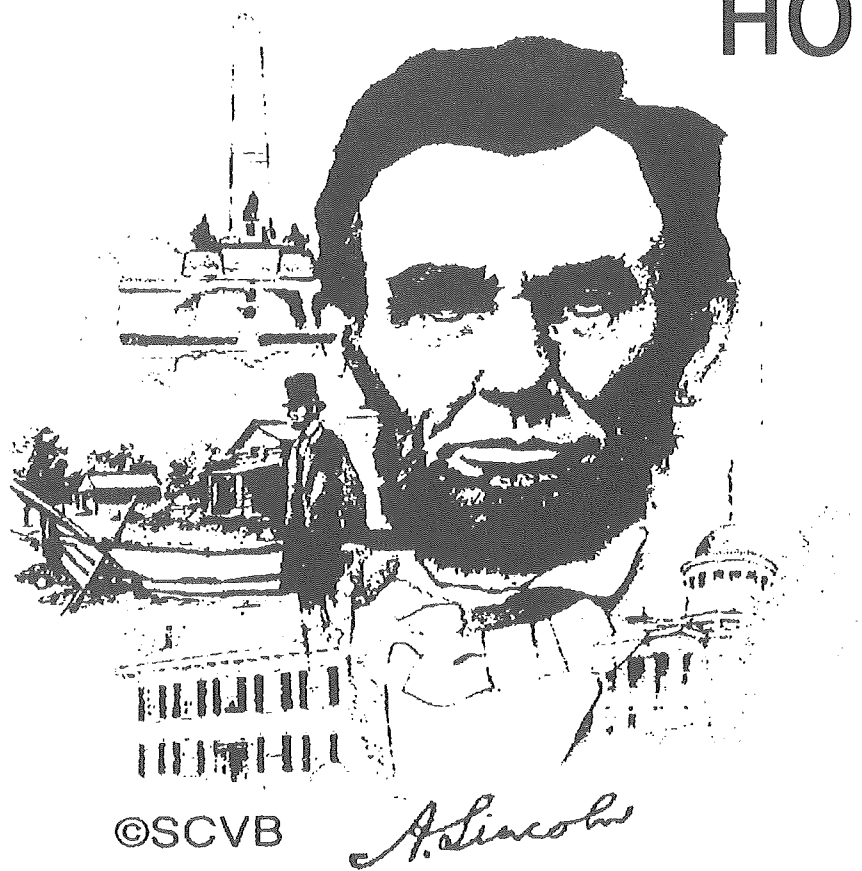


SPECTRUM

THE JOURNAL OF THE ILLINOIS SCIENCE TEACHERS ASSOCIATION

SCIENCE IN MR. LINCOLN'S HOMETOWN



September 28—30, 1995
Prairie Capitol Convention Center
Springfield, Illinois

28th Annual Convention
Illinois Science Teachers Association

Fall 1995



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The Illinois Science Teachers Association (ISTA) is a state chapter of the National Science Teachers Association, 1742 Connecticut Ave. NW, Washington, DC 20009.

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ISTA NEWS

PRESIDENT'S FALL 1995 LETTER

September has always been an exciting month for as long as I can remember. When I was a student, I always had trouble sleeping the night before school started because of exciting anticipation of new friends and new teachers. In those days, the signs of a new school year were the trips to buy new school clothes and school supplies. As a teacher, I still eagerly await the first day of the new school year. Each year brings the challenge of meeting the needs of new students and promise of new opportunities and programs. Just as there were the childhood signs of the new school year, so to are there signs for me as a science teacher. When I open my mailbox and the September issues of *Science and Children*, *Science Scope*, and *The Science Teacher* begin to arrive, I experience that same sense of excitement. The Fall issue of *Spectrum* is another welcome sign of the new school year. One of the reasons I look forward to each new year is that as a professional science educator, I am continually striving to perfect my craft. One of my goals each year is to do a better job than the year before. I have engaged in a few professional development opportunities this summer to help me achieve that goal. I hope you had the same opportunities.

I encourage my students to set realistic goals for themselves each year. I feel it is my responsibility to do the same. Here are a few of my goals for the coming year.

- * I am going to write an article to submit to *Spectrum* on the GLOBE Program, an environmental education program in which every school in Illinois could participate.

- * I intend to submit an article to *Science Scope* on the topic of a technologically ready science classroom.

- * I plan to attend the ISTA Convention in Springfield in September and the NSTA Convention in St. Louis in March of 1996.

- * I want ISTA to develop teams of trainers that assist teachers in implementing the National Science Education Standards and the Illinois Academic Science Standards.

- * I'm going to get my students involved in a number of Internet-based collaborative science programs. One of them is the above mentioned GLOBE Program and a second is the Virtual Science and Mathematics Fair sponsored by the Washington State University School of Education.

- * I will be working throughout the year to make next year's ISTA Convention in Chicago a success.

I hope you have set your goals for the coming year. While some of my goals are directed toward what I do in the classroom, others are directed at a larger audience. We all want to be the best teacher we can be for our students. That is one role we play in the improvement of science education. But as our professional careers evolve, we must also look to contribute to the improvement of science education beyond our own classroom.

When you attend the ISTA Convention later this month in Springfield, you will be engaging in professional growth. That professional growth benefits our students. It is part of our professional responsibility to share what we learn with our colleagues. I have set the goal of writing articles this year because I think I have some ideas that might be of value to other science teachers. I know many ISTA members can do the same. Think about submitting an article to *Spectrum* this year. Share what you have learned with your colleagues around the state.

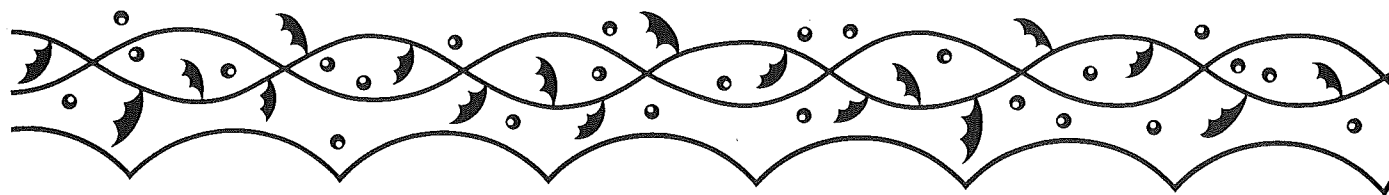
Start now to secure Eisenhower Math/Science funds to support your trip to St. Louis for the NSTA Convention in the Spring. With the national convention right in our backyard, I hope all ISTA members will be able to attend.

I commend Gwen Pollock for convening a meeting of representatives from ISTA, the Illinois Association of Chemistry Teachers, the Environmental Education Association of Illinois, the Illinois Association of Biology Teachers, The Illinois Section of the American Association of Physics Teachers, and the Illinois Earth Science Teachers. The purpose of the meeting was to begin the process of setting the vision for the future of science education in Illinois. This was the initial step in the development of a forum of professional science associations in the state of Illinois.

Planning for the ISTA Convention in Chicago will begin in early October. If you are interested in working on the Chicago convention, send me a letter or email me at bbradley@isbe.state.il.us I hope to hear from many of you.

ISTA will have its own home page up and running on the World Wide Web by the time I see you at the convention in September. Stop by the ISTA booth for information on how to access the new source of information.

I hope each ISTA member will have a successful year and I look forward to seeing you in Springfield in September. Bernie Bradley / Home Phone 312/943-6535; Home Fax 312/943-3419; School Phone 312/534-8007



LETTER FROM THE EDITOR WHO NEEDS CONFERENCES ANYWAY?

As recently as several years ago, it seemed to me that there were two months of the academic year which were particularly full of things to do with respect to professional conferences. Since then, the arrival of just about every month brings with it a conference in some way linked to science education. I simply can't attend them all. I can't be away from my classes too much, and there's not enough time, resources (\$), or energy to do so. So, I must be very selective in where I go. Sound familiar?

In my selection of conferences to attend, I sit back and think about each one: What is the format? How much do I really glean from going there? What will be the opportunities for me to find old friends and colleagues and connect with new ones? In what ways can I contribute to the conference? Which ones have I enjoyed the most in the past? The list goes on, but after some careful weighing of my options, I've settled on several that fit the bill. One of those is the ISTA annual conference.

Our annual conference is large compared to many in other states. And the selection of presentations available has proven to be, during my time in Illinois, quite varied and worthwhile. I've always found that attending the ISTA conference energizes me. I gather some new ideas about my teaching, my profession, and about myself. I can share with others who are as eager as I to find something new, something different, something more. The whole affair is invigorating! I'm certain others who attend feel the same way since I hear their comments and see the sparkle in their eyes and smiles on their faces.

By definition (at least by Webster's), a conference is a meeting for consultation, discussion, or instruction between individuals or groups. I might add that a conference should be a time for renewal as well. A conference provides us the opportunity to interact as a community of scholars. Past ISTA conferences have opened the doors to many innovations in science education for many members. Some innovations are not new, but others have been. Some examples I can pull off the top of my head include alternative assessment, satellite technology and distance learning, new science curricula, and various hands-on/minds-on teaching approaches. We've also had opportunities to discuss issues in science education, such as national standards, state standards, certification issues, and so on. One of the really neat things about the ISTA conference is its inclusiveness. Virtually anyone who desires to be included and involved can be. Our conference this year is in Springfield on September 29-30th. I look forward to it and expect as much from it as I have from past ISTA conferences. I encourage each of you to come to Springfield and experience the energizing atmosphere. Even if you don't present a session, you have much to share with others, and others have much to share with you. Many of you may find that you can obtain some Title II monies from your school district to help offset your expenses. That is one purpose of those funds, which originate at the federal level and are passed down to your schools. Grab a colleague and bring him/her along too! Bring someone who has never attended, or has not attended recently. Our conference can only be as good as those who attend and participate. And believe me, it has been a great one over the years! So who needs the ISTA conference anyway? We all do!

See you there! — Kevin D. Finson, Editor

IN MEMORIAM

Andrew J. Taft

Jan. 7, 1910-Feb. 1, 1995

Sister Mary Wilma Zink

June 6, 1913-Feb. 20, 1995

February 1995 saw the passing of two persons who were very important in the founding and early days of ISTA. On February 1st, Andrew J. Taft, husband of Katherine D. Taft died from a heart attack. While he was not a science teacher, he suffered from the vicissitudes of being married to one and helped immeasurably in all of the "grunt" work of organizing and nurturing the fledgling organization. He even escorted a bus load of nuns who were science teachers to LaSalle-Peru for the first ISTA Convention in 1967.

On February 20th, Sister Mary Wilma Zink, CSJ of the Sister of Saint Joseph of LaGrange Park, IL died. Sister Wilma had been in failing health for a number of years. Sister Wilma was President of the Chicago Catholic Science Teachers Association at the time of the founding of ISTA and was a member of the Illinois Delegation to the March 1966 CAG meeting in St. Louis from which ISTA developed.

Sister Wilma was the chemistry teacher at Nazareth Academy in LaGrange Park for 28 years. She served ISTA as

a member of the Constitution Committee and persuaded her brother, an attorney, to contribute his services to shepherd ISTA through the incorporation process.

Both Sister Wilma and Andy Taft gave unselfishly of themselves to education and science education in particular. Their hard work and dedication in the early days of ISTA helped lay the firm foundation upon which ISTA rests today. If anyone wishes to make a contribution in memory of either, the suggested courses are:

Sister Mary Wilma, CSJ

Our Lady of Bethlehem Convent

1515 Ogden Ave.

LaGrange Park, IL 60525

Andrew J. Taft, messages to Katherine D. Taft

609 W. Stratford Pl.

Chicago, IL 60657

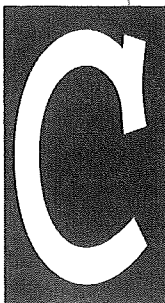
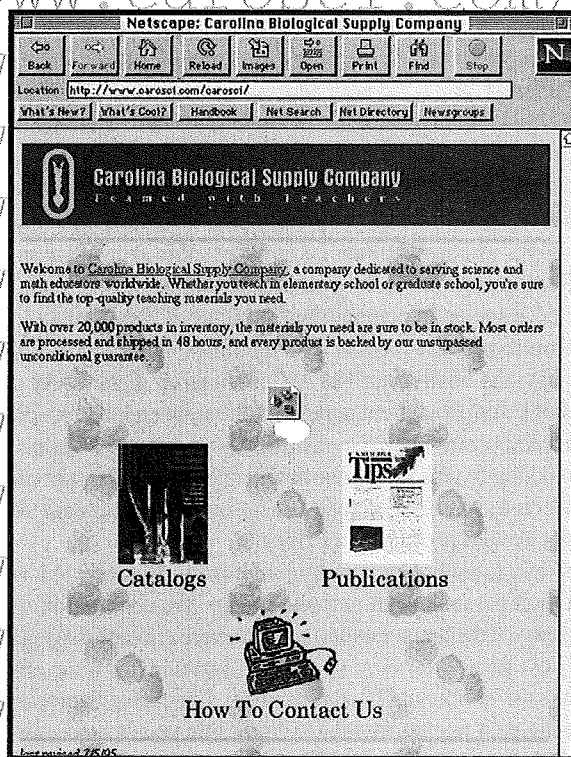
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ILLINOIS SCIENCE TEACHERS ASSOCIATION 1995 ANNUAL CONVENTION INFORMATION

A Welcome from ISTA President Bernie Bradley

I invite you to attend the twenty-eighth annual convention of the Illinois Science Teachers Association. This year's convention will be held in the Prairie Capitol Convention Center and the Renaissance Hotel in Springfield. I urge you to share this information with your principal, district science coordinators, and technology teachers. They will all find something of interest to them as part of the convention agenda.

As has become tradition, this year's convention will begin with a pre-conference on Thursday, September 28th. The theme of this year's pre-conference is Technology and Science. Participants in the pre-conference will be provided with an overview of the Illinois State Board of Education's technology plans. They will also attend break-out sessions which will feature innovative uses of technology in science education. As educational technologies find their way into more and more science classes, this is a conference that every science educator in the state should plan to attend.

The convention program will begin on Friday, September 29th and will offer a rich variety of presentations, exhibits by science education vendors, tours of interest, and a keynote address by May Berenbaum, a renowned entomologist from the University of Illinois. The theme of this year's convention is "Science in Mr. Lincoln's Hometown." In keeping with this theme, many state agencies will set up exhibits to provide information to teachers about available educational resources. Take advantage of this opportunity to find out about how these agencies can support your programs.

Each year I return home from the ISTA convention energized by new ideas, new activities, and new materials. From conversations I have had with members at conventions, I know that this is a fairly common experience. At this year's convention, I ask you to look for four opportunities to give something in return. First, Gwen Pollock, the State Science Supervisor has scheduled a number of sessions to present the first draft of the Illinois Academic Science Standards. Make it a point to attend one of these sessions to provide feedback on the future direction of science education in Illinois. Second, Bob Fisher of Illinois State University has chaired an ISTA Certification Task Force that will, in the near future, make recommendations to the State Board of Education about certification requirements for science teachers. Attend one of Bob's presentations to provide input on this important initiative. Third, if you want to become more active in ISTA initiatives or be a candidate in next year's election, stop by the ISTA booth and fill out a volunteer card. We want more and more ISTA members to become active in our efforts to improve science education. Finally, please plan to attend the reception to honor the finalists in this year's Presidential Award program on Friday.

It requires the efforts of many people to make our annual convention a success. Science educators from all over the state spend a great deal of time preparing their presentations and workshops. No convention would be a success without the support of the exhibitors that help us keep abreast of the latest materials for science education programs. Please stop by the exhibitors' booths to examine their materials. Two people deserve special recognition for their efforts. Gary Butler of University of Illinois-Springfield is the Chair of the convention and Diana Dummitt, Executive Secretary of ISTA, has handled registration and exhibits. They have worked for the past twelve months to make this year's convention a success and ISTA is indebted to both for their fine work. Come and enjoy this year's ISTA Convention in Springfield. I know you will find it to be a worthwhile experience.

Bernie Bradley / Home Phone 312/943-6535; Home Fax 312/943-3419; School Phone 312/534-8007

SCHEDULE FOR CONVENTION

Thursday (Preconference)		Friday		Saturday	
Registration	7:00—8:30	Registration	7:00—4:00	Registration	7:00—8:30
Keynote Speaker	8:30—9:30	Featured Speaker	8:30—9:45	Session Five	8:30—9:30
Break/Move	9:30—9:40	Move	9:45—10:00	Exhibit time	9:30—10:30
Breakout Round 1	9:40—10:40	Session One	10:00—11:00	Move	10:30—10:45
Move	10:40—10:50	Move	11:00—11:15	Session Six	10:45—11:45
Breakout Round 2	10:50—11:50	Session Two	11:15—12:15	Move	11:45—Noon
Move	11:50—Noon	Lunch	12:15—1:00	Session Seven	Noon—1:00
Lunch	Noon—1:00	Session Three	1:00—2:00	Membership Mtg.	1:15—2:30
Move	1:00—1:10	Move	2:00—2:15	Convention Close	2:30
Breakout Round 3	1:10—2:10	Session Four	2:15—3:15		
Move	2:10—2:20	Exhibit time	3:15—4:30		
Breakout Round 4	2:20—3:20	Reception ISTA Awards	5:00—7:00		
		Social	7:30—11:30		

Meeting Location

Convention registration, sessions and exhibits will be at Prairie Capitol Convention Center, Springfield, Illinois. Springfield is located at the intersection of I-55 and I-72 approximately 200 miles south of Chicago and 100 miles north of St. Louis. The Prairie Capitol Convention Center is bordered by 8th and 9th and Adams and Washington Streets in downtown Springfield. It is just northeast of the Springfield Hilton, the tallest building in the city.

Registration Hours

Onsite registration will be available at the Prairie Capitol Convention Center during the following hours:

Fri., September 29

7 AM - 4 PM

Sat., September 30

7 AM - 12 Noon

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 Springfield area.

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 will be open during the following hours:

Fri., September 29

9 AM - 4 PM

Sat., September 30

9 AM - 12 NOON

Experience Springfield and the Surrounding Area

Springfield is one of the leading tour cities in the United States. Lincoln's impact on world history has created a universal interest in his heritage. Visit Lincoln's newly renovated Home; his law office; the Old State Capitol, site of the famed "House Divided Speech"; and experience the emotion of his Tomb. Tour the log cabins in nearby New Salem Village where Lincoln served as postmaster and deputy surveyor. In addition to the Lincoln sites, there is the Illinois State Museum; the Executive Mansion; the Dana-Thomas House; the State Capitol; Washington Park Botanical Gardens; Lincoln Memorial Gardens; and Edwards Place.

Reception for

Presidential Awardees

Join us after the program on Friday for light refreshment, conversation and presentation of the Presidential Awards of Excellence in Science Teaching. The reception and awards ceremony will be held at the visitor's center at the Lincoln National Historical Site just a block from the Convention Center. The reception will begin at 5:00 PM with the awards ceremony beginning at 6:00. Tours of the Lincoln's Home will be available during the reception.

Friday Night Social

Relaxation; food; drink; music. Come join us at the JukeBox Junction from 7:30 - 11:30 PM for an evening of conversation, food and music. The evening will begin with a buffet featuring BBQ chicken and pork, salads, potatoes, and vegetables. Coffee, tea, soda and beer are included, with a cash bar available for other drinks. A DJ will provide a variety of music for both listening and dancing.

Transportation

Car: Springfield is located 200 miles south of Chicago and 100 miles north of St. Louis at the intersection of I-55 and I-72. The Prairie Capitol Convention Center is located between 8th and 9th and Adams and Washington streets in downtown Springfield. It is just northeast of the Springfield Hilton, the tallest building in the city.

If you are traveling on I-55, take the Clear Lake exit (98). Go west on Clear Lake, which will become Jefferson (one-way west) about 3 blocks east of the Convention Center. The Center is one block south of the intersection of Jefferson and 9th streets.

If you arrive from the Urbana-Champaign/Decatur areas on I-72, I-72 becomes Clear Lake once it passes over I-55. If you arrive from the west (Quincy area) on I-72, take the 6th street exit and go north on 6th to Washington street (the Old State will be on your left). Turn right (east) and the Convention Center is two blocks east.

Parking: There are several City of Springfield parking garages within walking distance of the Convention Center. One is located adjacent to the Convention Center.

Train: Amtrack has daily trains between Chicago and St. Louis which stop in Springfield. The Amtrack Station is located at the corner of 4th and Washington streets, about 5 blocks from the Convention Center.

Air: Springfield airport is located northwest of the city, about 20 minutes from downtown

Area Hotels

Springfield Hilton (near Convention Center)
217-789-1530

Renaissance (near Convention Center)
217-544-8800

Best Inns of America
217-522-1100 or 1-800-BEST-INN

Best Western Springfield East
271-529-6611

Days Inn
217-529-0171 or 800-329-7466

Ramada Limited
217-523-4000

Red Roof Inn
217-753 4302

VISIT THE EXHIBIT HALL FRIDAY AND SATURDAY

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

Commercial

Addison-Wesley
All-American Associates
Associated Microscope
Bob's Big Pencils
Carolina Biological Supply
Cuisenaire Company of America
Cynmar
Dearborn Resources
Delta Education
Discovery Toys
Educational Aids, Inc.
ETA
Flinn Scientific, Inc.
Forestry Suppliers, Inc.
GPN
Glencoe/McGraw-Hill
Grolier Publishing
Harcourt Brace Jovanovich
D.C. Heath & Company
Holt, Rinehart
Hubbard Scientific
Idea Factory
Ken-A-Vision
Kendall/Hunt Publishers
J.M. Le Bel Enterprises
Leica Inc.
LEGO Dacta
Macmillan/McGraw-Hill
Majeco
Midwest Model Supply
Midwest Products
NASCO
Nebraska Scientific
Ohaus Corporation
Optical Data
Pasco Scientific
Pencils & Play, Ltd.
Playfold-Kaulfuss
Prentice Hall
Sargent-Welch
Scholastic, Inc.
Science Kit & Boreal Laboratories
Scope Shoppe
Scott, Foresman and Company
Silver Burdett Ginn
Showboard, Inc.
SRA/McGraw-Hill

Tri-Ed Enterprises
Usborne Books
VALIC
Ward's Natural Science
Wm. C. Brown
World Book

Noncommercial

Bronx Zoo/Wildlife Conservation Park
Chicago Academy of Sciences
Earth Foundation
EEIA
Facilitating Coordination in Agricultural Education
Forest Park Nature Center
Hult Health Education Center
Illinois Association of Biology Teachers
Illinois Clinical Laboratory Science Association
ICE-University of Wisconsin
Illinois Corn Marketing
Illinois Department of Natural Resources
IFT
Illinois JETS
Illinois Science Olympiad
Materials World Modules
Museum of Science and Industry
NSTA
Rainforest Preservation Foundation
REALL
Shedd Aquarium
St. Louis Science Center
University of Hawaii
Young Entomologists' Society

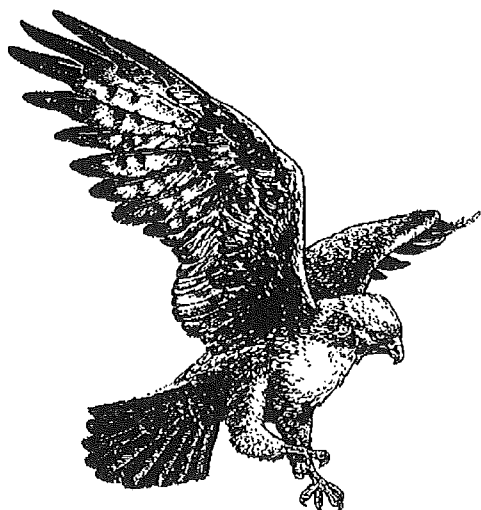
Illinois State Agencies

This year we will have an Illinois State Agency area near the exhibit hall. Representatives from several state agencies will be present to provide information about what materials and services their agency can provide teachers. Most will have materials available for you to take back to your classroom.

KEYNOTE SPEAKER MAY BERENBAUM FRIDAY 8:30 AM

May Berenbaum is the daughter of a chemical engineer and a chemist. She always knew that she wanted to be a biologist. She attended Yale University and there decided to face her childhood fear of insects by enrolling in a course on terrestrial arthropods. Her graduate work was done at Cornell University where she worked on the effect of plant chemistry on insects. In 1980 Berenbaum earned her Ph.D. in ecology and evolutionary biology and that fall she joined the faculty in the Entomology Department at the University of Illinois. Her main research interest is the interaction between the parsnip webworm, *Depressaria pastinacella*, and the wild parsnip, *Pastinaca sativa*. In addition to her research she teaches a series of popular courses to undergraduates: Insects and People, Chemical Ecology, and Insect Ecology. Having a wonderful time while learning about insects is what Berenbaum promotes to all her students, as well as to people of all ages outside the university. Also, she is well known on the UI campus for her annual Insect Fear Film Festival. Recently she published two books about insects for the public: *Ninety-nine Gnats, Nits and Nibblers* and *Ninety-nine More Maggots, Mites and Munchers*. Her topic for the ISTA Convention will be "Insects--Aliens from Planet Earth."





Stay One Step Ahead with *Survival Strategies*

Who: Grades 7-10 Science Teachers

What: Project W.I.Z.E. (Wildlife Inquiry through Zoo Education) Two-Day Curriculum Workshops

When/Where: March 4-5, 1996 March 7-8, 1996
Lincoln Park Zoo Miller Park Zoo
Chicago, IL Bloomington, IL

Time: 9:00 a.m. - 3:30 p.m. (check-in begins at 8:30 a.m.)

Cost: \$50 registration fee - payable to ISFC Registration Fund
(includes sample materials; BYO Lunch)

Survival Strategies is an **interdisciplinary**, multi-media life science curriculum which **motivates students** to study science by employing **wildlife** to teach basic life science concepts. Combining classroom study with the unique scientific resources available at **zoos**, *Survival Strategies* explores issues related to wildlife survival in the 21st century.

Led by project staff, the workshop includes training in the program's **methods** and **content**. Sample materials will be provided. Participants will complete examples of the classroom and field lessons (**at the zoo!**) and **learn to lead their students** in small study groups through **hands-on** classroom activities emphasizing **cooperative learning**.

**Intense group interaction leads to
CRITICAL THINKING
and sharpens reasoning skills.**



Registration for **PROJECT W.I.Z.E.: *Survival Strategies***

It is important that you register NOW as admission to the workshops is by ticket only. You must include a P.O. or check for \$50 made payable to ISFC Registration Fund - with this registration form in order to receive an admission ticket. One person per registration form - duplicate form as needed.

For information, call Rose Baker (800) 937-5131.

Please check the seminar you want to attend:

☐ Chicago - March 4 & 5

☐ Bloomington - March 7 & 8

Name _____

Address _____

Phone () _____



District _____

School _____

Grade(s) Taught _____

Fax Number () _____

Mail/Fax to: Nancy Waldrop, NDN, 1105 E. 5th Street, Metropolis, IL 62560 • FAX (618) 524-2004
Registration & Payment MUST be received by Wednesday, February 14, 1996

Survival Strategies was developed by a team of scientists and educators at the Bronx Zoo Education Department and is validated as an exemplary program by the U.S. Department of Education.

Join The Chicago Academy of Sciences

at the 1995 ISTA Convention

September 28-30 at the Prairie Capitol Convention Center
Springfield, Illinois



Sir Isaac Newton

Why are seatbelts important?
How do rockets move? Explore these
questions and others at the Science on
the Go! workshop "Newton's Laws of
Motion: Not Just a Good Idea!"

Science Education in the Land of Lincoln

Ever wondered what it might be like
to look at an issue from another person's
perspective or how to introduce environmental
issues without interjecting your own?...
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ARTICLES

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Norman, Oklahoma 73069

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National Weather Service, NOAA, Romeoville, IL 60441

LIGHTNING HAZARD EDUCATION

INTRODUCTION

This paper assesses misconceptions that students, science teachers, and the general public have of the lightning hazard. While most of the available information in school texts and pamphlets is correct, it is not clearly presented and the hazard remains confusing to most people. A person's perception of the lightning hazard appears to be derived from what was learned during school years.

PROACTIVE PLANNING

Not enough emphasis has been placed on the *proactive* ability to recognize a lightning hazard. Instead, most literature and training materials treat the *reactive* mode. This approach emphasizes the posture to take when a person is caught by surprise in the open (i.e., it is too late for precautions) by a thunderstorm when the lightning threat is at its greatest.

Questions from the public or media often start with issues similar to the following ideas:

- "Is it better to wear rubber-soled shoes than metal cleats on the golf course?"
- Should I move away from my metal bicycle because it's more likely to be hit?"

We delay answering these types of questions at the start of a question and answer period. Rather, we concentrate on the primary issue:

"Why be on a golf course or riding a bike during a significant lightning threat in the first place?"

When the discussion starts this way, there is an opportunity to explain a proactive approach to lightning safety that emphasizes advance planning. A complete explanation involves a sequence of decisions on a time scale from days to seconds. For an all-day hike, consider the following actions according to time sequence:

• Days before activity

1. Be aware of the possibility of storms that may form in the area and at the time of an activity. Listen to weather broadcasts by the media and NOAA Weather Radio for general outlooks.

2. Decide on rules to stop the activity, and where to take shelter.

• Day of activity

1. Have a plan at all times during the hike for where to take shelter if lightning moves toward your location.

2. For a group activity, use a designated spotter who watches for lightning. Follow the rules that were decided in advance.

• When thunderstorms develop

1. Estimate distance to lightning using the flash-to-bang method (section 3, next page).

2. Know how long it will take to reach shelter from where you are.

3. Determine whether the storm is approaching your position.

4. Take action in ample time to avoid the lightning.

• Lightning nearby

1. Go inside a vehicle with a solid metal top. Safe vehicles include a car, bus, van, or the cab of a truck. Don't contact any metal.

2. Go inside a building normally occupied by the public or used as a residence by people. In general, all-metal buildings are safe if a person stays low in the middle and keeps both feet together; a metal-topped building with stone or other non-conducting walls is not safe. Don't touch anything connected to the power, phone, television cable, or plumbing entering a building from the outside.

3. Don't stand under or near a tree; stay away from poles, antennas, and towers.

• Last minute

If precautions have been ignored, crouch on the balls of your feet with the head down. Don't touch the ground with your hands.

Other concepts are also explained in response to the two questions above. The following answers avoid the reactive mode:

• Lightning currents coming up from the ground are so strong that shoe type does not matter.

• A lightning flash originating in a cloud 6 km (20,000 ft) overhead is more likely to hit the tallest object.

• Since the average distance that a flash searches to strike ground is on the order of 50 years (meters), where you are located relative to other tall objects is very important.

This flow of discussion sometimes results in dissatisfaction from the questioner because it was hoped that a quick, easy approach to lightning safety would be given.

When these concepts are explained, less time is spent on the don'ts of lightning safety. For example, when hiking in the Colorado mountains on a July afternoon in a forest far from vehicles or buildings, there may be no better action than to seek a thick grove of small trees surrounded by tall trees, away from individual trees. At that point a listener realizes that safety here is more statistical than absolute.

Despite the need for proactive planning, some literature on lightning safety shows people in outdoor sports who are crouching in an open area. That message is reactive and not the complete plan; the message should also include planning ahead and avoiding the situation.

FLASH TO BANG

The distance to lightning from a location can be found using the fact that light travels enormously faster than sound. The distance to lightning using the "flash-to-bang" method of 5 seconds per mile has been taught for a long time. Yet it appears to be known correctly by roughly half of trained science teachers, much less than half of science students, and an equally small portion of the general public. In the metric system, the distance is 3 seconds per kilometer.

The "flash-to-bang" method is described in Vavrek et al. (1993a,b; 1994a,b) as:

- When you see the flash
- Count the seconds to the bang of its thunder. Divide the number of seconds by five for the distance in miles from you to the lightning.

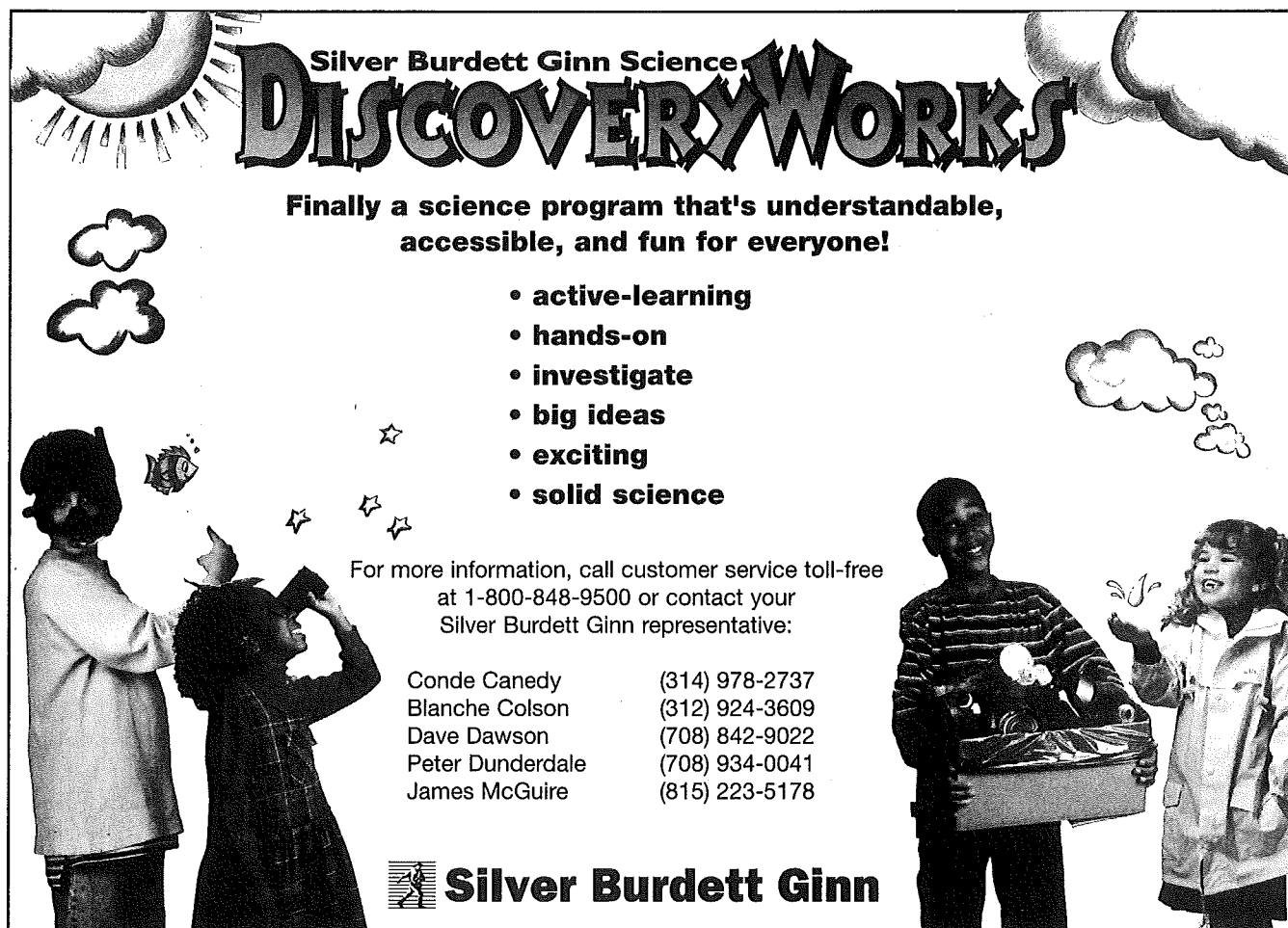
The result of such timing is that a flash five miles away takes 25 seconds for its thunder to reach the observer. In demonstrating this interval during a talk, the audience quickly realizes the length of this time period.

The other aspect of the flash-to-bang method is to determine a safe distance. A Florida study by Krider (1988) found the average distance between successive ground strikes in the same storm was two to three miles. This distance corresponds to 10 to 15 seconds from flash to bang. Other types of storms in other locations and other seasons have not been examined for this distance. For safety purposes, then, we always recommend a longer flash-to-bang time than 10 to 15 seconds when shelter should have been reached.

In contrast, there is a false alarm problem. Thunder can often be heard up to 10 miles (16 km), corresponding to 50 seconds flash-to-bang; sometimes it is audible as far as 20 miles away (32 km). Should all precautions be taken immediately on the first sound of thunder? Our experience has shown that most people who are frequently involved in outdoor activities will not follow an overly restrictive policy such as this. Instead, thunder is identified as the wakeup call to the threat of lightning. The distance, direction, extent, motion, and growth stage of the storm producing the lightning should be assessed immediately. Actually, the situation should be monitored earlier to be aware of the first flash from a storm. If a thunderstorm is far to the north and moving northeast, the threat is less than when lightning is three miles away and seems to be coming closer. When people know the flash-to-bang method and follow the storm situation, common sense starts to be used. They are more aware of the situation and are taking personal responsibility for their exposure to lightning—this is the main goal.

Some relevant results from a study by Holle et al. (1993) in central Florida were:

- The end of the storm is very important. As many lightning casualties occurred after as before the peak lightning activity. So the flash-to-bang method must be applied until thunder has receded completely.
- Low flash-rate storms had more casualties than high-rate storms.



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• The conclusion is that relatively few people are casualties of lightning during heavy rain and high flash rates in the middle of a storm. Instead, low flash rates before and after the strangest portion of the storm are very important. Low flash rates also occur on the edges of thunderstorms as they pass a location.

POSTURE RELATIVE TO GROUND

The posture of laying flat on the ground continues to be mentioned in some materials. More recent research shows that ground contact is an important source of casualties from nearby lightning strikes to ground (Andrews et al. 1992).

While it is good to be as low as possible, it appears that lightning more often enters the victim through the ground compared to a direct strike from overhead. The person, then, should crouch on the balls of the feet, with the head down. Don't touch the ground with the hands.

EDUCATION VERSUS WARNINGS

Some of the public expects that automatic measurement equipment being monitored by someone else will take care of their responsibility for tracking the lightning threat. In large installations such as the Kennedy Space Center and some outdoor recreation and utility operations, such systems are in place and have been tested for usable thresholds.

For most people in daily situations, however, there is not likely to be a product from the National Weather Service or other agency that will pinpoint the exact place and time of a person's vulnerability to lightning. Instead, each person must take responsibility for their own situation. This is the main reason why education is being emphasized for lightning safety.

In the case of team sports, a *designated spotter* on site should watch the sky for the storm situation. Experience shows that many coaches and officials are so involved in the games that they are unwilling or unable to monitor the development of the storm situation at the same time.

EDUCATION ACTIVITIES

The authors have undertaken a number of projects for lightning awareness and action. It should be mentioned that an excellent paperback book on many aspects of lightning is Uman (1986). Activities include:

• Flash to Bang article

The same article with slight variations has been published in several science teacher magazines at the state and national levels (Vavrek et al. 1993a,b; 1994a,b). It was intended as an instructional and resource tool for science teachers and their students, coaches, officiators, bus drivers, and school administrators who are responsible for the safety of students and others outdoors.

• Poster

A 16 x 20-inch poster was developed by Howard and Holle (1994) on avoiding trees during thunderstorms. A flash fills the poster as it strikes and illuminates a tree; the same photo is in Uman (1991). The vicinity of trees is the single most common location across the country and around the world where people are victims of lightning. The initial

audience is for school children by having the poster placed as a reminder near school doors and entryways. A first printing of 3000 copies was made and sent to science teachers in many organizations across the country, as well as to interested members of the public and media.

• Underreporting of lightning casualties

A more complete measure of the lightning threat ranks lightning nearly as high as most other types of severe weather in the average year. In some states lightning is the greatest threat from thunderstorms during most years. López et al. (1993) and Mogil et al. (1977) used regional datasets to show that lightning casualties are underreported, especially in the case of injuries.

• Scenarios of lightning casualties

In-depth analyses of activities and locations of past lightning victims were made for Colorado (López et al. 1994) and central Florida (Holle et al. 1993). Verbal narratives in *Storm Data* were used to extract more detail than in the past for these states. Discussions with the public, media, teachers, and personnel in the National Weather Service have benefited from better identification of scenarios that have led to lightning casualties in their areas.

SUMMARY

It is suggested that lightning education needs the following:

- A major reemphasis toward proactive planning.
- More emphasis on proper lightning-avoidance activities must be transmitted to students through the education system, especially in schools, as part of science courses.

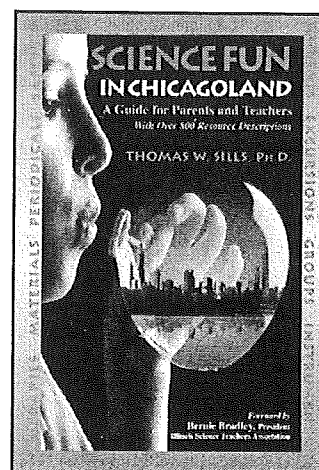
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• Better knowledge about proper behavior to avoid lightning must be transmitted to the adult public through a broad range of better prepared literature and other media.

A useful approach is to reach segments of the population that spends a substantial amount of time outdoors through magazines and publications targeted for such activities as fishing, climbing, and bicycling.

In summary, the suggested approach for lightning safety is to follow these steps:

1. Plan ahead
2. Avoid dangerous lightning situations
3. Don't be, or be connected to, the highest objects.

ACKNOWLEDGEMENT

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REFERENCES

Andrews, C. J., et al., 1992: *Lightning injuries: Electrical, Medical, and Legal Aspects*. CRC Press, Boca Raton, FL, 195 pp.

Holle, R. L., et al., 1993: The local meteorological environment of lightning casualties in central Florida. Preprints, 17th Conf. on Severe Local Storms and Conf. on Atmospheric Electricity, Oct. 4-8, St. Louis, Amer. Meteor. Soc., 779-784.

Howard, K. W., and R. L. Holle, 1994: Lightning danger. Poster, National Severe Storms Laboratory, NOAA, Norman, OK, 1 pp.

Krider, E. P., 1988: Spatial distribution of lightning strikes to ground during small thunderstorms in Florida. Proc., Intl. Conf. Lightning and Static Electricity, April 19-22, Oklahoma City, 318-322.

López, R. E., and R. L. Holle, and T. A. Heitkamp, 1994: Lightning casualties and property damage in Colorado from 1950 to 1991 based on *Storm Data. Wea. Forecasting*, 9 [in press].

___, R. L. Holle, et al., 1993: The underreporting of lightning injuries and deaths in Colorado. *Bull. Amer. Meteor. Soc.*, 74, 2171-2178.

Mogil, H. M., M. Rush, and M. Kutka, 1977: Lightning—An update. Preprints, 10th Conf. on Severe Local Storms, Oct. 18-21, Omaha, Amer. Meteor. Soc., 226-230.

Uman, M. A., 1986: *All About Lightning*. Dover Publications, Inc., Mineola, New York, 167 pp.

___, 1991: The best lightning photo I've ever seen. *Weatherwise*, 44, 8-9.

Vavrek, J., R. L. Holle, and J. Allsopp, 1993a: Flash to bang. *The Earth Scientist*, National earth Science Teachers Assoc., 10, 3-8.; ___, ___, and ___, 1993b: Flash to bang. *Spectrum*, Illinois Science Teachers Assoc., 19, 21-26.

___, ___, and ___, 1994a: Flash to bang. Reading 10 in *Project Earth Science: Meteorology*, P. S. Smith and B. A. Ford, Eds., National Earth Science Teachers Assoc., Arlington, VA, 210-219.; ___, ___, and ___, 1994b: Flash to bang=5 seconds per mile. *The Hoosier Science Teacher*, Hoosier Assoc. of Science Teachers, 19, 101-110.

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1401 E. Washington St.
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THE 1995 CLEAN WATER CELEBRATION (CWC)

**"The Most Important
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The second annual Clean Water Celebration '95 was held at the recently expanded Peoria Civic Center Exhibit Hall on Monday March 20th. This educational event is a prototype for people everywhere of how students, agencies, industry, and citizens can build partnerships and work together while accomplishing major public educational goals and objectives regarding the impact on the environment.

Special invited guests of honor to the '95 CWC this year were musician, James Taylor and the Administrator of the U.S. Environmental Protection Agency, Carol Browner. Val Adankus, Director of Region 5 of the U.S. Environmental Protection Agency was present to interact with the students, agencies and organizations, which are working together to conserve natural resources and protect the quality of the environment. Mr. Adamkus accepted the first "Making Waves" Award on behalf of his boss, Carol Browner.

His remarks expressed strong positive sentiment towards the possible widespread dissemination of the Clean Water Celebration as an exemplar to the other regions in the U.S. He said, "I

A graphic illustration for a LEGO Dacta advertisement. It features a large gear at the top left with a plus sign inside. A chain or cable hangs from the gear, leading down to a computer monitor. The monitor displays the text: "Your local LEGO DACTA Representative: Philip Ciano (414) 521-1733". To the right of the monitor is a keyboard. In the background, there are more gears and a stylized gear shape on the right side. The text "LEGO Dacta GEARING UP Today's Students" is at the top right. Below it, there is a paragraph about the K-12 system, a list of services, and the LEGO Dacta logo at the bottom right.

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travel throughout the world. I have not seen anything like it (CWC!)...Its unbelievable!...Its the most important classroom in the entire United States!¹ This is going to make a difference in the world." Musician, James Taylor was outside the country, and his agent received the citizen "Making Waves" Award on his behalf.

Well over 3,000 school age children from across Central Illinois participated in this day long event. The Illinois River Project students were in attendance from five states across the Midwest. All participants engaged in a day long dialogue regarding our region's and our country's water resources: both now, and into the future.

This event was sponsored by private donations from individuals, industry, and several state agencies. The Clean Water Celebration is a community-based event. The leadership for this event came largely from a citizens committee drawn together by two high profile and long established

organizations: The Sun Foundation at Washburn, Illinois and The Illinois Rivers Project at Southern Illinois University in Edwardsville. The navigating committee was made up of people with diverse interests. Members of the committee developed a network among the most Central Illinoisians having anything to do with the use of and conservation of water.

Corporate information regarding building partnerships like the Clean Water Celebration is available from the CWC co-chair Sue Atherton, Community Relations Manager of the Illinois American Water Company at telephone number (309) 671-3744; and educational information on hosting an educational celebration like the CWC can be obtained by calling the author of this article, Bill Beckman at (309) 676-6906.

REINVENTING THE "OUTCOME" WHEEL

Why do we have to reinvent the wheel? This is the question we struggled with as our district began to write learning outcomes for our school improvement plan. The Illinois State Goals for Learning, however broad, seem simple compared to the nuances of outcomes. What is an outcome? What is the proper format for stating an outcome? Are we headed in the right direction if we don't understand our own outcomes? How do we incorporate two or more learning areas (goals) into an outcome? How do we write authentic assessment tools which can be administered to elementary science students, and at the same time make them easy to assess with a sophisticated scoring rubric which accounts for a sundry of variations on a theme? Of course, each outcome is to be assessed in two different ways. How many outcomes need to be assessed at a grade level? Does each outcome need to be assessed at every grade?

Learning Outcomes for Physical & Biological Science

I. Outcome 1,1: The students will be able to construct a model (structure) and effectively communicate its function using basic vocabulary and concepts.

II. Outcome 1,2: Using basic vocabulary and concepts, the students will be able to identify the properties of a system and effectively communicate the components of that system and their interaction.

III. Outcome 1,3: Using basic vocabulary and concepts, the students will be able to observe constancy and change in physical, biological, social, and/or technological systems and effectively analyze and communicate the observable patterns of change.

IV. Outcome 2,1: Given a specific problem/issue of technology or society the students will be able to identify the causes and the related effects.

V. Outcome 2,2: Given a specific problem/issue of technology or society the students will be able to identify alternative methods of prevention or solution with considerations given to the effects of these solutions.

VI. Outcome 3,1 Given a specific research method, the students will be able to analyze an issue/problem and effectively communicate a solution to a given problem.

VII. Outcome 3,2: Given the data from an experiment the students will be able to interpret, construct visual models, and communicate results and conclusions relative to the given problem.

VIII. Outcome 3,3: Given a specific problem the students will be able to design and conduct an experiment and to effectively communicate its design (hypothesis, variables, and procedure) and a possible solution to the given problem.

IX. Outcome 4,1: The students will be able to use scientific equipment, take measurements, collect, organize, and interpret data, and effectively communicate the results.

X. Outcome 4,2: The students will be able to interpret, verify, and replicate experimental processes and results and effectively communicate the results.

Should you solve these questions, what about test validity? What about inter-rater reliability? What about the local assessment tools? Should the local assessment tool for science go beyond goal one (basic vocabulary and concepts)? How do you write a test item for goal two (the effects of technology on society and the environment) without making it seem like a goal one test item?

Why do we have to reinvent the wheel? Maybe it is because so few of us drive the same kind of car.

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THE FORUM ON K-12 SCIENCE EDUCATION: CHALLENGES, OPPORTUNITIES AND BENEFITS FOR THE GEOSCIENCE COMMUNITY

I recently returned from serving on a panel during the K-12th grade Earth Science Education Forum at the 29th Annual Geological Society of America. This was a combined North-Central Section and South-Central convention. The convention was held at the University of Nebraska at Lincoln on April 27-28, 1995.

The main focus of the forum discussions centered on *Improving The Earth Science Education Process*. The audience was made-up largely of certified geologists and agency staff members, who were also certified and trained geoscientists.

The panel members consisted of geoscientists and educators representing their respective groups are listed below as follows:

Bill Beckman	- secondary teachers (Illinois)
Ron Bonstetter	- teacher preparation (Nebraska)
Marv Carlson	- state geological survey (Nebraska)
Ed Geary	- geoscience organizations (G.S.A.)
Nina Lawson	- elementary teachers (Nebraska)
Sharon Stroud	- science standards (Colorado & NSTA)

A range of topics were discussed during the 4 hour forum. The sub-topics included the following:

- A. What types of partnerships can scientists and teachers form?
- B. What are the challenges that inhibit partnership development?
- C. What are the benefits for taking the opportunities to become involved in partnerships?
- D. What are the relationships between the scientific community's mission and goals and the Earth Science Education Process?
- E. What are the methods and opportunities to make earth scientists *more sensitive* to and *involved* in the educational process?

The session ran from 1:00 pm until 5:00 pm. After each panelist made his/her opening remarks, the audience was encouraged to offer their perspectives as to how all of the involved parties could help by Improving the Earth Science Education Process.

My remarks included three main topics: 1. *Partnerships*, 2. *Politics* and 3. *Projects*. I offered my experiences with the Illinois Rivers Project, the Illinois Middle School Groundwater Project and the Energy Net Project at East Peoria Community High School to showcase how effective and systematic change can be implemented within the traditional high school

and middle school settings. I also made the Illinois Goals 2000: Illinois' State Improvement Plan for Education available to the forum participants.

Ron Bonstetter offered a 12 point system of making effective changes through partnerships with state boards of education, school districts, universities, agencies pre-service and in-service teachers. Ron chairs the nationally ranked teacher preparation program at the University of Nebraska at Lincoln. Carl Sagan recognized the UNL teacher preparation program in 1992 for its innovations and commitment to improving earth science educational programs.

Marv Carlson reflected on the history of the nation's State Survey system and the Nebraska Survey's mission statement. He felt the Surveys' functions include an education component. He stated that a sense of direction should be forthcoming from educators to target educators and students as an audience was needed. Marv even suggested that the forum participants write letters to their state's directors of their state's geological surveys suggesting that education remain as a high priority in the mission of these agencies.

One member of the audience from the Missouri Geological Survey stated that the education component in that state was at risk because of budget constraints. The same sentiment was echoed from a Survey geologist from South Dakota.

Ed Geary, a professor of geology and educational coordinator from the Geological Society of America, brought a priority list of the major issues facing the geoscience community, when trying to "improve the overall earth science education process." Ed has worked to facilitate the process of developing the Colorado standards on science education. Ed lives in Boulder, Colorado, and he has an elementary age child attending public school in Boulder. His perspectives were particularly interesting because of the depth and breadth of his background: a geoscientist, professor of geology and with employment in the professional geoscience organization: Geological Society of America.

Nina Lawson teaches earth science to her 1st grade class in a small elementary school northeast of Lincoln. She highlighted the many positive experiences which her students have in her hands-on approach to the discovery technologies which she uses. She especially likes to hear the questions which earth science topics evoke from her first graders. Nina outlined the positive impact which the geoscience curriculum had to offer, but she admitted the science experience ranked 3rd in an importance in the elementary curriculum behind language arts, in 1st place, and mathematics in 2nd place. It is her opinion that time and training opportunities are the limiting factors to improving the earth education process.

Sharon Stroud, a Colorado high school teacher, brought copies of the newly formulated Colorado Model Content Standards for Science. It is an highly refined, inclusive document which suggests both breadth and depth in content requirements. The summary of the National Science Education Standards Proposal was also made available by Sharon. She is, former President of the NSTA.

A series of comments and questions came up later in the forum which clearly pointed out that students' interest and understanding of science peaks sometime during the elementary school experience. Interest in science drops-off steadily through the middle school and secondary school years. The panelists' experiences all seemed to concur with this evidence. A nation-wide awareness of this phenomenon has been well documented!

Agreement was reached during the forum that, the present is the time for this concern to be addressed. It was also suggested by the participants, that the very nature of the geosciences: the breadth and depth offered by the earth sciences makes earth science the ideal vehicle to deliver improved science education to all children. The panelists agreed that improving the earth science education process was a viable means to address this issue on the national level.

The forum concluded with remarks from forum leader, Dave Gosselin from the Nebraska Conservation and Survey Division. He stated that three elements were necessary "to improve the overall earth science process":

1. Make connections between the teachers, the professionals and the teacher preparation staff; i.e. **Partnerships**.
2. Establish a format to introduce teachers to the "world of researchers" and the scientists to the "world of teachers."
3. Educational theory and practices need to be applied to the process of improving the earth science education process: i.e. matching the vocabulary and the topic with the appropriate cognitive level, is paramount to re-engineering the public school science education process: i.e. **Programs**.

In short it was agreed that much work was needed to "improve the earth science education process." And, panelist Ron Bonstetter suggested this reform was needed on a very large scale to be effective—maybe with a paradigm on a state-wide level.

A participant from Arkansas stated this reform process was already in place at Little Rock, Arkansas, and it is called, "Break the Mold."

In my opinion, that these partnerships must be comprised of business leaders, policy makers, and educators. And in accordance with the Goals 2000 Plan Requirements - Section 306 (h) "Each State shall...ensure that comprehensive, systemic reform is promoted from the bottom up in communities, local educational agencies and schools...The processes making these types of systemic changes must be driven from the bottom up.



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SCIENTIFIC LITERACY IN ACTION

I casually asked a first grade teacher, "When do you teach science?" She responded, "Last thing Friday afternoon. If I'm lucky we run out of time and I won't have to teach it."

That was before that teacher's school became a Scientific Literacy Target School for ESC #1.

Last year after participating in the Scientific Literacy Target project I again asked the same teacher, "When do you teach science?" To my surprise she responded, "First thing in the morning. The children and I are so excited about science that I wouldn't dare skip it."

ESC #1, under the direction of the State Board of Education, has had a Scientific Literacy Target School Grant for the last three years. We started by sending out requests for proposals to all elementary and middle schools within our eight county area. Schools submitted proposals indicating their area of need and type of training required. The ESC selected eleven target schools and designed core required training in content, process and product development and assessment, interdisciplinary curriculum, parent involvement, and School Improvement. Schools individualized their own training in addition to the ESC core required training to meet their individual needs.

This year we were fortunate to be a dissemination site for the National Science Curriculum Project from the College of William and Mary. Five days of intensive training were provided including: implementing learner outcomes of significance, experimental design, an overview of exemplary curriculum, authentic assessment, metacognition, using technology, problem based learning, and a parent-teacher component of science activities to do at home with your child.

Each school is unique in its Scientific Literacy approach. The common thread that runs through all however is the enthusiasm for learning. Older, seasoned teachers as well as younger, inexperienced teachers have found challenge and excitement in teaching science. Walking through the buildings one might see baby chicks running on the elementary school floor, historical figures in science researched with the latest technology, Voyage of the Mimi in action, portfolios being developed, an archeological dig actually occurring, a rain forest greeting people as they enter the school, or Lego Logos running through the aisles.

Not only have teachers' attitudes changed. The children involved in the pilot sites show an excitement for learning that is contagious. With experimentation and hands on learning encouraged formerly unmotivated students have begun to excel. Thinking skills are being employed. ALL of us have learned.

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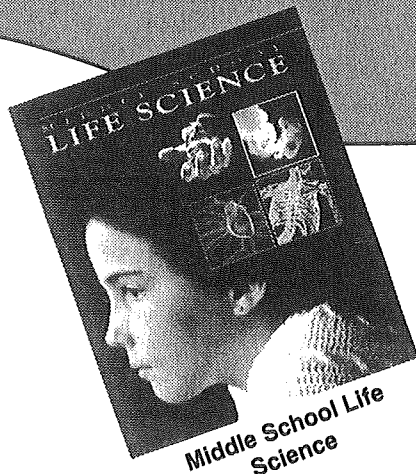
Linked to *ALL* Content Areas



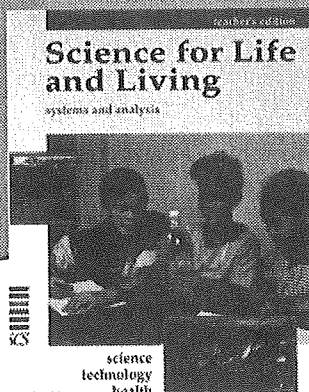
Science AnyTime is aligned with *Illinois State Goals and Objectives* and follows many recommendations contained in *Science for All Americans*, *Benchmarks for Science Literacy*, and *Project 2061*.

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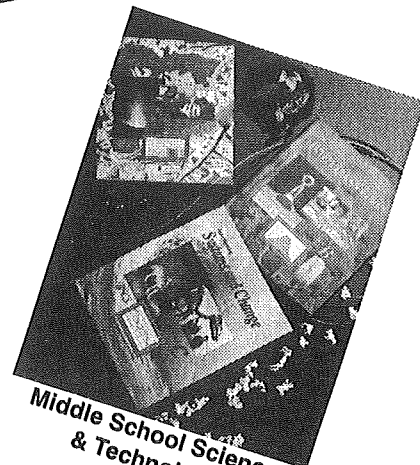
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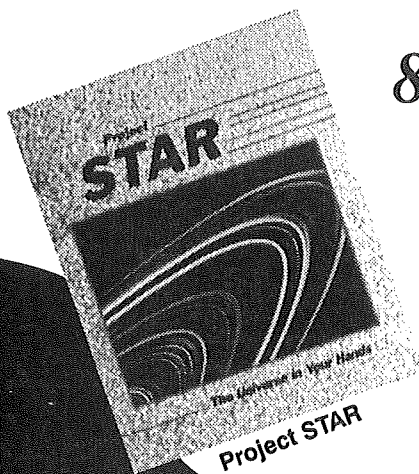
Middle School Life Science



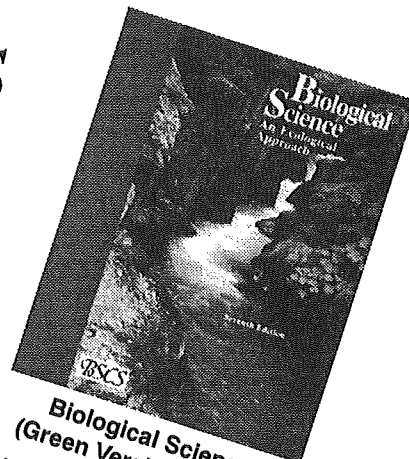
Science For Life and Living (BSCS)–K-6



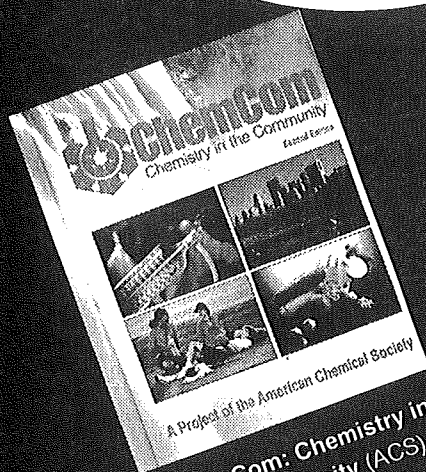
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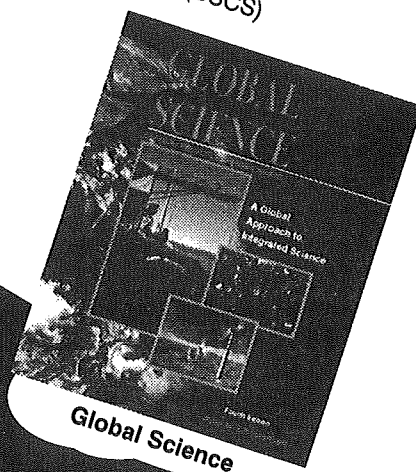
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KATS June 1995

Gary Andersen

CYBERSPACE SCIENCE

Explorers of the information super-hype way will soon find that all that glitters is not gold on the internet. Just as listeners of radio must sometimes sort information from static the internet is famous for a hefty noise to signal ratio which must be sifted through in order to find useful data. For example, I delete hundreds of Kidsphere mailing list messages for every announcement that I find useful. One might ask why does this foolish man still stay subscribed to that list. Well the few important grant postings or resource announcements I get are still worth it to me. Each person must make similar determinations for themselves. The point is, be prepared to spend time searching and filtering in order to get some truly valuable resources. How much time you are willing to spend is up to you.

One valuable resource in helping you to filter out noise from signal is the recommendation of other net explorers. Recommendations of those with like interests can be useful and time saving. If I may, I would like to recommend a resource to those of you inclined toward the teaching of Biology. The resource is known as Access Excellence, a web site maintained by the biotechnology corporation Genentech Inc. Genentech, Inc. is a pioneer biotechnology company that discovers, develops, manufactures and markets human pharmaceuticals for significant unmet medical needs. The company has headquarters in South San Francisco and is traded on the New York and Pacific Stock exchanges under the symbol GNE. Genentech is known for the manufacture and sale of biotechnology-based products such as human growth hormone and Alteplase, a substance used to dissolve blood clots in heart attack patients.

The site they sponsor, Access Excellence, may be located on the world-wide web at <http://www.gene.com/ae> or on America Online. The site has a variety of resources for biology teachers which merit a look. The primary information located in the site are:

Activities Exchange: Download lesson ideas and activities on a variety of biology topics, or share yours by uploading them.

Whats News: Learn about new scientific discoveries, listen-in to interviews with scientists making the news, and collect fun factoids you can use in your classroom.

Teacher-Scientist Network: When was the last time you talked to a scientist? Join online discussions and seminars, hosted by teams of scientists and teachers on subjects you'll want to know more about.

Resource Center: Access meeting and convention schedules, competitions, exhibits and other information from science education resources nationwide.

Teachers' Lounge: Talk with teachers from across the country online about a variety of topics related to high school biology education.

About Biotech: Take an in-depth look at this fast-growing area of science, from its roots to today's career opportunities.

What's Hot this Month!: This last month Access Excellence contains an interview with Ebola Virus expert Frederick A. Murphy, D.V.M., Ph.D. (UC Davis) former director of the National Center for Infections Diseases at the CDC in Atlanta.

Guided by a blue-ribbon panel of educational and scientific advisors, Access Excellence is dedicated to enhancing biology teaching by providing a computer network forum on which teachers can share their innovative teaching ideas and lesson plans and access information, expert assistance, and the advice and experience of other teachers to create new ideas.

Under the auspices of the National Science Teachers Association (NSTA), 105 of the most motivated high school biology teachers from every state and Puerto Rico were selected as Access Excellence Fellows in the first year of the program. This year, an additional 100 people will be selected by NSTA. Each of the teachers will receive a free laptop computer with modem and printer and a subscription to America Online, an interactive computer network.



In addition, the teachers will attend the Access Excellence Summit in San Francisco. At the Summit, the teachers will become acquainted with one another, learn how to use the laptop computer and online network, and be exposed to information and activities that go beyond traditional education conferences.

The teachers will continue this valuable ongoing communication by working together to converse and create on a variety of educational projects related. One of the most important aspects of the program is its ability to disseminate the innovative work of these highly motivated teachers to the universe of high school biology teachers nationwide. To that end, Access Excellence will provide access to America Online to several hundred additional teachers on a free, six-month trial basis. They also regularly distribute printed versions of selected lesson plans and other information from

Access Excellence to high school biology teachers nationwide. The teachers will have virtually all the resources they desire made available on the Access Excellence electronic forum and a support center located at Genentech's South San Francisco headquarters staffed by specially trained professionals and scientists.

Of the 105 Access Excellence teacher Fellows chosen for the first year of the program: 21 have won Outstanding Biology Teaching Awards; 15 have won Presidential Awards; 10 are part of the Woodrow Wilson Leadership Institute; five have won Christa McCauliffe Awards; and one is a Westinghouse Advisor. Sixty-one are women, and 44 are men. About 75 percent are from public schools, and 25 percent are from private institutions. Teachers who are interested in participating in the program should contact the Access Excellence staff toll-free at 1-800-295-9881.

SPECIAL INTERESTS

The Groundwater Gazette

ENR

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DPH COMPILES TEST RESULTS FROM PRIVATE WELLS: MORE THAN ONE-QUARTER ARE CONTAMINATED

A review of 130,000 private water well samples analyzed by the Illinois Department of Public Health's laboratories from 1986 through 1994 has found a significant number contained bacterial contamination.

Dr. John R. Lumpkin, state public health director was quoted in a May 15, 1995 IDPH press release as saying, "Although there does not appear to be an imminent health threat to the more than one million people in Illinois who rely on private wells for their water, bacteria can cause serious health risks, particularly to infants and immune compromised people, such as cancer patients or persons with AIDS." Dr. Lumpkin added, "These risks can include persistent diarrhea, nausea or vomiting."

IDPH urged private well owners to take the following precautions:

- Have the water tested at least once a year for bacterial contaminants and, if contaminated, disinfect the well and have a second sample taken. If a second sample tests positive for bacteria, the well owner should arrange a site visit by a local health department sanitarian to check for construction or location defects.
- If anyone in the household has a chronic illness, weakened immune system or is under six months of age, they should use an alternative source of water (such as bottled water or that from a municipal water system) until the well water has been tested and determined to be safe to drink.



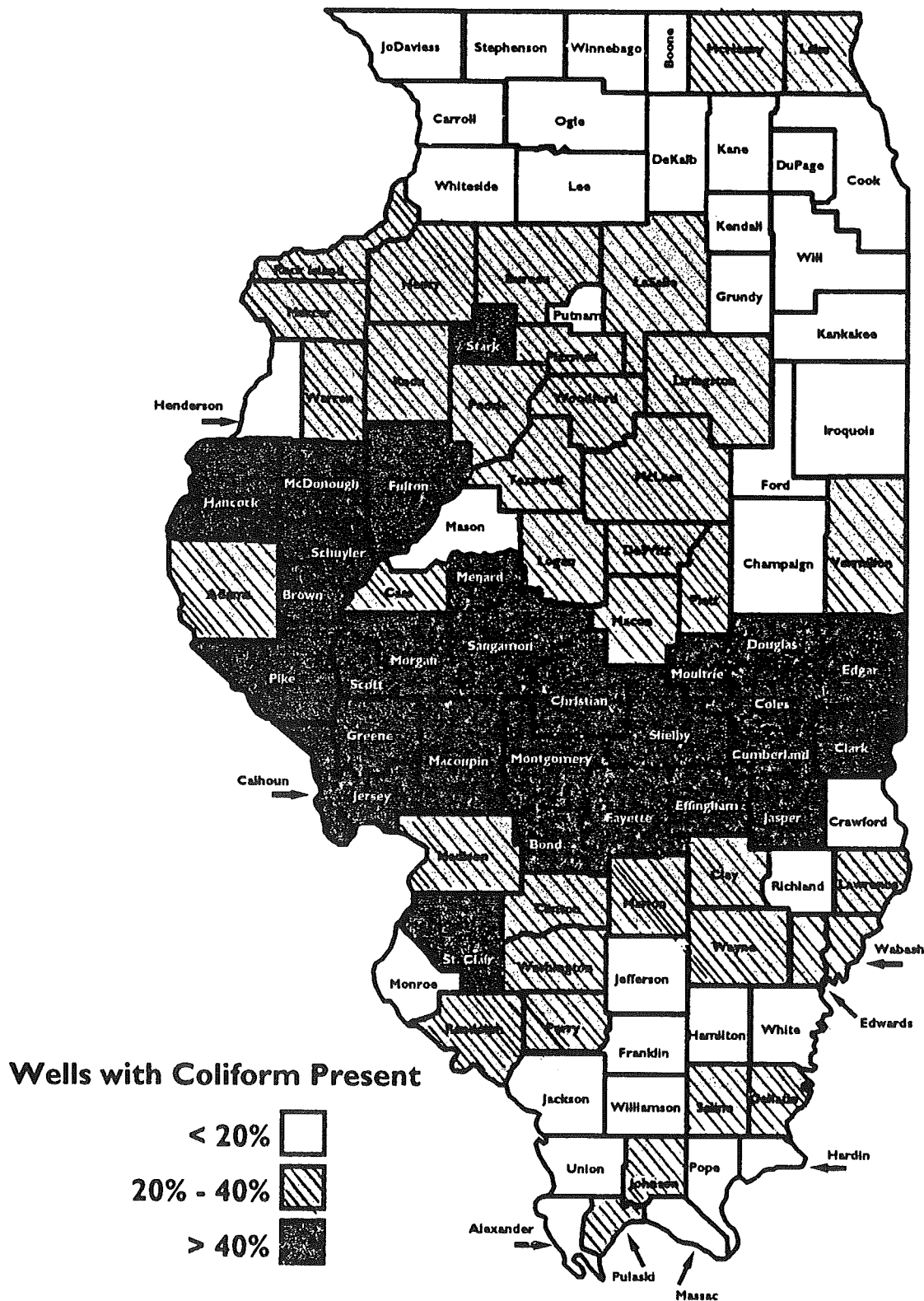
Of the 129,257 private water well samples submitted to the Department over the nine-year period, 27 percent, or 34,829 tested positive for coliform bacteria. Well contamination could be the result of poor well or water system construction, maintenance, location, accidents, repairs with no follow-up disinfection or a combination of these.

Private well users can call the Department's toll-free water well hotline, 1-800-545-2200 (TDD 1-800-547-0466, hearing impaired use only) for information and assistance about how to have the well sampled or disinfected. The Department will test water samples submitted to local health departments or regional offices at a cost of \$10, plus any handling costs the local health department may charge.

Dr. Lumpkin said a state-wide private water well quality study in 1994, of 818 randomly selected private drinking water wells, funded by the Centers for Disease Control and Prevention (CDC) led the Department to review historical data on well contamination. The CDC survey found that more than four out of ten wells tested had bacterial contamination.

The chart on the next page is a county-by-county list of the number of samples, positive samples and the positive percentages. The map on page 22 shows distribution of counties with under 20 percent, 20 to 40 percent, and greater than 40 percent positive samples.

Illinois Department of Public Health Private Water Wells With Coliform Contamination 1986 - 1994



**COUNTY-BY-COUNTY LIST OF PRIVATE WATER WELLS SAMPLED
AND PERCENTAGE THAT TESTED POSITIVE FOR COLIFORM BACTERIA**

CO.	Total # Positive	# Taken	% Positive	CO.	Total # Positive	# Taken	% Positive
Adams	632	2,568	24.6%	Logan	408	1,160	35.2%
Alexander	28	154	18.2%	McDonough	441	983	44.8%
Bond	241	2,239	10.8%	McHenry	1,971	8,579	23.0%
Brown	143	264	54.2%	McLean	702	2,410	29.1%
Bureau	221	854	25.9%	Macon	44	176	25.0%
Calhoun	256	487	52.6%	Macoupin	661	1,466	45.0%
Carroll	186	1,187	15.7%	Madison	274	893	30.7%
Cass	286	813	35.2%	Marion	38	170	22.4%
Christian	806	1,491	54.1%	Marshall	165	1,589	10.4%
Clark	218	376	58.0%	Massac	52	280	18.6%
Clay	169	573	29.5%	Menard	510	905	56.4%
Clinton	624	1,737	35.9%	Mercer	132	526	25.1%
Coles	408	886	46.0%	Monroe	234	1,344	17.4%
Cook	504	8,172	7.3%	Montgomery	695	1,565	44.4%
Crawford	62	353	17.6%	Morgan	834	1,467	56.9%
Cumberland	427	726	58.8%	Moultrie	235	513	45.8%
DeKalb	128	2,243	5.7%	Ogle	311	2,285	13.6%
Dewitt	193	639	30.2%	Peoria	93	415	22.4%
Douglas	487	1,158	42.1%	Perry	54	175	30.8%
Dupage	310	3,035	10.2%	Platt	117	460	25.4%
Edgar	208	351	59.3%	Pike	365	763	47.8%
Edwards	38	123	30.8%	Pope	19	117	16.2%
Effingham	1,030	1,989	51.8%	Pulaski	39	171	22.8%
Fayette	741	1,428	51.9%	Putnam	19	113	16.8%
Ford	89	529	16.8%	Randolph	229	1,147	20.0%
Franklin	37	273	13.6%	Richland	57	537	10.6%
Fulton	227	514	44.1%	Rock Island	365	1,787	20.4%
Gallatin	28	135	20.7%	St. Clair	1,036	2,568	40.3%
Greene	286	514	55.6%	Saline	43	193	22.3%
Grundy	55	471	11.7%	Sangamon	2,421	4,433	54.6%
Hamilton	14	101	13.9%	Schuyler	256	423	60.5%
Hancock	471	1,040	45.3%	Scott	150	274	54.7%
Hardin	25	166	15.0%	Shelby	959	1,690	56.7%
Henderson	76	409	18.5%	Stark	164	366	44.8%
Henry	263	871	30.2%	Stephenson	602	3,490	17.2%
Iroquois	242	1,468	16.5%	Tazewell	192	650	29.5%
Jackson	134	738	18.2%	Union	86	897	9.6%
Jasper	340	616	55.2%	Vermillion	1,598	4,370	36.6%
Jefferson	45	297	15.2%	Wabash	128	548	23.4%
Jersey	165	355	46.5%	Warren	272	838	32.5%
JoDaviess	488	2,773	17.6%	Washington	125	601	20.8%
Johnson	30	144	20.8%	Wayne	105	467	22.5%
Kane	160	1,945	8.2%	White	53	427	12.4%
Kankakee	175	1,476	11.9%	Whiteside	211	2,645	8.0%
Kendall	155	1,565	9.9%	Will	31	420	7.4%
Knox	366	1,041	35.2%	Williamson	39	232	16.8%
Lake	1,982	9,155	21.6%	Winnebago	193	1,190	16.2%
LaSalle	519	1,423	36.5%	Woodford	233	709	32.9%
Lawrence	307	1,220	25.2%				
Lee	139	1,284	10.8%				
Livingston	577	1,571	36.7%	TOTAL	34,829	129,227	27.0%

MINI IDEAS

Jim Guilinger
Facilitating Coordination in Agricultural Education (FCAE)
200 S. Fredrick
Rantoul, IL 61866
217-893-0091

INTRODUCTION TO HYDROPONICS

I. HYDROPONICS DEFINED

Hydroponics is a term coined by W.F. Gerike at the University of California in the 1930's. It is a combination of the Greek root words hydro ("water") and ponos ("labor"), or "water working." Howard Resh says that it is the science of growing plants without the use of soil, but by use of an inert medium to which is added a nutrient solution containing all the essential elements needed by the plant for its normal growth and development. Another application of the term hydroponics is to systems which recirculate and renew the nutrient solution, passing it over the plant roots again and again. This approach emphasizes the conservation of resources: land, water and nutrients.

II. TERMS AND DEFINITIONS

- A. *Hydroponics* - The growing of plants in a solution of nutrients necessary for growth, rather than directly in soil
- B. *Substrate* - The substance in which something takes root
- C. *Media* - Things that act intermediately - the anchoring source
- D. *Inert* - Devoid of active chemical properties
- E. *Decompose* - To separate into constituent parts or elements
- F. *Perlite* - Volcanic rock expanded and made porous by having been heated to 1800 degrees
- G. *Vermiculite* - Heated mica, retaining some available potassium and magnesium
- H. *coria* - Volcanic ash
- I. *Idealite* - Artificial, light-weight, concrete aggregate, made from fired illite shale
- J. *Aggregate* - Composed of distinct minerals separable by mechanical means
- K. *Stock solution* - Concentration of the elements in water
- L. *Milliliter* - A thousandth of a liter
- M. *Toxicity* - Poisonous
- N. *Nutrients* - Plant Food

III. ENVIRONMENTAL NEEDS OF A PLANT

- A. **Light** - Plants grown hydroponically will need 8-10 hours of direct sunlight each day to provide acceptable results. Plant-grow lamps will provide a supplemental form of light but will not produce crops with long maturity times.
- B. **Air** - Plants require carbon and oxygen to the shoots and roots to provide adequate growth.
- C. **Water** - Water with excessive alkalinity or salt content can result in a nutrient imbalance.
- D. **Nutrients** -

Primary Macronutrients	Secondary Macronutrients	Micronutrients	pH
Nitrogen	Calcium	Iron	Range 5.8 - 6.8
Phosphorus	Magnesium	Manganese	Optimum 6.3
Potassium	Sulfur	Zinc	
		Copper	
		Boron	
		Molybdenum	
		Sodium	
		Chloride	

- E. **PHYSICAL SUPPORT** - Hydroponically grown plants must be artificially supported to compensate for lack of soil for plants to anchor in.

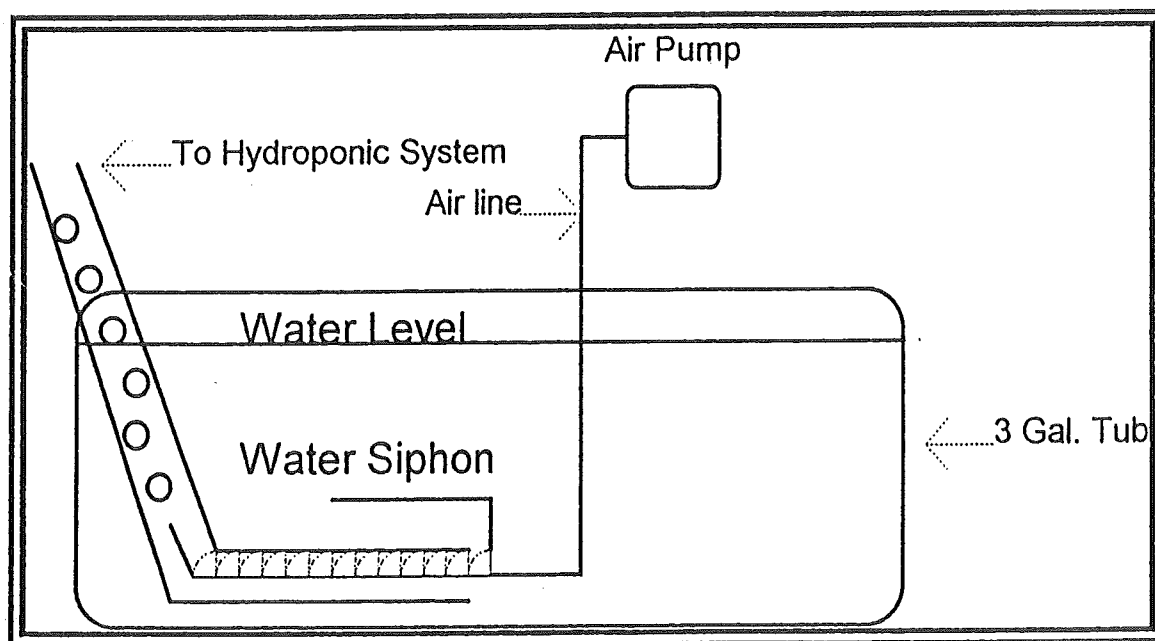
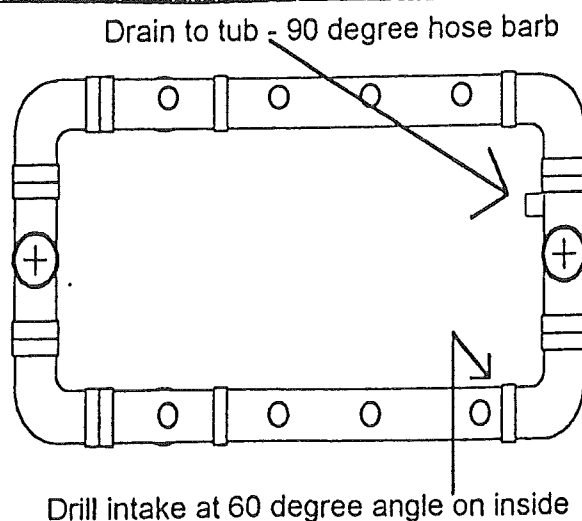
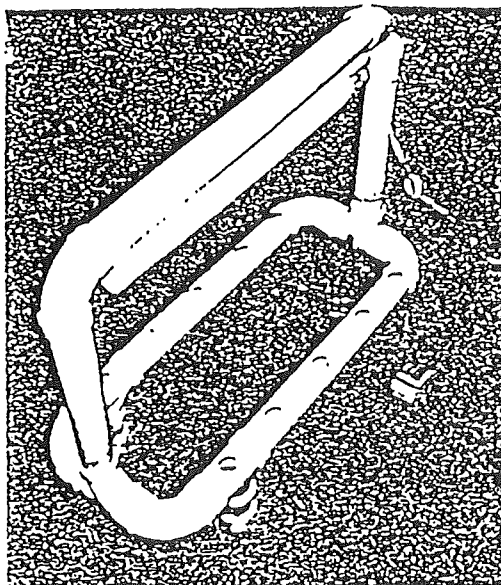
IV. SUGGESTED ACTIVITIES TO INTEGRATE HYDROPONICS INTO SCIENCE CURRICULUMS

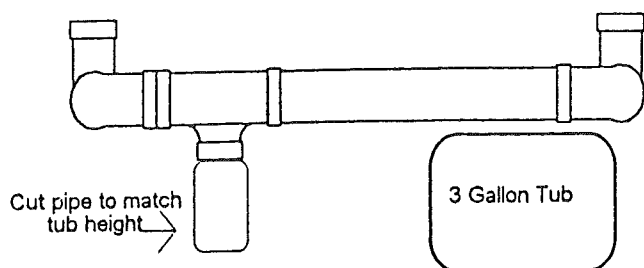
- A. Use hydroponics as a demonstration on plant growth and development
- B. Compare and contrast hydroponically grown and conventional soil grown plants.
- C. Develop a Science Fair Project with hydroponically grown plants.
- D. Produce plants within a nutrient deficient solution.

V. DIRECTIONS TO ASSEMBLE AN AIRLIFT HYDROPONICS SYSTEM

HYDROPONICS SYSTEM MATERIALS LIST

- 2 - 5/8" cup hooks
 - 1 - 2" diameter PVC pipe 10 foot long
 - 6 - 2" diameter PVC 90 elbow
 - 4 - 2" diameter PVC T connector
 - 2 - 2" diameter PVC caps
 - 1 - aquarium pump
 - 1 - 2' aquarium tubing
 - 1 - 24" fluorescent light with cord
 - 1 - 1/4" MPT x 3/8" hose barb
 - 1 - 1/4" x 3/8" 90 degree hose barb
 - 1 - Rubbermaid tub 3 Gallon
 - 1 - 20" #16 Jack Chain
 - 1 - 1/2" O.D. plastic hose (2 feet long)
 - 1 - Can PVC pipe glue
- *All PVC components are Schedule 40 gauge





CUTTING LIST FOR 10' PVC PIPE

Size Use

*1 - 2" x 25 1/4" Light holder

or 2" x 27 1/4"

2 - 2" x 14 1/2" Light supports

6 - 2" x 1 1/4" Connectors

*2 - 2" x 20" Plant hold sides

or 2" x 22"

2 - 2" x 4 1/2" Plant holder legs

*(Depending on the size of the light fixture)

VI. ASSEMBLY PROCEDURES

STEP 1 - Cut 10' PVC pipe to specifications from cutting list.

STEP 2 - Assemble plant holder - Glue one end of each of the sides to a 90 degree elbow, glue a connector to each of the elbows connected to a side, glue a T connector between the two elbows oriented straight up. Assemble the opposite end of the plant holder by gluing two 90 degree elbows to a T connector using connectors as done before, the T connector

should be oriented straight up. Connect the two ends using T connectors oriented straight down, these will act as legs. Add the plant holder legs to the T connectors oriented down and add caps to the hydroponics model. The holes for the plastic pipe connectors (1/2" diameter holes) should be drilled now in locations shown in illustration.

STEP 3 - Assemble light holder - Attach the 24" fluorescent light to the pipe with the 5/8" cup hooks and the jack chain. The 90 degree elbows can now be glued on.

STEP 4 - Assemble the light holder and plant holder together as shown in the diagram.

VI. SETTING UP AN AIRLIFT HYDROPONIC SYSTEM

1. Locate the air pump above the water level
2. Add two gallons of water to the three gallon tub.
3. Insert the air line into the 1/2" tubing four to five inches.
4. Push the airline and tubing under water (a small weight may be needed to keep the airline submerged)
5. Add water until it is within one inch of the top of the tub
6. Move the airline in the tubing until a siphon is obtained.

Design and Construction of an Airlift Hydroponics System.

For additional information concerning hydroponics contact the FCAE Coordinators office at the address above. The FCAE Project is a valuable field-based resource available to assist you in expanding and improving agricultural education. Six well-qualified agricultural educators are committed to assist teachers, administrators and system directors in providing education in and about modern agriculture.

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Oak Park, IL 60302

INTERDISCIPLINARY INSTRUCTION MODEL INVOLVING CELL

Start in the real world: at a level where students wonder. Use student questions to heighten curiosity. Find associations of ideas that may give clues. Raise dilemmas among the questions. Pursue testing. Collect data. Initiate thoughts about the fairness of the conclusions. Lead students to experience science as an open system of ideas to be explored.

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Weeks before the cell unit began, students were wondering about DNA. Darrell had heard of it in the court battle of O.J. Simpson. From Michael Crichton's book and Stephen Spielberg's film. *Jurassic Park*. Dodge remembered some ideas of DNA. Few students had seen DNA and not one knew how to find DNA. Claudio asked how DNA was found in blood cells. "Could DNA be found in all human cells - bone, skin, and muscle?" asked Dan. That Ara Parseghian's grandchildren had a genetic disease related to DNA was a fact shared by Jessica. And Nellie, so artistic, had seen a photo of DNA and wondered about the cellular world of art. Could a teacher facilitate scientific inquiry and problem solving by using these "wonderings and observations" to initiate team projects for scientific study? Imagine five teams designing and pursuing their cellular study plans as outlined in this proposal!

Darrell's team was ready to research the validity of DNA tests in court trials. A computer search, directed by the local librarian, surfaced endless primary sources about O.J. Simpson and DNA tests. At the police department. Ann and Joe were interviewing a forensic specialist about the uses of DNA evidence in the local community. Taking her camcorder, Yesenia videotaped three lectures of Mr. Hall, a law professor at Depaul University, who was discussing DNA tests from a legal point of view, using key cases of law. Their final project, a debate on the pros and cons of DNA evidence, including visuals and a Hypercard stack, making the presentation very persuasive.

Dodge's team was ready to analyze DNA themes used in the book and film of *Jurassic Park*.

Was the DNA information similar or different in both sources? How scientifically accurate was this science fiction thriller? From both texts, could data tables show comparisons of the nature, source, history, and quality of DNA? Video conferencing with several molecular biologists would help Dodge's team to further analyze data. What personal interaction might flow as all finalized their study in a talk-show format for class sharing.

Claudio wanted to find real DNA. His team planned to investigate. Vanitha, his partner, used a Lab Aids Molecular Model kit to view patterns and order in the DNA molecule. partners Kim and Dave proceeded to do staining of DNA in root tips, a technique explained to them by the local high school biology teacher. Zach and two other students went "on-line" using Alpha Server 200 to search Internet for locating clinics nearby who use DNA in PCR testing. They also found video clips of actual PCR tests which were down loaded for study. Drawing a model of a PCR (polymerase chain reaction) test clarified how DNA, RNA, and the cell itself were related. The DNA search had become very "hands on." Surely, bridges were forming between science, technology, and society.

The DNA in varied human cells is different, Dan hypothesized. If the cell structure is different, surely the DNA in the nucleus is different. Was this hypothesis correct? His team wondered! Mario and Keana, being tactile learners, used the Camscope and examined four types of human cells under 400X and 1000X magnification, hoping to answer Dan's hypothesis. Two of their technical experts used the Macintosh SI520 to search Internet for color photos, sound bites, references, and video clips on cell evolution, cell history, and cell differences. A new world of text fell before them. Differing cognitive styles responded, with the verbal-linguistic minds pursuing text and the visual learners studying video clips and film. Ultimately, would Dan's hypothesis prove true or false?

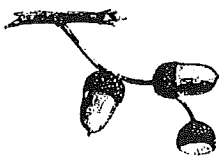
Jessica believed that learning is pursued to change the world for the better. Remembering how Ara Parseghian's grandchildren only had a few years left to live, due to Niemann-Tick, a genetic disease, Jessica's team proceeded to study this disease. First, they faxed a questionnaire to Mr. Parseghian, hoping to locate first hand information and photos. The team read about genes, cellular function, crossovers, and mutations. Three geneticists agreed to send Niemann-Tick news to Rm. 307 via E-mail.

Getting involved in national fundraising for genetic research on this disease, as Mr. Parseghian was doing, became natural. Jessica contacted Channel 29, the local cablevision, to seek advertising. Letters, electronically generated, inspired community support. Hallway posters, made by Tom and Phil, championed the positive uses of gene research and bioengineering.

Almost everyone in class had seen the double helix model of DNA, including Nellie whose hobby was art. She and the team reviewed several computer enhanced photographs of the microscopic world. Mr. Zek, the art teacher, agreed to help them create a portfolio of cellular art. Teleconferencing with T. Stone, a scientific illustrator, produced new avenues for art resources. Andy's father, who used computer graphics in his career, helped the team create molecular and cellular images using a colored laser printer. Their four by four foot mural of Watson and Crick and the DNA model was masterful.

Five young scientific teams are designing cellular science for tomorrow! Inherently individualized activities have characterized their scientific learning. Purposeful integration of technology has been experienced. Utilizing community expertise has promoted local partnerships. Cellular study is now connected to jobs and disciplines. Interdependence develops and belongingness grows. These young teams have accessed, evaluated, synthesized, and communicated cellular information in an exciting technological work world.

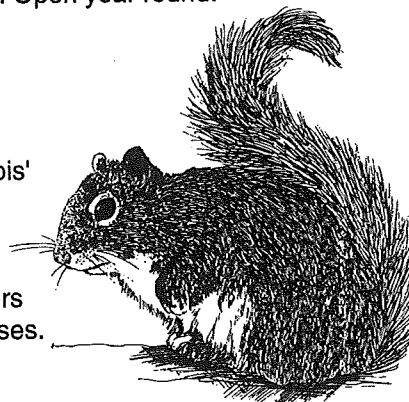
Forest Park Nature Center



Comprised of over 500 acres of dedicated Illinois State Nature Preserve, Forest Park Nature Center contains seven exciting miles of hiking trails. The Nature Center also features a natural history museum, viewing room for bird watchers, educational programs for school groups and the public, and handicap accessible restrooms & parking. Open year round.

The Trailhead Nature Store

features central Illinois' finest selection of science & nature related books, with discounts for teachers and quantity purchases.



5809 Forest Park Dr. Peoria, IL 61614 (309)686-3360
Open Monday-Saturday 9am-5pm, Sunday 1-5pm

OPPORTUNITIES

Melanie Wojtulewicz
Chicago Systemic Initiative
Chicago Public Schools
Department of Instructional Support
1819 W. Pershing Road
Chicago, IL 80609

SCIENCE AND ENGINEERING OPEN HOUSE

The University of Illinois at Chicago (UIC) is proud to announce this year's Science and Engineering Open House to be held on Tuesday, October 17, 1995 from 3 pm to 6 pm. The open house is hosted by the College of Liberal Arts and Sciences (Departments of Biology, Chemistry, Geology, Physics) and the College of Engineering. All Chicagoland high school teachers, advisors and students are cordially invited to participate. Parents are encouraged to accompany the students.

UIC is the largest institution of higher education in the Chicago area and one of the top 70 research universities in the United States. Its reputation for excellence in teaching and outstanding research has steadily improved with time. This year's open house, entitled "Inventing the Future" will feature guided tours of the various science and engineering facilities on campus and demonstrations by faculty of cutting-edge technology either under development or in use. At the end of the afternoon there will be a reception, with refreshments, where guests can discuss undergraduate studies with faculty, admission counselors, and students at UIC. For more information, please contact Sharon Mistele (Telephone: (312)413-2797), FAX: (312)996-9017, E-mail: Mistele@UIC.EDU). Free parking will be provided.

Kitty Pfutzenreuter
Volunteer Coordinator
Museum of Science and Industry
57th Street and Lake Shore Drive
Chicago, IL 60637-2093

Volunteer in the Museum of Science and Industry's Science Connection program. Interact informally with visitors of all ages using "hands-on" activities related to exhibits. Design and present a series of activities to give visitors an opportunity for further insight into that exhibit. Currently, the program is taking place on the Museum's Navy and Architecture exhibits. For more information call the Museum's Volunteer Office at 312-684-1414, Ext. 2422



AMERICAN PHYSIOLOGICAL SOCIETY
9650 Rockville Pike
Bethesda, MD 20814-3991
Fax: (310)571-8305

FRONTIERS IN PHYSIOLOGY SCHOOL SCIENCE TEACHERS RESEARCH PROGRAM

The American Physiological Society (APS), with support from the National Science Foundation, is continuing its sponsorship of a program to provide middle and high school science teachers with experience in physiology research. Each grant supports the involvement of a teacher in the ongoing research program of an APS member's laboratory. Grants include a \$5,000 stipend to support the teacher's full-time participation in laboratory research for up to nine weeks during the summer and a one-week Summer Institute at APS headquarters in Bethesda, MD. There is also a \$750 travel allowance for the teacher to attend the annual APS meeting, *Experimental Biology '96*, to be held in Washington, DC.

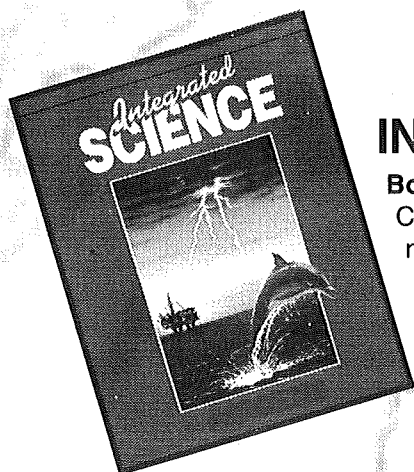
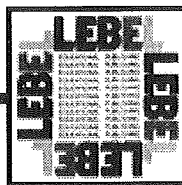
The program makes special efforts to include middle and high school science teachers who are members of underrepresented minority groups or who teach significant numbers of minority students.

Additional information concerning the APS *Frontiers in Physiology* Summer Research Program for Teachers and application forms may be obtained from:

Marsha L. Matyas, Ph.D
Project Director
Phone: (301)570-7132
email: mmatyas@aps.faseb.org

Phyllis R. Edelman
Project Coordinator
Phone: (301)571-0692
email: pedelman@aps.faseb.org

APPLICATION DEADLINE: January 4, 1996



INTEGRATED SCIENCE

Books 1, 2, and 3 (grades 6 – 9)

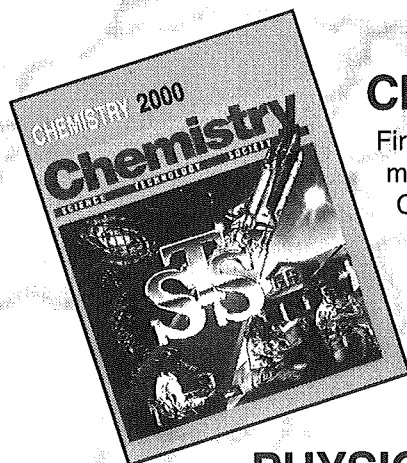
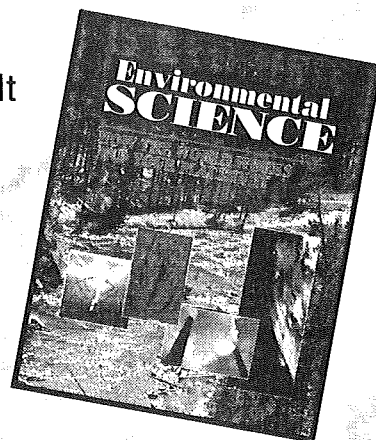
Comprehensive activity oriented science curriculum for junior high/middle school — life, chemistry, physics, earth and space sciences are coordinated and integrated throughout. Each chapter presents concepts to students of different abilities. The sequence is keyed to chapter review tests. A separate test program evaluates process skills and understanding of the content. (over 350 activities)

ENVIRONMENTAL SCIENCE

How The Work Works And Your Place In It

Second Edition by Jane L. Person

Revised and updated edition with new labs and case studies for grades 9–12. Designed to introduce STS and environmental issues. Ideal for the students not taking chemistry or physics. Components include: Teacher's Manual, Study Guide, Lab Investigations, and Test Program.



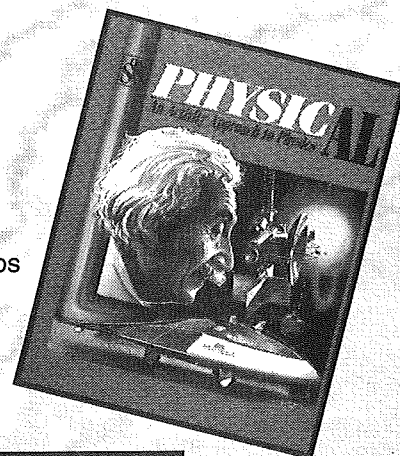
CHEMISTRY 2000

First course in Chemistry for general level students — contains more STS integration with special attention to the environment. Components include: student's Work-A-Text Books 1 and 2, Teacher's Manual, Supplementary Questions and Assignments along with additional Chemistry Units, and Computer Test Programs.

PHYSIC-AL

An Activity Approach to Physics

Doing physics not just talking about it! Over ninety labs integrated throughout the text. Components include: Teacher's Reference Manual, Solution Manual, Students' Exercise Book, Physic-Al Computer Disk and Test Program.



For more information contact:

J. M. LeBel Enterprises

6420 Meadowcreek Drive, Dallas, Texas 75240

Call or FAX (214) 661-0687

Katherine D. Taft
Volunteer Lincoln Park Zoo
Member Emirita ISTA

LIFE — BE IN IT — AT THE ZOO!

Lincoln Park Zoo in Chicago has a number of distinctions. The beautiful setting along the lakeshore, the heart of the city location, manageable size, successful breeding programs of endangered species, increasing educational programs and NO ADMISSION CHARGE are all unique. The Zoo is under the governance of the Lincoln Park Zoological Society with an agreement with the Chicago Park District. Keeping the Zoo free is part of that agreement.

The mission of a modern zoo goes far beyond the menagerie concept of the early zoos. It is comprised of many elements including conservation of certain species, an appreciation of the various cultural settings within native habitats, education through exhibits and programs and last but not least, a pleasant experience for the visitors.

LPZ has visitors from the city, neighboring communities, other states, and other countries. Visitors with various backgrounds other than the city of Chicago are always pleased to find an animal, domestic or wild to which they can relate. Furthermore, they enjoy sharing this with a volunteer or docent on the scene. Our city visitors often tell a volunteer or docent that they have learned during their visit.

It is particularly pleasurable to watch the school children change from being apprehensive about feeding 1500 lb. cows

to petting them before they leave the Farm-In-The-Zoo. Similarly in the Children's Zoo, the care which the animals receive and the close contact with many of the animals help to foster a feeling of sensitivity to the needs of the animals and their place in our world among the young visitors. LPZ has embarked upon an ambitious program of extending the educational programs in places such as those at the Children's Zoo, the Farm and the Curiosity Carts stationed at various places, as well as programs based upon the exhibits. To do this many more volunteers and docents are needed.

While the Zoo always has need for volunteers to staff the gift shops and information centers, act as staff assistants and gardeners, or work on special projects and events, the thrust of this appeal is to the teachers and retired teachers who are reading this article. It is truly a rewarding experience to volunteer at the Zoo.

If you have retired and miss the contact with children and teaching, LPZ has a place for you. If you enjoy making new friends and meeting the public LPZ has a place for you. If your thirst for learning seems unfulfilled, LPZ can help you. If you care about the well-being of the animal world and want to help others develop caring feelings, LPZ has a place for you. If you enjoy seeing families with children showing a pleasurable experience, LPZ is the place.

The logistics of volunteering are relatively simple. First is a commitment to spend a minimum of 4 hours one specific day of the week for a year. Next is an interview with the volunteer recruiting staff. The third step is base training. This



will be given in January for educational positions. Volunteers are also needed to complete training that qualifies them to present programs on orangutans, chimpanzees and gorillas in the Great Ape House.

You will enjoy your experiences at the Zoo and the new people you will meet. You will also be making a major contribution to enhancing the program of the Zoo. Last but not least you will be giving the visitors of all backgrounds an opportunity for a pleasurable learning experience that they can afford. Lincoln Park Zoo is committed to remaining free. For details, contact the volunteer coordinators listed below. Call anytime MON-FRI for more information and to arrange an appointment.

Rebecca Severson or
Elizabeth Wheeler
c/o Lincoln Park Zoo
2200 Cannon Drive
Chicago, IL 60614

VOLUNTEER HOT LINE - CALL
FOR MORE INFORMATION AND
APPOINTMENT (312) 742-2124

FUTURE NSTA CONVENTIONS

1995-1996

Area Conventions
Salt Lake City, Utah
October 19-21

Baltimore Maryland
November 16-18

San Antonio, Texas
December 14-16

Rapid City, South Dakota
February 8-10, 1996

1996
National Convention
St. Louis, Missouri
March 28-31

LIVE FROM THE STRATOSPHERE

In Fall 1995, students can take a "virtual" night flight, 41,000 feet above earth, and use an infrared telescope aboard NASA's Kuiper Airborne Observatory (KAO) to study the origin and evolution of galaxies, stars and planets. For the first time, the KAO will downlink video, audio and data via NASA's Advanced Communications Technology Satellite (ACTS). Two preparatory programs will air during the regular school day. But one Friday night will see an opportunity for students to "camp-in" at participating science museums, schools and other sites. A teacher and a student on board the KAO will be the eyes and ears of those on the ground.

Online resources will prepare students for their aerial field trip, and inform them of the careers in science and aeronautics which make such experiments possible. Collaborative activities, on meteorology, flight and the scale and structure of the universe will motivate connections between sites, as well as up to the Kuiper. A printed Teacher's Guide will suggest hands-on science activities and multidisciplinary options. Students will be exposed to ongoing opportunities to explore the solar system and the universe throughout the year, such as December's encounter of the Galileo spacecraft with Jupiter, beginning its extended tour of the intriguing Jovian moons.

LIVE FROM THE HUBBLE SPACE TELESCOPE

Live from the Hubble Space Telescope (Spring-Summer 1996) will allow students to look over the shoulders of astronomers using the nation's foremost orbital observatory. Students from all across America will have the chance to converse via interactive video with the scientists who have helped humans see farther out into the universe, and back in time, than ever before.

Some students—selected through a national competition—will physically visit the Hubble's "home" on the ground, at the Space Telescope Science Institute in Baltimore, Maryland, and work there with researchers to perform observations using the Hubble! They'll share their experiences, on-camera and online, with many more students who can't make the actual journey. **Passport to Knowledge** will encourage all other students and teachers to go online from school and home, and give them pointers about how to use the plentiful resources—information and images—already accessible there.

Watch for an Announcement of Opportunity over the Internet this coming Fall, and for activities beginning coincident with **Live from the Stratosphere** and continuing throughout the 1995-96 school year. Winning proposals for Student Observations will likely require collaboration between educators, local amateur astronomy groups and scientists, whether situated nearby or cooperating over the Internet. Meanwhile, check out the extensive materials about the Hubble and the Space Telescope Science Institute: they are not only informative but also quite beautiful!

Using World Wide Web: <http://stsci.edu/top/html>
Gopher, Anonymous FTP, or Telnet: spacelink.mfsc.nasa.gov
or via NASA's SpaceLink, direct dial 205-895-0028
to contact **Passport to Knowledge** call: 1-800-626-LIVE
send e-mail to: listmanager@quest.arc.nasa.gov
in the message area write: **subscribe sharing-nasa**
or write: **Live from...** PO Box 1502, Summit, NJ 07902-1502

**BIOLOGICAL SCIENCES
CURRICULUM STUDY (BSCS)
UPDATE: NEW GRANTS
D.O.E. FUNDS
THIRD GENOME MODULE**

For the last twenty years, the American public has been inundated by a steady stream of new discoveries about human and medical genetics, including, quite recently, insights related to phenomena such as genomic imprinting and genetic anticipation. These are only two mechanisms that often are grouped under the category of nontraditional inheritance (NTI). Other such mechanisms include mitochondrial inheritance, uniparental disomy, and RNA editing.

In keeping with the public's interest in matters related to health and medicine, the media's interpretation of this information has focused largely on the implications for personal, family, or public health, and on the ethical, legal, and social implications of new or potential discoveries. Although these emphases are appropriate and appealing for the adult public and for students at the high school level, they convey only part of the story about these new discoveries in genetics. What is missing from the interpretation of NTI is a consideration of the ways these genetic mechanisms reinforce or challenge current biological thinking and illustrate the nature of science.

BSCS will address those issues in a new instructional module for the high school biology classroom, tentatively titled *Nontraditional Inheritance: Genetics and the Nature of Science*. Under this twenty-month grant funded by the U.S. Department of Energy (DOE), BSCS will develop materials that focus on nontraditional inheritance as a vehicle to demonstrate the nature and methods of science. Developed in cooperation with the education committee of the American Society of Human Genetics, this module will provide teachers with an update on important information in human genetics and with concrete strategies to teach about the nature of science.

This program will be ready for field testing in the spring of 1996. If you are interested in using the experimental version with your students, please contact:

BSCS Attn: HGN3
Pikes Peak Research Park
5415 Mark Dabbling Blvd.
Colorado Springs, CO 80918-3842



**NEW SERVICE PROVIDES
WETLANDS INFORMATION
FOR ILLINOIS**

Information on Illinois wetlands is just a phone call away now that the Illinois State Water Survey possesses more than 1,000 National Wetlands Inventory (NWI) maps indicating marshes, bogs, wet meadows, swamps, shallow ponds, and bottomland forests throughout the state. A service charge may apply in some cases.

Survey staff participated in a one-day training workshop on how to interpret the maps, and we are ready to answer requests for wetland information. While not for regulatory use, the maps are an excellent and recommended first step for determining if wetlands occur on a particular property. Final determination of wetland areas requires on-site investigation by certified personnel," says Sally McConkey, manager of the Survey's Surface Water & Floodplain Information Services.

The maps were created for the Illinois Wetlands Inventory (IWI), an effort to locate, classify, and map the state's wetlands and deepwater habitats. The IWI is based on the NWI, a program initiated by the U.S. Fish and Wildlife Service in 1975 in response to the loss of 90 percent of the wetlands in the United States. The IWI contains detailed information on remaining wetlands that occur over 2.6 percent of the state's area. Marvin Hubbell oversees the Wetlands Program for the Illinois Department of Conservation and coordinated the IWI mapping.

Aerial photography, soil and topographic maps, and data from field investigations were used to produce the maps, which display wetlands on U.S. Geological Survey 7.5-minute quadrangle topographic base maps at a scale of 1 inch - 20,000 feet. A classification code describes ecological and physical characteristics, substrate type, hydrology, and human effects. These features have also been digitized for integration with a Geographic Information System.

Currently, the Water Survey is using paper copies of the maps. Other agencies are responsible for distribution of the maps and digital data. For more information, contact the Water Survey at (217) 333-0447.

Currents is published quarterly by the Illinois State Water Survey, a Division of the Illinois Department of Energy and Natural Resources. All articles are prepared in collaboration with staff scientists and engineers; materials may be reprinted if credit is given to the Water Survey. Comments may be addressed to *Currents*, Illinois State Water Survey, 2204 Griffith Drive, Champaign, Illinois 61820-7495, phone (217) 333-8888.

NATIONAL ENGINEERS WEEK FUTURE CITY COMPETITION™ 1995-1996 Academic Year

A competition for 7th- & 8th-grade students to foster interest in *engineering, math and science through hands-on, real-world applications.*

What is National Engineers Week?

Since its beginning in 1951, National Engineers Week has been the only national event celebrating the engineering profession. National Engineers Week seeks to increase public awareness and appreciation of the engineering profession and technology by emphasizing the positive contributions that engineers make to our quality of life. Thousands of engineers, engineering students, teachers, and leaders in government and business participate in National Engineers Week each year.

In order to help students better understand the practical applications of math and scientific principles, the National Engineers Week Committee is sponsoring the fourth annual National Engineers Week Future City Competition™ in cooperation with the MATHCOUNTS Foundation and The National Science Education Leadership Association.

National Engineers Week Future City Competition™

Since the National Engineers Week Future City Competition™ program began, it has been recognized by the education and engineering communities as an innovative learning approach. It has also been recognized by the White House.

Excitement abounds throughout the classroom. Students are responsible for solving problems while creating their future city. What is the best location for the residential, industrial, and commercial zones? How will the city transport its citizens? What about waste management?

The National Engineers Week Future City Competition™ offers students a resourceful and fun way to learn about engineering. Through the program, students will:

- See firsthand how engineers turn ideas into reality;
- Use a popular award winning computer game, *SimCity Classic™* and *Sim City Classic Graphics™* package, to design a future city;
- Build a working model of their future city;
- Be challenged to recycle materials into their model;
- Work as a team under the guidance of an engineer and teacher;
- Learn about factors to consider when selecting a site for the city's manufacturing zone by writing an essay; and
- Apply their knowledge to real world situations.

The Competition is open to students in 7th and 8th grades. Regional contests will take place in January, 1996. The winning team from each region will win prizes and a trip to Washington, D.C., to compete in the national finals on February 21, 1996. The team that wins the national finals will win a trip to U.S. Space Camp in Huntsville, Alabama, provided by the 3M Corporation.

The Problem:

Design and Build a Future City

Engineers' expertise and skills are necessary for the planning and development of our cities. Engineers work with student teams to design and build a city in the year 2010. The city must display residential, commercial and industrial areas, power plants, transport tubes, power lines, etc. The city must be energy efficient, supplying enough energy for its residents. Other considerations are pollution levels, traffic density, taxes and budgets.

The solution will consist of a computerized design using award winning *SimCity Classic™* software and *Sim City Classic Graphics™* package provided by Maxis, team-made physical model, an essay on "What factors should be considered when selecting a site for your city's manufacturing zone?," and an oral presentation of the city.

- *SimCity Classic™* software and *Sim City Classic Graphics™* package will be donated by Maxis and sent to registered teams by the regional coordinator.
- *SimCity Classic™* software and *Sim City Classic Graphics™* package will be available in DOS and MAC formats. For maximum benefit, a color monitor and mouse are recommended.

Limitations to the Problem

- Teams will consist of three students (all must be from same school), one engineer, and one teacher. Teachers from the science, mathematics or technology departments may be especially interested in this competition.
- Only one team from each school will be able to participate in the regional competition.
- The students, with the help of the engineer and teacher, will design the city using the *SimCity Classic™* software and *Sim City Classic Graphics™* package sent by the National Engineers Week Future City Competition™ Regional Coordinator. After designing the city, the team will printout their city. This computer printout will serve as a blueprint for constructing the model.
- Only one software package is available to each registered school. A site license for software duplication will be included in the school's registration package.
- The team will decide what materials to use to build a working model of one section of the city, which must be no larger than 34" (width) x 72" (length) x 24" (height). The model must contain at least one moving part. All power sources must be self-contained, i.e. no plugs.
- Students are encouraged to recycle common materials into the model, i.e. plastic tubs, glass jars, metal containers, etc. The total cost of all materials used to make the model may not exceed \$100 (cash or in-kind). An accounting of all expenses related to the building of the model will be requested at the regional and national competitions.
- Students will be required to write an essay of 500 words or less on "What factors should be considered when selecting a site for your city's manufacturing zone?"
- Students will also be evaluated as a team on how well they can explain the design and function of their futuristic city.

The Competition

Regional competitions will be organized by your city's National Engineers Week Future City Competition™ Regional Coordinator. Regional competitions will take place in: Baton Rouge, Chicago, Detroit, Milwaukee, New York City, Philadelphia, and Washington, D.C.

When: January, 1996

Where: Local junior high college, university, science/technology museum, or engineering firm (as determined by the regional coordinator)

Cost: Team members are responsible for their own travel to the regional competition.

Prize: A trip to Washington, D.C., to participate in the National Finals, "What's The Secret," CD-ROM donated by 3M, and other prizes.

The National Finals will be held during National Engineers Week. The winning team will be announced immediately following the national finals.

When: National Engineers Week, February 18-24, 1996

Where: Washington, D.C.

Who: Regional Competition Finalists

Cost: National Engineers Week will provide the airfare and hotel accommodations for the five members of the winning team from each region. Team Members will be responsible for all additional expenses such as ground transportation, meals and other items.

National Prizes:

First Place Prize: Trip to U.S. Space Camp in Huntsville, Alabama awarded by the 3M Corporation.

Second Place Prize: \$1000 grant from Maxis for the school's computer education program.

Additional prizes will be awarded including a special award from the Society of Manufacturing Engineers to be presented at the national finals.

Scoring

Teams of judges will evaluate both the computer printout and city model. Student competitors will also be judged on their essay and oral presentation. The judging categories are:

- Computer Design — layout, efficiency, livability.
- City Model — creativity, attractiveness, use of recycled materials (optional), moving components
- Essay — information and research as it relates to the competition topic, "What factors should be considered when selecting a site for your city's manufacturing zone?"
- Presentation — how well the students can explain the city's design and construction components, focusing on its benefits and aesthetic quality.
- Economics — all city model materials must stay within the \$100 budget (cash or in-kind)

How to Participate

Teachers: If you would like your students to participate in this program, please return a registration form no later than **October 11, 1995** to your regional coordinator. If necessary, your regional coordinator will match you with a local engineer and send you the official "National Engineers Week

Future City Competition™ 1996 Teacher/Volunteer Handbook" and *SimCity Classic*™ software with the *Sim City Classic Graphics*™ package by October 18, 1995. If your school already has a local engineer volunteer with whom you can work, please indicate this on the registration form.

For more information contact:

National Engineers Week Future City Competition™
1420 King Street
Alexandria, VA 22314
703-684-2852

ATTN: Carol D. Rieg

1996 NATIONAL ENGINEERS WEEK FUTURE CITY COMPETITION™ REGISTRATION FORM

This form must be received by your regional coordinator no later than October 11, 1995, with a check or purchase order payable to National Engineers Week. No fax registrations will be accepted.

TEACHERS (Please fill out completely)

- ☐ I would like my class to participate in the 1996 National Engineers Week Future City Competition™.

Teacher's Name _____

School _____

Address _____

City/State/Zip _____

Telephone/Fax _____

Grade Level _____

SOFTWARE SPECIFICATIONS

Please circle (one) for type of computer:

IBM or 100% DOS compatible Macintosh

Please circle (one) what size disk you need:

• 3 1/2" 5 1/4"

REGISTRATION FEE

Your registration fee will help cover some of the administrative costs associated with running your local program. Make checks or purchase orders payable to "National Engineers Week."

- ☐ \$15 early registration fee (prior to 9/29/95)
☐ \$25 registration fee (after 9/29 until 10/11/95)
☐ Check enclosed.
☐ Purchase Order enclosed.

Please complete all registration information and return the form with your check or purchase order to your local contest coordinator. Final date to receive registration forms is October 11, 1995.

MEETINGS AND WORKSHOPS

GLOBAL CHANGE EDUCATION WORKSHOPS

The Advisory Services office of the UW Sea Grant institute is part of a national effort (sponsored by NOAA's Office of Global Programs) to develop and host a series of ongoing workshops for adult educators who teach environmental issues. Each two or three-day workshop addresses such issues as: Natural Climate Variability, Ozone Depletion/Greenhouse Warming, Ecosystem Response, and Decision-making Under Scientific Uncertainty.

Participants receive specific instruction on teaching global change issues, a Global Change Resource Guide, opportunities for hands-on activities and active demonstrations, and a variety of other support materials. Participants are expected to conduct at least two workshops using global change information within one year of their training. The workshops are free and there is some money available for travel reimbursement.

The next Global Change Education Workshop in the Great Lakes Region is scheduled for September 25-26, 1995 at the U.W. - Stevens Point. For more information on this and other workshops, contact:

UW Sea Grant Institute
Advisory Services - Global Change Education
1800 University Avenue
Madison, WI 53705

or call: 608-265-5109

or fax: 608-263-2063

or email: ehanson@seagrant.wisc.edu

ESCONI

The Earth Science Club of Northern Illinois is having a Rock Flea Market and Auction Saturday, October 7, 1995. There will be all kinds of fossils, minerals, rocks and crystals. Crystals are only 25 cents each. In addition, a silent auction will be held at College of DuPage, Lambert Road and 22nd Streets, in Glen Ellyn from 10 am to 4 pm, Room 1024 A and B, Student Resource Center. For more information, call Don Auler, 708-832-0479

Cheryl Mell
Teacher Services Supervisor
John G. Shedd Aquarium
1200 S. Lake Shore Drive
Chicago, IL 60605
(312) 939-2426 x33060

SHEDD AQUARIUM TEACHERS' WORKSHOPS: FALL 1995

The Aquarium is a wonderful resource for a unique educational experience. Take advantage of Shedd Aquarium's expert teaching staff by attending any of our teacher workshops offered this fall!

Oceanarium and Aquarium as a Resource

Explore the diversity of the Pacific Northwest coast whales, dolphins, otters and seals temperate rain forests, rocky tide pools and volcanic geology. Then travel around the world to visit aquatic animals from Australia, Africa, Europe, and the Americas. This workshop includes a tour through the Oceanarium and Aquarium and support materials for curriculum development. An overview of our education department's classes, labs and self-guided visits will be presented.

Wednesday, October 18, 1995, 4:30-7:30 p.m., (code 001WE)
Workshop Fee: \$5.00

Aquatic Arts and Crafts I

Bring the underwater world to your classroom! Learn how to make fish kits, anemone hats, piranha pencil puppets and more. Crate a rockhopper penguin from a 2 liter soda bottle and design a spiny sea urchin. Join us for a morning of fun and take home an "ocean" of ideas.

Wednesday, October 25, 1995, 4:30-7:30 p.m., (code 002WE)
Workshop Fee: \$10.00

Beluga Whales

Are you intrigued by Shedd Aquarium's beluga whales? This workshop looks at the physiology, behaviors, habitat and conservation of this arctic denizen. Find out where Shedd's belugas came from and the status of wild populations. Meet our belugas and learn about research projects here which may benefit wild populations.

Saturday, November 4, 1995, 9:30 a.m.-12:30 p.m., (003SA)
Workshop Fee: \$5.00

Pond Life Lab

Water striders, dragonfly nymphs, and cattails are just a few of the neat plants and animals found in a pond. In this hands-on workshop, create your own mini pond ecosystem. Learn about collecting equipment and techniques, observation and identification, and the best times of year to visit ponds. Spend the morning getting an up close and personal look at aquatic life!

Saturday, November 18, 1995, 9:30 a.m.-12:30 p.m., (004SA)
Workshop Fee: \$10.00 (Price of workshop includes *(Pond Life - A Golden Guide)*)

Project Wild Aquatics

An interdisciplinary approach to teaching about aquatic wildlife and habitats, this collection of K-12th grade activities includes both freshwater and marine environments. Participate in Project Wild Aquatics activities, share ideas with fellow educators, and take home a Project Wild Aquatics activity guide. Please bring a brown-bag lunch.

Saturday, December 9, 1995, 9:30-12:30 p.m., (005SA)

Workshop Fee: \$5.00

WORKSHOP REGISTRATION

To register for a teacher workshop, please call (312) 986-2300, Monday through Friday, 9.00 a.m.- 4:00 p.m. Please have ready the name of the workshop, date, code, and fee.

GREAT LAKES EDUCATORS COME TO CHICAGO

The Great Lakes Educators of Aquatic and Marine Science (GLEAMS) will hold their annual conference at the John G. Shedd Aquarium in Chicago October 6-8, 1995. GLEAMS is an organization that provides educators with information, methods and materials on the interrelationships between the world of water and land. Highlights of the conference will include keynote speaker, Richard Ellis, author of *Dolphins and Porpoises*, informational concurrent sessions and pre and post conference trips at to her educational institutions in the Chicago area. For further information about the conference or becoming a member of GLEAMS, please call (312) 939-2426, ext. 3550.

AWARDS AND RECOGNITION

Mr. Alan D. Hoffmann

Community High School District #99 - North
4436 Main St.

Downers Grove, IL 60515

NABT (NATIONAL ASSOCIATION OF BIOLOGY TEACHERS) OBTA (OUTSTANDING BIOLOGY TEACHER AWARD) 1994/95

In addition to being recognized as the 1994/95 OBTA from Illinois, Mr. Hoffmann's credentials include the following:

Presidential Award for Outstanding Science Teaching, State Finalist

Tandy Technology Scholar Award Recipient

Illinois Science Teachers Award of Excellence in Secondary Science Teaching

Acting Faculty Advisor for the Global Environment Seminar, Washington, D.C., 1993

Environmental Education Committee Member of the Conservation Foundation of Dupage County

National Advisory Committee member of the Washington Workshops Foundation

Biology Teacher Network of the Western Suburbs of Chicago - CoFounder

Lifetouch Enrichment Grant - Summer Student Volunteer Program at Lyman Woods Nature Preserve, Downers Grove, IL

Founder - Outdoor Environmental Club, Downers Grove, - North

Global Environment Seminar, Washington, D.C., 1992-present

Basketball Coach

Presenter - Environmental Education Teachers Conference of Dupage County

Presenter - Woodrow Wilson Foundation Outreach Program, Cleveland, OH

Co-instructor - Woodrow Wilson Foundation Outreach One-Week Program, Utica, NY

Co-instructor - Louisiana Science Teachers Association Conference, Lafayette, LA

Presenter - National Association of Biology Teachers conventions

Presenter - Hope College Science Day, Holland, MI

Presenter - Illinois Science Teachers Association conferences

Workshops & Institutes: Molecular Biology Workshop, E. Lansing, MI; Galapagos Natural History Tour; Marine Laboratory

Field Science, Jamaica; Woodrow Wilson Foundation Biology Teacher Institute, Princeton, NJ; Fast Plant Workshop,

Madison, WI; Human Genome Project Workshop, Kansas City, KS; Bioethics Workshop, Winnetka, IL

University of Chicago Outstanding Teacher Award

Volunteer: Habitat for Humanity - Jimmy Carter Work Project Cheyenne River Reservation, SD; Red Cross - Aide for Mississippi River Flood Victims

B.S. - Western Illinois University

M.S. - Northern Illinois University

If you would like applications for the 1995/96 OBTA Award from Illinois after January 1, 1996, contact: Mrs. JoAnne Edwards, OBTA Illinois State Chair, Wheeling High School, 900 S. Elmhurst Rd., Wheeling, IL 60090

THE DEADLINE FOR RECEIVING APPLICATIONS IS MARCH 1, 1996.

Paula Mylenki
Ohaus Corporation
29 Hanover Road/P.O. Box 900
Florham Park, New Jersey 07932-0900
Phone: 201/377-9000
Telex: 6853191 ohaus
Telefax: 201/593-0359

OHAUS AWARDS

For 26 years the Ohaus Corporation, a producer of educational balances and associated teaching aides, and the National Science Teachers Association have honored elementary, secondary and college level teachers for outstanding contributions to education through the *Gustav Ohaus Awards for Innovations in Science Teaching*. Named after Ohaus' founder, these awards provide recognition and a monetary award to teachers selected by the National Science Teachers Association from numerous entries submitted each year. The teachers are honored each year at the National Science Teachers Association Convention. The *Gustav Ohaus Awards* is one of the oldest award programs for science teachers in the country, with Ohaus awarding as much as \$7,000 each year to the winners. The program is open to teachers around the world. For more information on the award program, or for an application for the 1996 Gustav Ohaus Awards, call NSTA's Lori Dean at 703-243-7100. For more information on any of the winning projects, contact the winners for further detail.

1995 OHAUS/NSTA Award for Innovations in Elementary Science Teaching \$1,000 Award

Integrating Environmental Education Is a SNAP!

Contact: Jim Olson, South Elem. School, 805 S. Eighth Ave., Princeton, MN 55371; (612)389-6905.

With a \$500 School Nature Area Projects (SNAP) grant, Olson and the students of South Elementary School planned, designed, and built a nature area outside the school building. During the year-long project, Olson supervised "Green Teams" of student representatives from each grade level, who would discuss plans for the area, gather information and report back to the rest of the approximately 700 students.

The Green Teams visited local greenhouses and prairie restoration sites (including wetlands) to study and choose plant species native to the area to put in the nature area, participated in flower-bed and pond design contests, and visited a nursery to learn about the care and maintenance of trees. All of the students participated onsite to construct the North Nature area. The site consists of a "model prairie" with a wetlands (the pond), prairie wildflower beds, more than 30 trees, rolling hills, and several bird feeding stations.

\$750 Award

Take-Home Science Kit

Contact: Beverly Ellen Kingery, PO Box 115, Rt. 85 South, Van Elementary School, Van, WV 25206; (304)245-8811.

To increase the level of parents' involvement in students' science education, the Van Elementary School staff created a take-home science kit. The school obtained funding for one year to compile and maintain the kits, which include magnets, measuring apparatus, tangrams, fingerprint kits, seashells, rocks and minerals, skeleton/bones kits, stethoscope, microscope, telescope, geoboards, and calculators. The kits also include activity/instruction cards and an evaluation sheet that students complete jointly with their parents. Students at each grade level have one week to use the kits at homes.

According to Kingery, the project's most important benefit has been the students' increased positive attitude toward science, with students viewing everyday activities as science related. The kits were shown to enhance student achievement, parental involvement, and staff teamwork.

1995 OHAUS/NSTA Award for Innovations in Middle Level Science Teaching \$1,000 Award

Chemistry and Physics (CAP) Corps

Contact: Denise E. McCarthy, Ben Franklin Junior High, 1420 Eighth St. North, Fargo, ND 58102; (701)241-4731.

As project director of a new outreach science education program called the CAP Corps, McCarthy guided 11 ninth-grade students at Ben Franklin Junior High as they conducted hands-on science activities with sixth graders from area elementary schools during the 1993-1994 school year.

The student instructors individually spent six hours selecting, planning, organizing, and practicing hands-on chemistry and physics activities from classroom resource materials. Working in cooperative groups of threes and fours, each student instructor presented four 30-minute hands-on science activities and three to four demonstrations. The student instructors stressed necessary safety precautions, including the wearing of safety goggles, to the sixth graders before and during the demonstrations and hands-on activities.

Following the program, the sixth graders took home some simple materials they could use to show their parents what they had learned, including a copy of Ben Franklin Take-Home Experiments 1994. The project was continued in 1994-1995 as local support was obtained or renewed based on the initial successes of the 1993-1994 project.

\$750 Award

Animal Studies—A Team Approach

Contact: Sandra Jordan, Glen Meadow Middle School, PO Box 516, Vernon, NJ 07462; (201)764-1700.

For several years Jordan has placed her seventh grade students in small groups to encourage them to work cooperatively as they handle and closely examine live indigenous species of invertebrates and vertebrates without sacrificing the animals' well-being. Jordan provides enough animals so that every two students handles one animal specimen. Specimens represent six animal groups and include hydra, planaria, nightcrawlers, crickets, crayfish, goldfish, newts, frogs, and toads. Activities include observing animals eating, excreting wastes, and displaying preferences for light or dark, moist or dry environments, and companionship or solitude; measuring respiration rates in goldfish by the activity of their gill covers; and witnessing crayfish undergo at least one molt.

Jordan's approach can be adapted to both elementary and high school classrooms. It can replace dissection activities in non-college-prep classes, be used in conjunction with dissection software, or introduce high school dissection activities. Jordan says the project encourages students to develop an awareness and respect for living creatures.

1995 OHAUS/NSTA Award for Innovations in High School Science Teaching \$1,000 Award

Physics, Material Science, and the Environment

Contact: Arlene Vidaurri Cain, Sam Houston High School, Lake Charles, LA 70611; (318)855-3528.

Cain's project, designed to focus student awareness on the issues of waste reduction in research and industry, stems from the work she did for three summers at Sandia National Laboratory in Albuquerque, New Mexico. Cain modified a traditional design project to demonstrate the environmental ethics involved in research and development. Her multidisciplinary simulation involves the students in areas of chemistry, economics, environmental science, technical writing, video production, and physics.

Students work in "research and development" teams to design a new composite material to be used as a consumer product. Teams must consider environmental issues and incorporate the "Reduce, and Recycle" policy; work within a budget; and factor in disposal cost. Students use safe, common materials such as paper mache, plaster of paris, cotton and polyester fabrics, clays, rubber bands, and aluminum foil.

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Each team tests the new composite for flexibility and strength and compiles a report that describes their composite's physical properties, statistical data and test reports, environmental data, and recommendations for manufacturing and marketing. Students maintain a project journal and create a company portfolio documenting the design, production, and analysis of the composite. Finally to market their product and have it classified as environmentally friendly, teams create a one to one two minute video commercial.

**1995 OHAUS/NSTA Award for
Innovations in High School Science
Teaching
\$750 Award**

**Summer Science Research: High-Level Skills for
Inner-City Students**

Contact: Stanley Jay Shapiro, Midwood High School, Brooklyn, NY 11210; (718)859-9200.

To give inner-city Brooklyn youth a meaningful summer experience and to encourage them toward science careers, Shapiro and Midwood High School developed a summer science research program that is held at Brooklyn College and the State University of New York's (SUNY) Brooklyn Health Science Center. The program has three components: Beginning Skills in Science Research, Advanced Skills in Science Research and Mentored Project Research.

In the Beginning Skills in Science Research program, freshmen from Midwood do hands-on science work. Then have daily biology and chemistry labs, learn computer skills, visit a research hospital once a week, and learn how to use a modern research library.

In the Advanced Skills in Science Research program, 15 minority sophomores take an innovative advanced chemistry class, learn computer and library skills, and prepare for the SAT/PSAT. More than 50 graduated of the five-year program are attending top colleges as science or math majors. Five students have been Westinghouse Science Talent Search semifinalists; one was a Westinghouse finalist.

In the Mentored Science Research program, 48 juniors work five days a week in the laboratories of research scientists at a variety of area facilities.

**1995 OHAUS/NSTA Award for Innovations in
College Science Teaching
\$1,000 Award**

Playful Teaching; A Simple Teaching Strategy That Really Works.

Contact: Raymond Beisersdorfer, Dept. of Geology, Youngstown State University, Youngstown, OH 44555; (216)742-1753.

Beisersdorfer won the award for his innovative, "playful" approach to teaching geology. At the beginning of each class, for example, Beisersdorfer plays music. The music may be chosen in conjunction with a unit (for example, the tune "Hot Lave" combined with a discussion of volcanoes), or it may be chosen to set an exciting or soothing mood. The music plays again 25 minutes later when the class stretches and "rejuvenates".

The class is conducted interactively: Students are asked what they want to achieve in class and how they can best achieve it. Students prepare for tests by writing and answering potential exam questions, many of which later appear on the exam. The course also features a variety of hands-on activities to further involve students. Results are good: Attendance and grades are up, and students say they learn and retain more information.

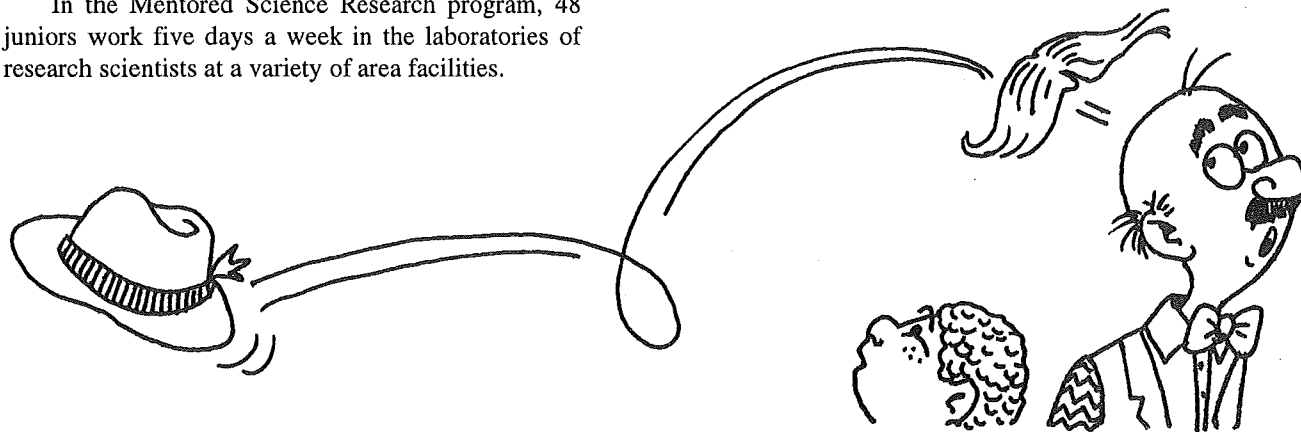
\$750 Award

Statewide Convention Tours Program

Contact: John Sode, 155 Home Economics Bldg., North Dakota State University, Fargo, ND 58105; (701)231-7103.

Sode won for his innovative program, the North Dakota Science Teachers Convention Tour, a way to promote and provide professional development and networking opportunities for teachers in rural areas. The program is based on the belief that national science/education conventions provide an invaluable means for enhancing teacher skills, for learning about new approaches to teaching, and for networking with colleagues.

Under Sode's leadership, teachers in North Dakota team up to attend national conventions. Sode offers advice on how to best learn at national meetings and how to transfer what is learned to the classroom. More than 120 science teachers participated in Sode's program last year and brought back new ideas to their classrooms.



Structural Engineers Association
of Illinois
203 North Wabash Ave., Room 1000
Chicago, IL 60601
(312)372-4198
FAX (312)372-5673

SEAOI ACKNOWLEDGES EFFORTS OF FUTURE ENGINEERS AT STATE SCIENCE FAIR

For the fifth consecutive year, SEAIOI was present at Illinois State Science Fair to judge and award the efforts of the next generation of structural engineers. The state wide educational competition is sponsored by the Illinois Junior Academy of Science and brings together the top 1000 science projects prepared by students at the junior high and high school level.

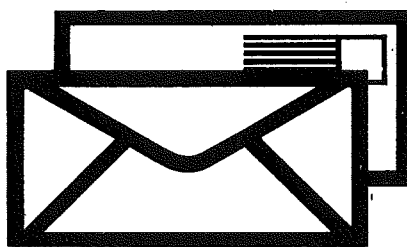
Selection of the top projects began at the school level with students competing against their classmates. The winners of the school competition advanced to the regional level where they competed against the top students from other schools. The winners of the regional competition met the other top 1000 students in the state at the University of Illinois in Champaign-Urbana on May 7, 1994.

Associate Member and Young Engineers Committee Co-Chairpersons Deb Zroka and Tim Laken represented SEAIOI in judging projects in the Engineering category. On behalf of the Board of Direction and all members of SEAIOI, a Certificate of Outstanding and a \$100 savings bond was presented to the top project entered in the category of Engineering Science. In addition, three students were awarded certificates of Honorable Mention and \$50 savings bonds for their projects. Through the presentation of these awards and acknowledgement of the effort put forth, SEAIOI is supporting and encouraging these young and future engineers to continue their interest in area of structural engineering.

Projects at this years fair covered a wide spectrum of engineering applications, including the construction and testing of bridges and related structures, levee construction, wind bracing systems of buildings, and studies of material properties and strengths.

At this years state science fair, SEAIOI presented the top award to Ryan Warhooover, an eighth grader at St. Stephen School in Caseyville, for his project titled "The Effect of Soil Composition on Levee Construction" which dealt with a comparison of different types of soil composition used for levee construction and determining which is most suitable. Honorable mentions went to the following students and their projects: Ravi Kasi, a seventh grade student at Hubble Middle School in Wheaton, for his project titled "The Effectiveness of Forces in Bridges" which dealt with analyzing two types of forces; compression and tension and their effect on bridge design; Douglas Yau, an eleventh grade student at Whitney M. Young Magnet High School in Chicago, for his project titled "The Elasticity of Concrete" which dealt with determining the elasticity of concrete and its breaking point; and Erin Hjertstedt, an eighth grade student at South Middle School in Arlington Heights, for her project titled "Battle of the Bridges" which dealt with determining whether a suspension bridge or truss bridge would deflect the least under different weights. Copies of the reports can be obtained through the SEAIOI office.

Our sincere congratulations to all students everywhere who worked to develop projects to test and investigate aspects of structural engineering. The future belongs to these young inventors and innovators, and to their spirit of discovery.



TOSHIBA/NSTA
Exploravision Awards
1840 Wilson Boulevard
Arlington, VA 22201

1995-96 TOSHIBA/NSTA EXPLORAVISION AWARDS COMPETITION

A battery-powered toothbrush, a milk carton with a pH indicator, a battery-powered wheelchair with a hydraulic lift, and a playground peacemaker—these are some of the future innovations from national finalist teams in the 1994-95 Toshiba/NSTA ExploraVision Awards competition.

Working in teams of three or four with a teacher-advisor, the students chose a present technology and envisioned how it might be used 20 years from now. More than 18,000 students in grades K through 12 from the United States and Canada entered the 1994-95 competition.

The 12 national finalist teams—four first-place and eight second-place teams—received a weekend trip to Washington, D.C., that included a press conference and visits on Capitol Hill.

In addition to a trip to the nation's capital, students on the first-place teams each received a \$10,000 U.S. savings bond, and students on the second-place teams each received a \$5,000 U.S. savings bond. The teacher-advisor and schools of the national finalist teams were awarded their choice of Toshiba products, such as laptop computers, copiers, TVs and VCRs.

Entry kits for the 1995-96 competition will be mailed to teachers in September. The deadline for entries is February 1, 1996. If you do not receive an entry kit by October 15, contact Toshiba/NSTA ExploraVision Awards Program, 1840 Wilson Boulevard, Arlington, VA 22201-3000; (703)243-7100 or call toll-free (800)EXPLOR-9 after September 1, 1995.

PRESIDENTIAL AWARDS FOR EXCELLENCE IN SCIENCE TEACHING

1995 STATE-LEVEL FINALISTS

Illinois

<u>Discipline</u>	<u>Level & Name</u>	<u>School</u>	<u>Home</u>
Elementary Science	Mary E. Sue Kerr	Washington School 400 South Charles St. Belleville, IL 62220 (618)277-2017	3301 Saratoga Dr. Belleville, IL 62221 (618)233-0796
Elementary Science	Elizabeth Trummel	Husmann Elem. Sch. 131 Paddock St. Crystal Lake, IL 60014 (815)459-7114	7513 Inverway Crystal Lake, IL 60014 (815)477-4477
Elementary Science	Jim Zimmerman	Thomas Paine Elem. Sch. 1801 James Cherry Dr. Urbana, IL 61801 (217)384-3602	1405 Kinch St. Urbana, IL 61801 (217)344-3778
Secondary Science	Nancy Kawecky Nega	Churchville Jr. High Sch. 155 Victory Parkway Elmhurst, IL 60126 (708)832-8682	15W620 Wrightwood Elmhurst, IL 60126 (708)832-0733
Secondary Science	Brian B. Poelker	Midwest Central Jr. H. S. 450 Southmoor St. Manito, IL 61546 (309)968-6464	103 Colony Court Manito, IL 61546 (309)968-7683
Secondary Science	David T. Workman	Illinois Math and Science Academy 1500 W. Sullivan Rd. Aurora, IL 60506 (708)907-5049	1560 South Hampton Dr. Aurora, IL 60506 (708)896-8121

CONGRATULATIONS TO ALL!

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SEPUP Sampler Kit - FREE Science Education for Public Understanding Program

SEPUP is now being distributed only through Sargent-Welch. If you want to know more about this hands-on Middle School Science program highlighting societal and environmental issues, **and receive a Free Sample Kit** illustrating one of the labs, call the Coordinator of Curriculum Products, at 800-727-4368.

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Sargent-Welch, are handy tools for budgetary estimates (for you and your Administrator!) of the costs associated with corresponding materials required for a new program. Call Sargent-Welch at 800-727-4368 with the name of the text and copyright date for a **FREE copy**.

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Looking for Grant Funding Sources

Call Sargent-Welch for list of companies and organizations offering equipment grants to science teachers at 800-727-4368.

New Science Program Equipment Proposals?

Sargent-Welch will prepare a new program Equipment Proposal customized to your school's new science program specifications. Contact Sargent-Welch at 800-727-4368 for details.

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Houston, TX 77204-5872**

Inquire about shipping costs for buying many manuals: 713-743-4948

TEN AGRISCIENCE TEACHING KITS: A SCIENCE LABORATORY LEARNING ADVENTURE FOR STUDENTS IN GRADES K-8

Science and Agriculture are linked together in the study of animals, energy, insects, plants, and soils. Such areas of study are crucial for today's students and their knowledge of the world they live in and will help to shape in the future.

These kits are available for use by teachers who teach science to students K through 8. These self-contained easy-to-use kits were developed by the College of Agriculture, University of Illinois, teamed with the Illinois State Board of Education, Department of Adult, Vocational, and Technical Education and the Facilitating Coordination in Agricultural Education staff. These kits help students learn science through agriculture.

Challenging experiments are a part of each of the ten AgriScience Kits.

Eggciting Experiments—Chick Incubation and Embryology

Students participate in a 5-week study of living organisms including incubation of chicken eggs, charting events as the embryos develop in the eggs, and observation and care of the hatched chicks.

Agriculture Renews Our Planet Growing Energy for the Future

Students compare soyink with petroleum based ink, make biodegradable plastics from corn, and compare renewable and nonrenewable natural resources.

Insects—Agriculture's Foes or Friends

Students study the parts of a grasshopper and compare it to close relatives, study and compare honeybee queens, drones, and workers, and study the role of the honeybee in plant pollination.

Probing Our Soils—Getting to the Roots of Agriculture

Students collect soil samples, study soil texture and structure, determine acid and base reactions, measure PH, compare moisture holding capacity of different soils, and examine the effects of soil erosion and pollutants.

Protein Providers—The Superb Soybean

Students examine the effect of water on seeds, learn the parts of seeds, compare monocot with docot seeds and plants, study the effects of temperature variations on seed germination and plant growth, and investigate the many uses of soybean products in our lives.

Animals in Agriculture—Their Growth and Development

Students compare common food products with a complete livestock feed, checking for protein, sugar, starch, fat, and vitamin C. They dissect a chicken wing, comparing it with the parts and functions of the human arm. Scale animal models are used to help learn about livestock weight estimates and weight gain.

Dairy Delights—Good Nutrition from Milk

This kit provides hands-on experiences for students as they become involved in demonstrating the processes of using milk and acids, enzymes, bacteria, heat, and cold to make glue, cottage cheese, yogurt, and ice cream.

Growing Better Every Day—Using Genetics to Improve Agriculture

Colored paper clips are used to illustrate genes and chromosome chains as students learn how traits are inherited by offspring from parents. A germination study of seeds which produce albino or normal green corn plants helps students understand genotypes and phenotypes. Students learn about probabilities of transmission of two genes from parent to offspring.

Agriculture Measures Up—Using Mathematics in Agriculture

Students compute the areas and calculate the perimeters of enclosures as they study the most economical use of fencing. A small jar of shelled corn is used to simulate a grain bin as students learn to estimate weights, numbers, and volumes. Students determine the amount of fertilizer needed for the lawn of a problem home after they have calculated the areas of the lot, house, garage, and driveway.

Rain or Shine—Weather's Effect on Agriculture

Students build a terrarium to observe the water cycle and compare the growth rates of three types of plants. Students build growth chambers to observe how various light colors influence plant growth. They use varying fertilizer rates in an attempt to grow layer, healthier plants.

Each of the ten AgriScience Kits are exciting for students for many ages.

Kit Titles

Grade Levels

Egg Experiments	K-8
Growing Energy for the Future	K-8
Insects	K-8
Probing Our Soils	2-8
The Superb Soybean	K-8
Animals in Agriculture	4-8
Dairy Delights	K-8
Growing Better Everyday	6-8
Agriculture Measures Up	3-8
Rain or Shine	K-8

For more information about AgriScience Kits contact:

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University of Illinois
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ZERO POPULATION, INC. ANNOUNCES NEW MATERIALS

POPULATION MATH KIT

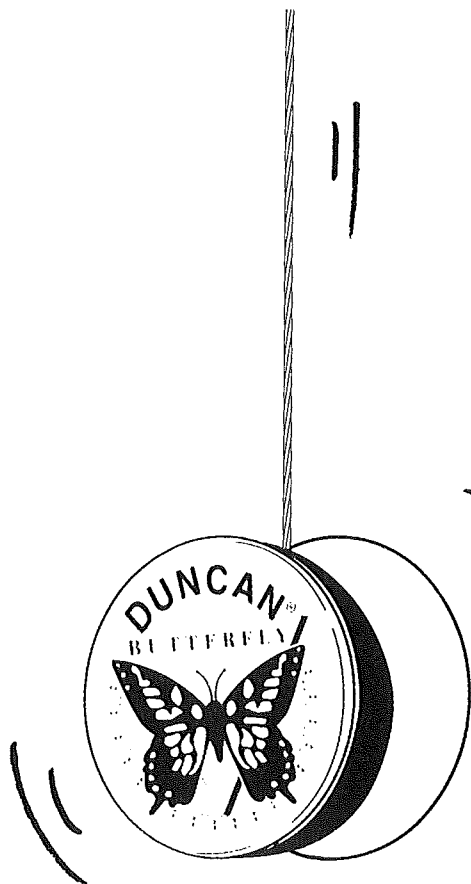
Zero Population Growth (ZPG) announces publication of its first teaching resource especially for math teachers. *Multiplying People, Dividing Resources*, ZPG's new teaching tool, contains 19 innovative math activities which closely adhere to the new national math standards urging teachers to bring real world data into the classroom.

While the activities are primarily written for the middle school math classroom, many are applicable for grades 5-10. The kit is designed to give students added practice with common math functions such as calculating percentages, working with large numbers, understanding exponential growth and graphing and interpreting data. Students also get a chance to see the applications of their math problem-solving in increasing their environmental I.Q. Topics such as population growth, carrying capacity, and people's use of land, water and food resources are covered in each activity.

In addition to the activities, each kit contains a teacher's guide, a World Population Data Sheet wall chart, and a survey of computer software for population education.

Multiplying People, Dividing Resources is available from ZPG for \$9.95 plus \$1.50 shipping and handling. To order a copy, contact ZPG Population Education Program, 1400 16th Street, N.W., Suite 320, Washington, DC 20036 or call 202/332-2200.

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ELEMENTARY KIT

Zero Population Growth (ZPG) announces publication of a new teaching kit for elementary educators. *Counting on People: Elementary Population and Environmental Activities* helps young people in grades 1-6 to understand their connections to other people, all living things and the world that sustains them.

The 150-page, spiral-bound book contains more than 40 innovative, hands-on activities to explain concepts such as population dynamics; water, mineral and energy use; waste production; wildlife protection; and the need to promote a quality future for all people. Every chapter is enhanced with charming, colorful illustrations and delightful poems and songs, including ditties from Pete Seeger and *Sesame Street*.

A truly interdisciplinary resource, the book's activities develop knowledge and skills applicable to elementary science, social studies, math, language arts, family life education, as well as the visual and theater arts. The "Teacher's Guide" at the beginning of the book clearly outlines which activities are appropriate for each subject area. All of the activities in *Counting on People* are designed to engage students' imaginations. A variety of teaching strategies are included to meet the needs of different educators and their individual teaching styles. Students might simulate pandas in the wild trying to amass enough bamboo to stay alive, observe the growth of a fruit fly population in a simple lab, audit their home water use, interview recent immigrants to find out why people migrate, or form a "millipede stampede" to see how much cooperation is needed for a group to move as one. Each activity strives to form lasting impressions for building young students' environmental stewardship and global citizenship.

Counting on People: Elementary Population and Environmental Activities (150 pp.) is available from ZPG for \$19.95, plus \$3.00 shipping and handling. To order a copy, contact ZPG Population Education Program, 1400 16th Street, NW, Suite 320, Washington, DC 20036 or call 202/332-2200.

POPULATION EDUCATION KITS FOR KIDS AND TEENS

Zero Population Growth, Inc., announces the release of *Kids' PACK* and *Teen PACK* (Population Awareness Campaign Kits). These free information and action kits are designed to educate and activate young people on population and environmental issues through stories, articles, games, and concrete ideas for making a difference.

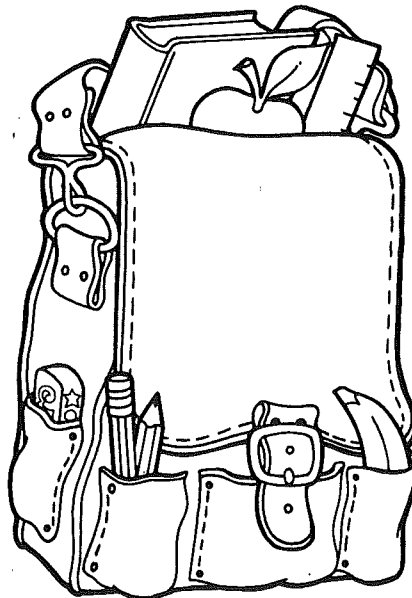
In *Kids' PACK*, elementary students write their own booklets on their "place on the planet," observe the effects of crowding in a home gardening activity, and "catch" pollution around their neighborhoods. After identifying the challenges of environmental protection and population pressures, children learn how to use the "power of the pen" in crafting messages to newspaper and magazine editors of their favorite publications, as well as to their legislators. *Kids' PACK* even includes zany stickers, brainteasing word games, and a pull-out poster of "Amazing Eco Facts and Figures."

Teen PACK, geared for students in grades 7-12, includes letter writing tips, plus ideas on starting petition campaigns, and suggestions for writing research papers on population and environmental topics. Readers of *Teen PACK* find out about trends in population growth, land use and resource consumption, and meet other teens who have become "eco-heroes" through local projects. The *PACK* also contains the global simulation game, "Food for Thought," for use in youth groups, ecology clubs and class projects. Enclosed in each *Teen PACK* is a colorful art poster depicting people living harmoniously with other creatures amidst the planet's natural beauty.

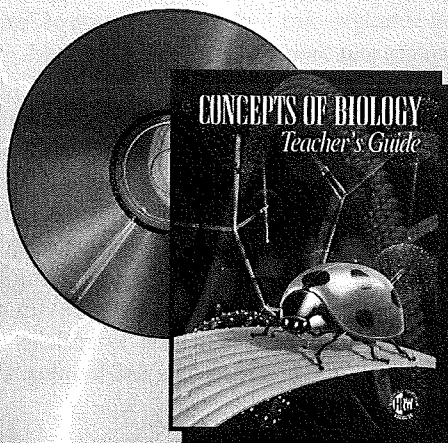
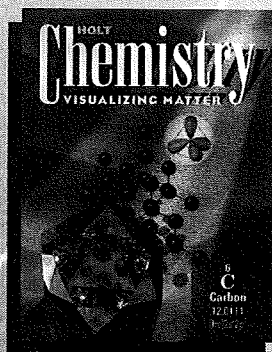
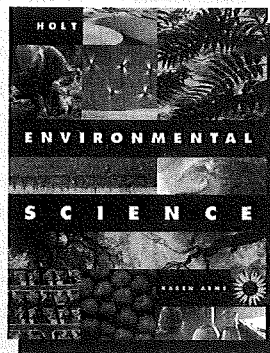
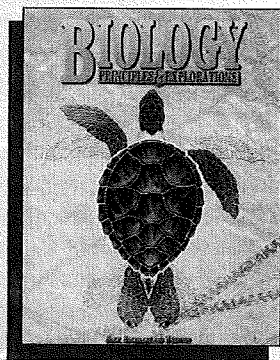
"Kids and teens may not realize the influence they can have over lawmakers, publishers and community leaders when they express themselves on vital issues which affect their future," says Pamela Wasserman, ZPG's Director of Education. "We hope the *PACKs* will educate, entertain and empower young people to be responsible, caring citizens."

Kids' PACK and *Teen PACK* were developed by ZPG with funding from a number of foundations including The Pew Charitable Trust for Global Stewardship and the Educational Foundation of America. They are each available free of charge upon request. Teachers and youth group leaders should inquire about quality orders. Contact: ZPG Population Education Program, 1400 16th Street, N.W., Suite 320, Washington, DC 20036; (202) 332-2200 (voice); (202) 332-2302 (Fax); zpgpoped@igc.apc.org.

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



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Teach about water in a whole new way using *Water Matters, Volume 1*, a new publication from the National Science Teachers Association (NSTA) that features colorful educational posters and an accompanying Teacher's Guide. Designed for grades 3-8, but also useful to higher grades, the three-volume *Water Matters* series uses bright, eye-catching posters by the U.S. Geological Survey and other groups to bring the subject of water to life.

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- "Water: The Resource That Gets Used and Used and Used for Everything"
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- "Wetlands: Water, Wildlife, Plants, & People!"

The kit contains each poster in both an elementary and a middle-level version. Look to the 32-page Teacher's Guide for ideas on how to connect these water themes to math, language arts, geography, and art curricula.

Water Matters, Volume 1, costs \$14 plus \$3.75 shipping and handling. To order, contact NSTA Publications Sales, 1840 Wilson Blvd., Arlington, CA 22201-3000; 800-722-NSTA.

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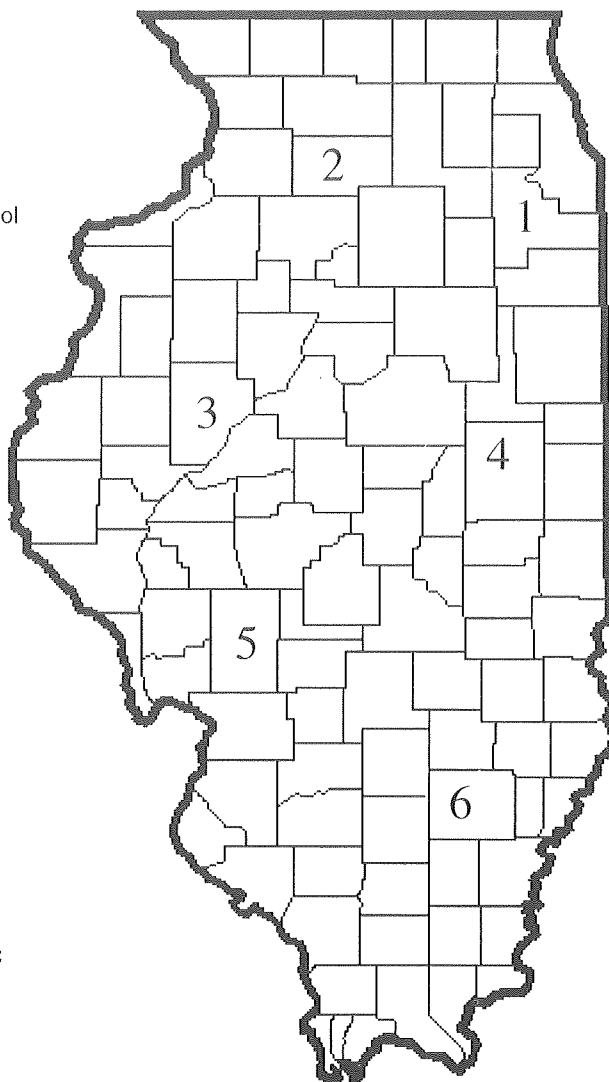
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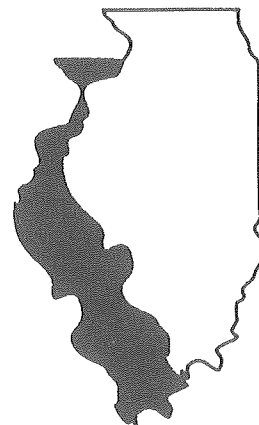
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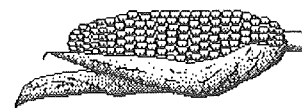
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