Ecology in Action:

Biodiversity Field Studies

Volume III

The Paul F-Brandwein
Summer Leadership Institute

Ecology in Action: Biodiversity Field Studies

The 2002 Paul F-Brandwein Summer Leadership Institute

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The Paul F-Brandwein Institute
Unionville, New York

This publication is dedicated
To All Teachers Everywhere
And To Mary Brandwein
Who saw the future in the past.

The F-Brandwein Summer Leadership Institute program is supported by a grant from the Toyota USA Foundation, the Brandwein-Morholt Trust and the Pocono Environmental Education Center.

Designed by Thomas Thornton
Edited by Helen Conover
www.brandwein.org

Contents

"Nature has been for me, for as long as I remember, a source of solace, inspiration, adventure, and delight; a home, a teacher, a companion."

Lorraine Anderson

Message From The Chairwoman The Paul F-Brandwein Institute

In 1997 I wrote in The First Paul F-Brandwein Symposium publication about the establishment of the Brandwein Institute. I explained how my husband, Paul F-Brandwein, and I, with our friend, partner and colleague, the late Evelyn Morholt, had planned for more than twenty years to establish the Rutgers Creek Wildlife Conservancy in Greenville, New York. We incorporated the Brandwein-Morholt Trust as a nonprofit organization just before Paul died in September 1994.

Mary Brandwein

Evelyn suggested that we talk to Jack Padalino, then the president of the Pocono Environmental Education Center, or PEEC. Jack had known Paul who was one of PEEC's first trustees, and they shared similar views on the environment, conservation, and education.

Jack agreed to help and brought Bill Hammond of Florida and Alan Sandler of Washington DC to Rutgers Creek, to analyze its possibilities for conservation education. Other experts – botanists, environmentalists, a water quality specialist and ornithologist – visited and admired the property's beauty, flora, fauna and waterways. Jack also brought international visitors – Russian teachers, children and scientists. Junior Natural Scientists visited and helped Fred Tetlow set out 10 bluebird boxes.

Dean Bennett from Maine, Marily DeWall from Washington, DC and Keith Wheeler from Vermont joined Bill, Alan, Jack and I to plan future activities at Rutgers Creek. After that meeting, we met four times a year. In 1996, the advisors decided unanimously to locate the Paul F-Brandwein Institute on the grounds of the Conservancy. The Institute was born, a joint effort of the Brandwein-Morholdt Trust and PEEC. Advisors became board members, PEEC received an endowment for an annual Brandwein lecture series, and the Institute convened 17 scientists and teachers to Milford, Pennsylvania as newly selected fellows. In November 1997 the Institute fellows met for the first Paul F-Brandwein Symposium.

In 1999 the Institute received a grant for a series of three Summer Leadership Institutes at PEEC and the Rutgers Creek Conservancy. The first was held in 2000, the third and final Summer Leadership Institute was held in July 2002. The Fellows now include 78 scientists and teachers, all of whom correspond with each other through a list serve. Hundreds of ideas, suggestions and helpful information are shared in this way. The Ecology in Action: Biodiversity Field Studies publications consist of three volumes. Sixty exemplary teachers have participated in the summer programs.

The dream has come to fruition. More plans are being made for the future. The Board, the Fellows and I are committed to Paul's dream of a viable conservancy serving children, teachers, and scientists interested in a thriving environment.

– Mary Brandwein

www.brandwein.org

"Study nature, not books"

Louis Agissiz

Mission Statement

Reflecting the wisdom of Paul F-Brandwein – author, teacher, scientist, publisher, conservationist, and humanitarian – the Paul F-Brandwein Institute educates people to recognize their responsibility for sustaining a healthy and healing environment. Paul F-Brandwein Institute programs help all learners develop an understanding of the symbiotic relationship between humans and the environment.

About the Paul F-Brandwein Institute

Established in 1996 as a collaboration between the Brandwein-Morholt Trust and the Pocono Environmental Education Center (PEEC), the Paul F-Brandwein Institute (BI) perpetuates the legacy of Paul F-Brandwein through environmental education. BI programs nurture the gifts and talents of all learners at all levels and foster skills, concepts, and values basic to environmental decision making within a global context. By bringing together students, educators, and scientists, BI educational programs encourage an "ecology of achievement," allowing ideas to form and be tested through meaningful research and fieldwork. There programs integrate the natural wealth of biodiversity at the Rutgers Creek Wildlife Conservancy (Greenville, New York) with scientific investigation, creative analysis, and state-of-the-art technological research tools. In this way, education and conservation of the environment become intertwined.

Paul F-Brandwein (1912-1994)

Scientist

Born in 1912, Paul F-Brandwein (PFB) immigrated to the United States from Austria prior to WWII. Paul's interest in science began quite early, partially owing to the time he spent in hospitals with childhood arthritis. Though the condition cut short a career in piano, his love for the instrument remained strong throughout his life. PFB became an assistant at the Littnauer Pneumonia Research Laboratory in New York where he worked while completing his bachelor of science from New York University (NYU). This early start in original research had a great impact on the direction of his studies and philosophy on education. By 1940, upon completion of his masters and doctorate studies at NYU, PFB was secure in the belief that "the best way to encourage the young in science was to help them early to do original work."

Teacher

Paul's experience as an educator began at George Washington High School. He moved on, through the 1940s and into the mid 50s, to serve as a member and later as chair of the science department at Forest Hills High School. There he piloted a program encouraging students to do original work in science. It has been suggested that more of Paul's students won the prestigious Westinghouse Science Talent Search than those of any other teacher.

Author

An accomplished author, PFB began publishing science textbooks in 1946, revolutionizing the way science was taught throughout the country. Disappointed with lecture and textbook-based teaching, Paul developed classroom materials based on investigation, research, and analysis. His widely used grade-specific series, *Concepts in Science,* pioneered the style of hands-on, investigative, science education that generations of students have come to experience as the norm. Even so, Paul remained aware of the limitations inherent in any textbook. To forward innovative education methods, he joined with scientists and educators on the Sputnik science project. Additionally he served on the Steering Committee of the Biological Sciences Curriculum Study, as chair of its Gifted Student Committee, and as consultant to the Physical Science Study Committee. Through these committees, PFB strengthened the presence of programs designed to interest high school students in science through "originative" inquiry.

Humanitarian

Always concerned with and committed to a vision of equity in education, PFB strived to improve education for the students he believed to be most neglected: the disadvantaged and the gifted. He once said, "We do pretty well for the 80 percent of the students in the middle. But the 10 percent at the top and the bottom: we grind them under our feet!" Based in his belief of equal access to opportunity, he promoted self-selection by interested students rather than assignment based on testing.

Philosopher

Lifelong research and experience with education led Paul to develop the concept of an "ecology of achievement" whereby "the school-community ecosystem acts in mutualism with cultural and university ecosystems." With this analogy to the relationship of students, educators, scientists, and the community at large, PFB expressed the necessity for integrating education with life and community. Drawing a distinction between "schooling" and "education," PFB emphasized the impact of the community on the school rather than vice versa. Refusing to allow schools to shoulder the blame for society's ills, he saw the quality of schools as symptomatic of the state of the community. "Specific communities get the kind of schools their economic and social conditions permit; it is simplism itself to blame schools for the plight of the community or of society."

Conservationist

In addition to his involvement with primary and secondary education in the United States, PFB participated in many roles with graduate and undergraduate institutions throughout the world. He was education director and later co-director of the Pinchot Institute for Conservation Studies at Grey Towers in Milford, Pennsylvania. This position combined his interests in education and conservation. The Rutgers Creek Wildlife Conservancy, established by Paul and his wife Mary, has been administered by the Brandwein-Morholt Trust since Paul's death in 1994. In affiliation with the Pocono Environmental Education Center, the Conservancy serves as a site for educational programs and research. The Paul F-Brandwein Institute advances Paul's intention for the land as a place of learning and discovery for students, teachers, scientists, and those interested in natural systems and the environment.

Evelyn Morholt (1914-1995)

Evelyn Morholt was a long-time friend of Paul and Mary Brandwein, and a former science teacher with PFB at Forest Hills High School. Over the course of her long career, Evelyn served as editor of **The Teaching Scientist** *(Federation of Science Teachers, New York City), chair of a New York City high school science department, and acting examiner for the New York Board of Education. She wrote nine books, and the most recent (in 1986, with PFB),* **A Sourcebook for the Biological Sciences** *(3rd ed.), is still an important resource for science education.*

Evelyn Morholt bequeathed her home to the Brandweins in 1994. Her house, which is close by the Brandwein residence, currently contains the BI offices and herbarium.

The Brandwein Summer Leadership Institute Sites

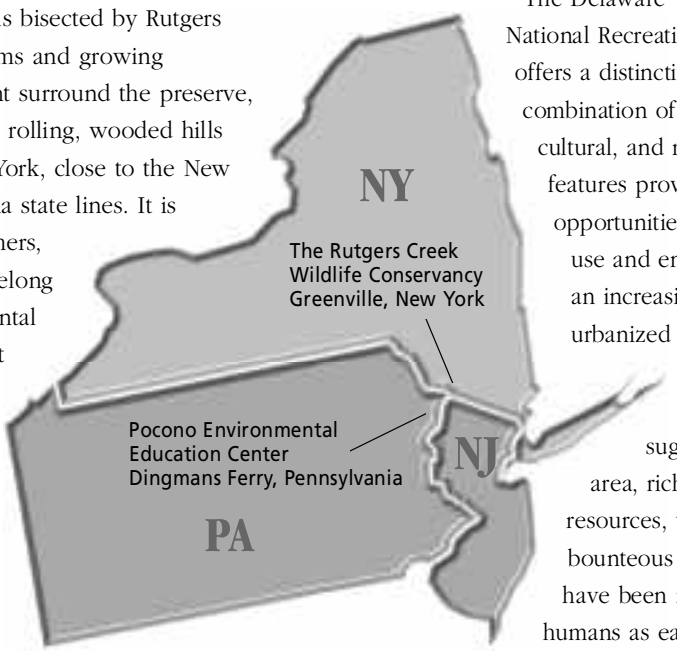
The Rutgers Creek Wildlife Conservancy Greenville, New York

The Paul F-Brandwein Institute is located on the 77-acre Rutgers Creek Wildlife Conservancy preserve, with its offices in the former residence of Evelyn Morholt. The Conservancy land was farmed until the 1960s, and is now wooded and houses diverse wildlife habitats. The land is traversed by stone walls marking the former fields, and is bisected by Rutgers Creek. Active dairy farms and growing residential development surround the preserve, which is located in the rolling, wooded hills near Greenville, New York, close to the New Jersey and Pennsylvania state lines. It is used by students, teachers, scientists, and other lifelong learners for environmental studies. Two houses sit on the property: the former residence of Evelyn Morholt and the Brandwein home, a farmhouse dating from the mid-1850s. In addition to the BI offices and herbarium, the Morholt residence will eventually house laboratory, exhibit, and classroom facilities.

Pocono Environmental Education Center Dingmans Ferry, Pennsylvania

The Pocono Environmental Education Center (PEEC) is the Western Hemisphere's largest residential environmental education center. PEEC annually serves more than 22,000 students, including children, families, teachers, scientists, and other lifelong learners. More than half a million people have visited PEEC since it was established in 1972.

Its 38-acre campus sits on the escarpment of the Pocono plateau and within the 67,000-acre Delaware Water Gap National Recreation Area (a national park). Surrounding parklands and Nature Conservancy lands offer visitors over a quarter million acres for study. PEEC, a nonprofit organization, works in partnership with the U.S. Park Service.



The Delaware Water Gap National Recreation Area offers a distinctive combination of natural, cultural, and recreational features providing opportunities for public use and enjoyment in an increasingly urbanized region. Current theories suggest that the area, rich in resources, wildlife, and bounteous forests, may have been inhabited by humans as early as 8500 BC. Approximately 40 miles of the exceptionally unpolluted Delaware River lie within the park's boundaries. The area's geologic and natural features form scenic landscapes and typify landforms and biotic areas of the Appalachian Mountains. The park encompasses elevations from 500 to 1,500 feet, which contain diverse habitats for plants, invertebrates, amphibians, reptiles, birds, mammals, and fish. The park's mission is to provide outdoor recreation opportunities while conserving its natural, cultural, and scenic resources by working cooperatively with surrounding communities and the public.

Summer Leadership Institute Overview

For the third year the Brandwein Summer leadership Institute (BSLI) 2002, with support from the Toyota USA Foundation and the Paul F-Brandwein Institute, offered K-12 teachers nationwide environmental fieldwork and workshop experiences. The goal is to develop a cadre of teacher/scientist mentors who will share their expertise with other teachers and students nationwide.

The BSLI focuses on providing teachers with science content and strategies for facilitating student/scientist interactions. Scientists, educators and resource specialists participate by teaching and mentoring BSLI teachers both in the field and after the summer institute. In addition of having opportunities to share information and collegial interactions, participants explore the cultural and natural features of the Pocono and Southern New York State area, and spend a day in New York City.

A committee of master teachers, field scientists and members of the BI Board of Directors select twenty outstanding science teachers. They use various criteria, including experience with student fieldwork, interest in environmental education and inquiry-based teaching, and the desire to share knowledge and expertise with other teachers.

The 9-day BSLI concentrates training in four areas:

- Long-term ecological research
- Technology for field-based inquiry
- Assessment strategies for field-based learning
- Funding techniques

The participants become Brandwein Fellows, a select group of scientists and educators recognized by the Institute. In the future, they educate and mentor others to accept responsibility for sustaining a healthy and healing environment.

Each participant receives $1,200 to lead at least three workshops, sharing what they learned at the BSLI. Over the next two years, addition funding is available for expanded outreach. The Fellows remain in contact through an email list service through which they can share resources, experiences, and projects.

In the spring the Brandwein Fellows meet at a luncheon following the Brandwein Lecture at the National Science Teachers Association National Convention (NSTA).

The 2002 Brandwein Summer Leadership Institute participants

"There is nothing in which the birds differ more from man than the way in which they can build and yet leave a landscape as it was before."

Robert Lynd

The BSLI Focus

At the first Brandwein Symposium in 1997, a forum of scientists and master teachers convened where participants discussed and determined priority needs for improved field-based science education. This symposium included several Toyota TAPESTRY awardees, and was the first meeting of Brandwein Fellows. The BSLI is designed to address needs identified by the Brandwein Fellows.

Implementing long-term ecological research

At the Rutgers Creek Wildlife Conservancy, BSLI teachers learn to conduct long-term ecological research techniques for use with students. The first BSLI (BSLI-2000) focused on terrestrial biodiversity studies using the Smithsonian Institution's Monitoring and Assessment of Biodiversity (SI/MAB) protocol for establishing and monitoring biodiversity plots. The SI/MAB protocol has been implemented by scientists and educators at 62 sites around the world.

In addition to terrestrial studies, BSLI teachers conduct aquatic studies in Rutgers Creek. Both low tech and high tech approaches to water quality data collection are used.

Integrating field-based inquiry with the latest technology

Teachers need access to and training in the latest technology used by scientists in order to share with students authentic science experiences. With this in mind, the BSLI is designed to provide ample opportunities for teachers to use technology and to explore ways of integrating it successfully into student field studies. At the BSLI, teachers work with the latest software for analysis, mapping, displaying, and communicating results.

Prior to the BSLI-2000, a Web-based e-mail list service for BSLI participants and resource people was set up. This forum enables teachers to share resources, files, and discussions. After the summer institute, teachers continue posting to the forum, sharing resources and developing new collaborative projects for sharing student-collected data over the Internet. This online list service is an easily accessible means of continuing the collegial relationships formed among participants and resource people during the BSLI.

While in the field, BSLI teachers use hand-held Global Positioning System (GPS) units within their study quadrats, and transfer these data into a Global Information System (GIS) mapping program. In computer labs, teachers learn to merge field data with databases containing geological, soil, topographical, and other data to create rich "overlays" of their study sites.

Representatives from companies such as PASCO, Inc., demonstrate high tech water quality testing devices. Teachers use the equipment themselves, and then learn to graph and analyze the data.

Exploring alternative assessment strategies

Increased student test scores is only one measure of a program's success. It is more likely that quality environmental science education programs will be assessed, in part, by measuring increased understanding of environmental principles by the public. BSLI participants discuss and devise methods to measure the success of problem-based, environmental science field study. They create instruments to measure field-based learning and evaluate alternative

"A true conservationist is a man who knows that the world is not given by his fathers but borrowed from his children."

John James Audubon

assessments and performance-based examinations. Participants find ways to measure not only what students have learned, but also whether their learning has had an impact on them, on their society, and/or on the environment. Teachers and scientists review different models and metrics to enable them to demonstrate effectively the success of the inquiry approach to field investigations.

Exploring funding resources

Sustainability is a key point for teachers attempting to implement long-term ecological field studies. Many teachers do not know where to begin when it comes to locating funding sources and writing grant proposals. The BSLI includes sessions to help teachers in this area. The sessions provide grant-writing tips and resources, and advice and perspectives from successful grant writers and grant readers. BSLI participants test their own grant-writing skills by preparing a proposal for use of their $1,200 Brandwein outreach grant.

The BSLI Impact

There is a reluctance to teach environmental education in a great many school districts today. The leading reason for this resistance is the lack of teachers prepared to teach scientific principles in the context of the environment.[1] The BSLI addresses this need by building a cadre of science teacher leaders who are trained in environmental field techniques and who then mentor numerous teachers and students throughout the country. This group will grow to include 60 BSLI-trained teachers during the three-year period of Toyota funding.

Paul F-Brandwein said that mentoring was a key ingredient in successful science education. Scientists, educators, and resource specialists participate in the BSLI, presenting sessions, facilitating ecological fieldwork and technology training, and serving as mentors to BSLI teachers in the field and after the summer institute. Teachers take their BSLI training back to their schools, where they mentor students and other teachers in ecological field studies. In addition, teachers are encouraged to contact resources in their community, and to bring in scientists and others who can mentor students.

To maximize the BSLI's impact, participants are selected from a pool of recognized outstanding science teachers including Presidential Awardees in Science Teaching, GTE GIFT Awardees, and Toyota TAPESTRY awardees. By drawing from this group, the BSLI includes many teachers who have already demonstrated excellence and leadership in their profession. In addition, BSLI participants have done extensive student field studies and have demonstrated an interest in the environment and eagerness to share their knowledge with colleagues.

BSLI participants agree to do a minimum of three workshops to share the fieldwork protocols and to help other teachers implement similar projects. Each Brandwein Fellow is expected to reach a minimum of 90 additional teachers through post-BSLI training sessions in the coming year. Venues for these outreach activities include presentations at national and regional NSTA conventions, state and local teachers meetings, and school and district inservice days.

Over the course of Toyota funding, the BSLI will provide training, resources, and mentoring for environmental fieldwork to an estimated 7,500 teachers nationwide.

[1] *Teaming with Life: Investing in Science to Understand and Use America's Living Capital. President's Committee of Advisers on Science and Technology. OSTP. March 1998.*

BSLI Participants

2002 BSLI Participants

Marie Brett
Peabody Veterans Memorial High School
Peabody, Massachusetts

Deborah Comelison
Byng Junior High School
Ada, Oklahoma

Patrica Dick
Blatchley Middle School
Sitka, Alaska

Christine Donovan
Desert View High School
Tucson, AZ

Jane Evans
Mid Valley Secondary Center
Throop, Pennsylvania

Christina Francis
Friends of Van Cortlandt Park
Bronx, New York

Polla S. Hartley
Spalding Academy
Spalding, NE

Steve Holiensed
Gunter High School
Tom Bean, TX

Hector Iberra
West Branch Middle School
West Branch, Iowa

Emily Janke
Darrow School
New Lebanon, NY

Marilynn Opper
Alexander W. Dreyfoos, Jr.
West Palm Beach, Florida

EllaJay Parfitt
Southeast Middle School
Baltimore, Maryland

Julie Polak
Pewamo-Westphalia High School
Pewamo, Michigan

Jan-Petrina McCarty Puhl
Soubegan High School
Amherst, New Hampshire

Judy A. Reeves
Tongue River Middle School
Ranchester, Wyoming

Mary Smigel
Emporia High School
Emporia, Kansas

Jo Ann Staiti
Winchester Public Schools
Winchester, Massachusetts

Jonathan Stern
New Paltz High School
New Paltz, New York

Brandon Thacker
R.L. Paschal High School
Ft. Worth, Texas

Ian Turoff
Navarre High School
Navarre, Florida

2001 BSLI Participants

David Awtrey
Washburn High School
Washburn, Wisconsin

Kevin Baker
Dennis-Yarmouth Regional High School
South Yarmouth, Massachusetts

David A. Billesbach
Covington High School
Covington, Louisiana

Don Bogdanske
Ripon High School
Ripon, Wisconsin

Nancy Bruce
Circle J-Norris Ranch, Tulare
Springville, California

Mary Jane Davis
Red Bank Catholic High School
Red Bank, New Jersey

Connie Green
Mabelvale Middle School
Mabelvale, Arkansas

Maxine A. Henry
Forest Park Elementary School
Crystal Falls, Michigan

Tracy D. Hollis
Natural Science Education Center
Grand Prairie, Texas

Randy Laurence
Eagle Pass High School, CC
Eagle Pass, Texas

Judy A. Lee
Blocker Middle School
Texas City, Texas

Gilda Lyon
Howard School of Academics & Technology
Chattanooga, Tennessee

Carolyn R. Maragh
Louisa May Alcott Elementary School
Chicago, Illinois

Patricia McGinnis
Arcola Intermediate School
Norristown, Pennsylvania

Joyce A. Nishimura
Woodward Middle School
Bainbridge Island, Washington

Robert Oddo
Horace Greeley High School
Chappaqua, New York

George M. Radcliffe
Centreville Middle School
Centreville, Maryland

Gary Swick
Dundee Crown High School
Carpentersville, Illinois

Harry Weekes
The Community School
Sun Valley, Idaho

Ronald Wilmot
Akron-Westfield Community School
Akron, Iowa

2000 BSLI Participants

Vernon R. Beeson
Banks High School
Banks, Oregon

Allen R. Bone
East Middle School
Butte, Montana

David L. Brock
Roland Park Country School
Baltimore, Maryland

David E. Brown
St. Peters School
Quincy, Illinois

Gary L. Endsley
Texas Rural Systemic Initiative
Jefferson, Texas

Miguel A. Germain
Miami Sunset Senior High School
Miami, Florida

Lura Hegg
Colony Middle School
Palmer, Alaska

Thomas D. Hennigan
DeRuyter Central School
DeRuyter, New York

Larry M. Hodgson
Linford Elementary School
Laramie, Wyoming

Jenelle D. Hopkins
Centennial High School
Las Vegas, Nevada

D.J. Huddleston
Page Middle School
Page, Arizona

Susan Jeffries
Collegeville Elementary School
Bryant, Arkansas

Lori L. Kindsvatter
Pewamo-Westphalia High School
Pewamo, Michigan

Ruth Krumhansl
Soubegan High School
Amherst, New Hampshire

Timothy Maze
Tongue River Middle School
Ranchester, Wyoming

Marilyn K. McComber
Emporia High School
Emporia, Kansas

Connie B. Petruskevich
Somerset High School
Somerset, Texas

Paul M. Schlotman
Soubegan High School
Amherst, New Hampshire

Blake Sills
R.L. Paschal High School
Ft. Worth, Texas

Anne L. Tweed
Eaglecrest High School
Aurora, Colorado

BSLI 2002 Teacher-Participants

Applicants expressed their desire to study, learn and teach, as well as detailing their abilities and interests.

Marie Brett
Peabody Veterans
Memorial High School
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Peabody, MA 01960
978-531-1600

I have been teaching in the Peabody Public Schools for 35 years. I spent the first six years teaching grades 7,8and 9. I taught life science and biology as well as general science. In 1973 I started teaching at the high school. Over the past 30 years, I have taught the gamut. Since I majored in Biology at Northeastern University, I had a versatile background. I have taught Chemistry, Biology all levels as well advanced Biology, Anatomy and Physiology, Environmental Science and Ecology. It was when I was teaching Biology using the BSCS Green version that I came to really enjoy teaching the environmental sciences. I taught Environmental Science at the High School and began to use the land surround our school to teach freshwater and terrestrial ecology. Our studies included air and water pollution as well, unfortunately there were lots of examples for our classes to focus on. Peabody was at one time the tanning capital of the world and subsequently was the product of urban sprawl. Our environmental program was geared for lower level students and I noticed that a lot of college bound students showed a great interest in the course but were reluctant to take it because of a lack of college credit. In 1989, I developed the curriculum for our honors Ecology course. It has been proven to be a very popular course not only with those students that have a scientific interest but those with a more societal conscience.

I have enjoyed many summer programs having to do with Ecology and Biodiversity. My first introduction was with the TERC group. We spent three weeks in the Catskill Mountains in New York. It was a wonderful learning experience that helps sustain a large portion of my curriculum. One of my best experiences was with the Earthwatch Program. I was able to do whale and dolphin research in the Bahamas for several weeks. I was with people from all walks of life, it was the best group that I've ever been a part of. The summer before last, I spent a month at Princeton University participating in the Woodrow Wilson Teacher Institute for Biodiversity. It was the ultimate learning experience, I think that I am still digesting all the information. My group did a module on Ethnobotany and has our lessons on the Woodrow Wilson website that I have used with my own classes.

Tide Pool Studies, Halibut Point, Rockport

Identifying and Measuring Marine Animals

Microscopic Identification of Plankton

Deborah Cornelison
Byng Junior High School
Route 3 Box 215
Ada, Oklahoma 74820
cornel@byngschools.com

Deborah Cornelison is a National Board Certified Teacher with seventeen years of teaching experience. She received a BS degree in biology and a MEd in secondary education from East Central University in Ada, Oklahoma. As an ECU adjunct instructor, she taught General Biology and General Physical Science for three years before accepting her current position in 1988. She teaches ninth grade physical science and grades 9-12 science research in the rural district, Byng Schools. Deborah also teaches science to high school students in two federally funded programs at the local university on Saturdays and during the summer.

Deborah has mentored more than 260 individual student laboratory and field research projects in all areas of the natural sciences. Her students spend months planning and implementing their projects, analyzing data, and preparing presentations for regional, state, national, and international competitions. Six of her students have advanced to the Intel International Science & Engineering Fair in the past five years. As one example, a high school junior will continue her environmental studies under Deborah's supervision this year. Last year she studied the use of vermicompost as an alternative to chemical fertilizer, winning first place in the high school environmental category at the state science fair. Her 9th grade project, "The Effects of Wood Ash Disposal on Soil Chemistry and Growth of Phaseolus vulgaris" placed at three state competitions—science fair, junior academy of science, FFA agriscience—and won 1st place in the junior high environmental category of the National FFA Agriscience Fair.

"The Brandwein Summer Leadership Institute allowed me an opportunity to reconnect with the outdoor world, refocus on science in the field, and become part of a dynamic network of peers and experts. I plan to introduce aquatic and terrestrial studies to students and teachers in my district, so that their connections to our environment might also be strengthened."

Deborah will use the Brandwein Institute grant to purchase equipment and supplies for the field studies. Part of the grant will also be used to travel to a regional NSTA convention to be part of a presentation to other science teachers.

Brandwein Institute Grant Proposal:

Deborah will use the Brandwein Institute grant to purchase equipment and supplies for the field studies. Part of the grant will also be used to travel to a regional NSTA convention to be part of a presentation to other science teachers.

Patricia L. Dick
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Sitka, Alaska
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I was raised in West Texas and attended a university there for two years. I metand married my Texan husband, Ronald Dick in Seattle in 1971. We moved to Colorado for 8 years and had two daughters at our home 9,000 feet up in the mountains. Collauna (Cherokee for Raven) was born in l977, and Chohla Agehya (Cherokee for Cardinal Woman) was born in l979. I wanted more than anything to have a healthy and happy family. I started an apprenticeship learning about Native American herbal medicine with a Mohawk medicine woman about 1979. We moved to Alaska in l985 and I got my Bachelor of Science degree and my teaching certificate in 1989. I immediately started teaching at Mt Edgecumbe High School for two years and then found my teaching home at Blatchley Middle School in l990. Through the years I have tried to teach my 6th grade science students about the environment we live in. I have focused on the same lessons that I taught my girls about respect for the earth. My family was adopted by the Lingit people. My girls and I were adopted by the Kiks.adi Clan and my husband by the Chookaneidi Clan. I have taught my students to listen to the Lingit elders who were here before us and learned the many lessons the earth had to teach. I take my students out to the forest, beach, and ocean to learn that science is woven into our daily lives and into our future. I constantly seek grants and support for learning how to be a more effective teacher and productive member of my community. That is how I came to be invited to the Brandwein Summer Leadership Institute 2002.

Brandwein Institute Grant Proposal:

I surveyed our school district to find out what other science classes are doing so that I could feed into their programs. Our high school chemistry class does some water tests such as dissolved oxygen and the biology class does some data collecting in transects. I plan to share ideas I learned in BSLI 02 with both teachers. My students started the year studying about plants and they conducting pH test of different ecosystems in our area. I felt as though I was moving toward meeting some of the goals outlined in my proposal this summer. Then something exciting dropped into my lap.

We have a Whale Fest every year when the whales arrive. Experts all come to teach about sea mammals, marine ecology, etc. Last year they asked me what help I could use in the classroom during the Fest; some experts give small classroom presentations while they are in town. I Said that I need help with plankton (we collect plankton on the boat field trips).

We have many species of plankton here and with the Toyota/TAPESTRY money I got a microscope video system to better identify them. A plankton researcher in Juneau is available to come into my classroom for a whole week during the Whale Fest and do plankton activities with ALL of my students. We will learn identification (my weak area) and many other things about plankton. The exciting thing about learning identification is we can then start

MONITORING the plankton once we can determine individual species and its different forms. Since our school is about a block from a harbor, my students can monitor the abundance and diversity of plankton there. With this skill, we can compare plankton populations in different harbors in town at different times of the year. Plankton are SO EXCITING! We get 80% of our oxygen from plankton. By monitoring the plankton in our area we will be able to find polluted sites, study the effects of weather on plankton, and other subjects. Once we establish the protocol, we can link up with teachers in Juneau and compare our data with Juneau. Juneau's waters are considered "inside" waters and should be different from Sitka's, which are considered "outside" waters.

The Whale Fest is at the end of October. Because of this opportunity I will be able to present the results at the NSTA Western Regional Convention in Portland November 14-16.

"Occurrences in this domain are beyond the reach of exact prediction because of the variety of factors in operation, not because of any lack of order in nature."

Albert Einstein

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I am Chris Donovan, otherwise known as Ms. D by my students. I've been teaching high school science for the past 15 years. I moved west from New York after college and found the South West less crowded and full of unknown adventures. I have lived in Tucson for the past 33 years, raised a daughter and presently share my house with a dog and 2 cats.

I received my MAT from Antioch College in Ohio; thirteen years later I had my own classroom. I've taught Earth Science, Oceanography, Geology, Biology and Ecology.

The first summer after I began teaching I attended an Image Processing Workshop at the University of Arizona. Since then, I have been involved in ongoing projects with practicing scientists in the fields of geosciences, biology and environmental education. Every summer I do field research in such places as the Arctic (Barrow, AK.), SE Alaska, the Channel Islands, California, the Colorado River Corridor and Sonora, Mexico. Presently I teach oceanography, geology, earth systems and ecology all under an environmental education umbrella.

Locally, we constantly conduct field studies on water. Tucson is dependent on an underground water source (delivery of Colorado River water for human consumption started this year). The topic permeates political, social and environmental decisions here. Water processes and availability, aquifers, water pollution and plant and animal adaptations in a unique desert environment are emphasized.

My classes, in collaboration with the University of AZ. Geoscience Department and the USGS, are studying environmental issues involving pollution in Tucson and Nogales, AZ. Our school district has one of the largest of the EPA's TCE Superfund Sites and I am teaching its history and science.

My class is in the 2nd phase of an ongoing project with the local office of the USGS, which has been monitoring, over the past several years, movement of TCE in the aquifer in Nogales AZ. The initial site of the contamination was a musical instrument factory that used TCE in their plating processes for the musical instruments. The location was identified and the plant discontinued its use of the material but questions remain concerning the direction and speed of the water flow and the containments given the underground geology of the area. The geologic maps we have are not very specific so the USGS is monitoring wells as an indicator of the underground water flow.

Last year my students went to Nogales, approximately 60 miles south of Tucson, on three occasions and conducted water testing at the golf course pond and at two of the wash sites. One of these washes, the Nogales Wash, flows south into the US from Mexico where many of the maquiladores are located. This fact also complicates and may add to a separate possible contamination situation. The students drove around the city identifying potential point sources of pollution. Establishments such as gas stations, dry cleaners, and industrial parks were sited using a Magellan GPS 315 and added as a Theme to the existing ArcView project that the USGS is compiling.

This year, the second phase of the project, the students will return to Nogales at least three times per semester gathering more data. We will have access to a number of the production and monitoring wells in the area as well as previously sampled sites. We hope to re-canvas the city to update new businesses that are possible point sources of pollution. Using our data we will start analyzing it to see if we can identify directional and speed patterns of the aquifer.

In 2002-2003 I will be out of the classroom, coordinating restructuring our district's K-12 science curriculum and district wide science adoptions.

Brandwein Institute Grant Proposal:

I plan to devote half my grant monies to attend the Regional National Science Teachers Association Convention in Portland, Oregon.

With the balance I will purchase materials for classroom use. All our equipment was borrowed last year so I plan to purchase a Magellan GPS model 315, a LaMotte Water testing kit, a conductivity meter, Micrology Lab, e-coli and coliform tests. I will also rent one 15-passenger van for three Saturdays per semester to take students to the sites.

"If we do not permit the Earth to produce beauty and joy, it will in the end not produce food either."

Joseph Woodkrutch

Jane H. Evans
Mid Valley Secondary Center
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I teach Chemistry and Environmental Science at Mid Valley Secondary Center in Throop, Pennsylvania. I was introduced to the GLOBE Program (Global Learning to Benefit the Environment) in March 1995. As first we concentrated on atmospheric data, but in September 1997, my students began to monitor the Lackawanna River on a weekly basis reporting temperature, pH, dissolved oxygen, alkalinity and conductivity. This testing lead to a cooperative effort between Mid Valley Secondary Center and Angela Lambert, PA-DCNR (Commonwealth of Pennsylvania, Department of Conservation of Natural Resources), an educational specialist at Lackawanna State Park. Since that time, students have collect macro invertebrates twice a year and have participated in two Watershed SNAPSHOT sponsored by PADEP (Pennsylvania Department of Environmental Protection). The Toyota TAPESTRY grant obtained in 2001was designed to provide equipment and involved high school students teaching sixth grade students about the river.

This institute has re-generated my thought process. As a result, I have a clear eye on the future and on what my students can investigate in the future. Due to the destruction of our GLOBE Study Area (which was cut down in the fall of 2001 to make way for a parking lot), it is important that a new study area be identified and categorized as soon as possible. This will be done in the fall of 2002, following not only established GLOBE protocols, but also incorporating the ideas of Win Everham. Trees will be tagged and measured for both height and diameter ay breast height. Maps will be made and students will begin a new database of information. Hopefully, students will also be able to incorporate GIS technology into this activity.

Two separate projects loom on the horizon. First is a pond restoration project. As a result of the building project currently taking place at the Mid Valley Secondary Center, a small retention pond has been constructed to catch runoff from the new parking lot and the underground spring discovered during construction. I plan to have the students measure and map the resulting pond. The ultimate goal, or course, will be a viable wetland with rushes, cat-o'-nine tails, etc. The students will then be able to monitor this site from the beginning.

The second project is further into the future. Plans are in the works to restore Eddy Creek which used to flow a short distance behind the school. At the present time it is running underground through an abandoned coalmine. The intent of various organizations in the area is to return the creek to its ancient creek bed. When this happens, the students will begin monitoring its recovery.

Brandwein Institute Grant Proposal:

As a result of my time spent attending the Paul F-Brandwein Summer Leadership Institute, I have two ways in which I plan to offer outreach to fellow science teachers. Having previously published an article in Science Scope, I have plans to write a second article in the near future that will highlight information that I have gained through this Institute. I also plan to attend the National Science Teachers Convention to be held in Philadelphia in 2003. At that time I will network with other science teachers. I will present a PowerPoint presentation highlighting the student's progress in setting up a new Study Area at Mid Valley Secondary Center. It is possible that some of the grant money will be used for transportation to the NSTA Convention. Although some equipment and supplies are on hand, funds will be used to purchase aluminum nails and tags, tapes to measure tree diameter, densiometers and 50-meter tapes.

Christina Francis

Friends of Van Cortlandt Park
Bronx, NY 10471

Born and raised in upstate New York, Christina Francis was surrounded by nature throughout her childhood. She was always outdoors exploring the world around her. Choosing to join the environmental field was an easy choice and so was choosing the school that would help her fulfill her dreams. Christina attended The College of Environmental Science and Forestry and majored in Environmental and Forest Biology. After school, her first "real" job led her to work in Westchester County and live in the Bronx in New York City. A few jobs later she still living in the Bronx but also working there. And loving it!

As the Outreach/Education Coordinator of the Friends of Van Cortlandt Park, Christina uses 1,146 acres of forests, wetlands, meadows, fields and a lake as her classroom. Therefore, the vast majority of her teaching is done outdoors. She is responsible for organizing and leading two after school programs focused on environmental education. She also leads programs in the park for school groups (K-12) and teacher workshops. Some topics, students have worked on in Van Cortlandt Park with Christina include water quality, soil quality for planting trees and shrubs and basic environmental awareness. Christina looks forward to implementing the information she learned during the BSLI into her programming to allow her students to perform ongoing research in the park.

Brandwein Institute Grant Proposal:

Each fall and spring, Christina offers a series 5 teacher workshops to teachers throughout New York City and the surrounding area on various topics, including Nature Awareness, Birding Basics and Four Seasons. The vast knowledge that she has gained at BSLI will be shared at each of these workshops and especially at one focused on using Forestry to teach math and science. The teacher will have an opportunity to set up a quadrant in a section of the park and collect data while using basic math and science skills. Teachers will then be allowed to bring their students to the park to participate in similar activities. Data will be collected yearly from quadrants throughout the park to observe changes occurring in the forest over time.

Polla S. Hartley
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Science has always been my strong suit. So after obtaining a degree in Food Science with an Educational endorsement at the Univ. of Nebr-Lincoln with the strong support of my parents, Don and Judy Ita, I pursued a masters degree at Oregon State. I returned to Nebraska, along with my husband, Gary, as we found a mutual fondness for wide open spaces. Teaching in rural schools has afforded me the opportunity to use the great outdoors as an integral part of my curriculum endeavors. With the aid of a Toyota TAPESTRY grant, several high tech environmental research projects are now being implemented by the students at Spalding Academy and Spalding Public. Finally, my three young children, Kassi, Frank and Kate, are excellent models of inquiry in action. Quote "Brandwein takes the level of experts, the level of materials and the level of people you experience it with way above the current standard."

Student Projects: long term monitoring of recovery processes of two local reservoirs is currently being undertaken by the students. They collect data on flora and fauna diversity, chemical levels, geographical parameters and video documentation.

Brandwein Institute Grant Proposal:

"Which Came First? The Trees or the Town?" is an integrated program of History, Science, Math, and English. Students will investigate, using historical archives, the origin of several buildings and homes in their community. Using GPS and tree coring samples they will determine the location and age of designated trees in the vicinity of these dwellings.

With Arcview software, maps will be generated and compared to earlier aerial photos obtained of the community. Growth or shrinkage of the community in terms of square kilometers and population density will be calculated, as well as canopy cover based on a percentage. Students will compile their findings and publish an informational brochure, with the local community as their target audience. Evaluation will be based on the final draft presented from each group for publication.

Outreach:

Available teachers and students will be asked to present their involvement in the process at the state science teachers conference, NATS, in October 2003. Polla Hartley will attend NATS in 2002 to present the project inprogress and her involvement with the Brandwein Institute in a joint session with Julia Polak. The grant monies will be used for supplies such as tree corers, an Arcview Software, GPS Unit, Supplies and travel.

Steve Hollensed
Gunter High School
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As science teacher and science chairperson at Gunter High School, Steve Hollensed has brought corporate experience and real world problem solving to the classroom. The former geologist has taught biology, chemistry, physics, and environmental science at Gunter for the last ten years. He recently developed Project S.E.RV.E. (Students Engaged in Restoring Vital Environments) for his environmental science and special education biology students. He has worked as licensed fishing guide, and has performed work as a Texas Parks and Wildlife Department certified angling, boating, and hunting educator. He has also worked to conserve and protect wetlands as a volunteer for Wetland Habitat Alliance of Texas.

Hollensed is pursuing a Masters Degree in Environmental Science at the Institute of Applied Sciences, University of North Texas. His research interests include constructed wetlands, ecological restoration, and environmental education. He is drawing upon this broad experience base to provide students with an experiential approach to environmental education in hopes of instilling an environmental ethic in his students. Through Project SERVE students have restored a native prairie and pond, and built a constructed wetland.

Hollensed is chronically plagued with fishing fever, which requires frequent and liberal doses of flyfishing for largemouth and smallmouth bass, striped bass, and trout. Doctors believe the prognosis is favorable, as long as he continues his treatment immediately upon the onset of symptoms.

Brandwein Institute Grant Proposal:

Hollensed, via the Brandwein fellowship proposes to establish a network of schools involved in student driven, ecological restoration. Projects under discussion include, trout stream restoration in Utah, a contructed wetland in New York, and wetland restoration in Florida.

Hector Iberra
West Branch Middle School
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I have 26 years of teaching experience at the middle level. Environmental awareness and conservation are key components in the West Branch Middle School 6th grade curriculum. Throughout the school year students are engaged in case studies and projects in which they apply what they learned in the classroom. The activities are inquiry oriented and relevant to students.

Projects include 1) calculating the amount of water used in the students' homes before and after retrofitting; 2) calculating the amount of energy used lighting systems of small businesses before and after retrofitting with T8 lighting system; 3) designing, building, testing, and racing miniature photovoltaic cars; 4) weighing used oil filters before and after crushing with an oil filter hydraulic press to determine the amount of oil trapped in the filters that might have gone to the landfill; 5) testing and analyzing drinking water and yard/garden soils; and 6) planting native hardwood seedlings as part of the Timber Stand Improvement (TSI) program that is done with the Cedar County Conservation Board.

The Brandwein leadership program reinforced activities and ideas that can be integrated in the TSI program. Developing quadrat and transect mapping skills, determining canopy density, using GPS devices, stream studies, analyzing core extractions, and sharing projects made the summer institute program one of the best professional development programs in the nation. I plan to incorporate lessons learned to expand the TSI activities that are done by my students. Lessons to be developed include gathering, recording, and analyzing data from quadrats and transects. The TSI program provides students the opportunity to experience field activities that include orienteering, analyzing water and soil samples, determining the height of trees using clinometers, analyzing core extractions, and microscope activities using field microscopes. Presentations are made by Cedar County Conservation naturalists.

Many of my grants have been environmentally oriented. My students use a wide assortment of Hack and LaMotte soil and water equipment to measure ph, nitrates, dissolved oxygen, phosphates… and soil analysis as they do activities related to the Timber Stand Improvement (TSI) project done with the Cedar County Conservation Board (CCCB). In 1993, with the assistance of CCCB, I helped established a TSI program. Activities include planting native hardwood

seedlings, transects, recording data, using core extratheir ideas. Inquiry represents a powerful general strategy for helping them to potential solve many of the problems that they will encounter in everyday life.

Brandwein Institute Grant Proposal:

I will use the funds from the Brandwein program to make presentations at NSTA conferences and from a technology grant to purchase GIS software, GPS equipment, and additional equipment. I would also like to develop a students' exchange of information program between Japanese and West Branch students. This would be in addition to my current Christa McAuliffe grant project. I look forward to sharing ideas and providing feedback to the Brandwein fellows.

"Man shapes himself through decisions that shape his environment."

Rene Dubos

Emily M. Janke
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Upon graduation from Colgate University with a BA in Environmental Geography, I began teaching at Darrow School, a small, private, boarding school in eastern New York. Using Darrow's 365 acre campus and the surrounding area, I teach Environmental Science, Stream Ecology and Land Management to students through hands-on learning experiences. Stream Ecology Students shared their research of the nearby Kinderhook Creek through museum-style displays at the Clean Water Congress hosted by Hudson Basin River Watch. These students also presented to the New York Department of Environmental Conservation officials recommendations for changes to water quality standards.

In addition to my teaching responsibilities I am a dorm parent, advisor, tutor and leader in outdoor recreational activities. I am also the assistant director of the Hands-To-Work program, in which students work with faculty each Wednesday morning to improve the school and greater community. Service learning is an important component of our school's curriculum.

With a colleague, I initiated and led Darrow's Outdoor Education program to teach students the technical, communication and leadership skills necessary to safely enjoy the backcountry. This year I will also serve as a co-director of the Samson Environmental Center at Darrow School. My responsibilities will include maintaining and monitoring the Living Machine, an ecological wastewater treatment facility, as well as conducting tours of the Center's facilities.

Brandwein Institute Grant Proposal:

With the money gained from the Brandwein Institute I will purchase the equipment necessary for my students to engage in outdoor studies of the school's forested and agricultural lands. Through inquiry-based research, students will investigate the importance of biodiversity and the cycling of resources in the natural environment. Students will use forestry equipment and digital cameras to put together a field guide of their site - the flora, fauna and geology. They will have the opportunity to share their studies with younger students from a nearby K-5 school. Also using digital cameras, the students and I will document the process and methods implemented to complete the field studies. These visual images will be included in a final pamphlet that outlines our model curriculum, suggests outdoor labs and activities, as well as lists available relevant resources, such as websites, books, local contacts and possible professional development opportunities. This pamphlet will be sent to science teachers in the region to encourage and support their integration of inquiry-based, field research on school property.

"Over the long haul of life on this planet, it is the ecologists, and not the bookkeepers of business, who are the ultimate accountants."

Stewart Udall

Marilynn Pedek Opper
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Marilynn Pedek Opper teaches biology, chemistry and environmental science at a public magnet arts high school in West Palm Beach, Florida. In her instruction at a school driven by the fine arts, she strives to help students make connections between their art passions and science. For the last two years she was one of the two teachers mentoring students in a unique art integrated honors chemistry and physics course. In this course, artistic community members, teachers and students created a community of learners focused on exploring the sciences through the study of five art areas (dance, theatre, music, communications and visual arts). In one project students utilized the inquiry approach to master chemical and physical changes and the properties of light through the study of pigments obtained from minerals and dyes isolated from plants.

Ms. Opper strives to help students understand the complex biological and political aspects of the Kissimee- Okeechobee- Everglades water system. Students in her environmental science class conducted biotic and abiotic studies in the channelized and restored Kissimee River, in Lake Okeechobee, and in the Northern Everglades. In another art-integrated project, visual arts students worked with Ms. Opper and a professional visual artist to create wind sculptures designed to interpret the natural South Florida environment. Through field trips, students were given the opportunity to experience and analyze the Everglades. They canoed in a national refuge and slogged through the Loxahatchee Slough. The culmination of this project was the student created artist expression centered on a large Banyan tree on the school campus. The tree was draped with long pieces fabric (Christo style) and decorated with wildlife patterns for the entire study body and staff to enjoy.

Brandwein Institute Grant Proposal:

There are two components of Marilynn Pedek Opper's Brandwein grant, professional development/ outreach and student driven environmental science field projects.

She proposes to share the knowledge and experiences from the Brandwein Summer Leadership Institute in four venues. She will present for one hour at the Palm Beach County Pre-school science symposium, Florida Association of Science Teachers, and at the national convention of the National Association of Science Teachers. These presentations will focus on environmental data collection techniques, specifically quadrats and transects. In addition stream data collection protocols will be discussed.

She also proposes to organize and instruct a countywide workshop focusing on environmental data collection methods. The same content will be covered as in the hour-long conference presentations but participants will be offered the opportunity to practice data collection techniques in the field with appropriate equipment. Emphasis will be placed on collaborative projects that can be implemented between schools within the district.

The second component of her Brandwein grant, centers on student driven environmental research. Students in her advanced placement environmental science class will create a map of the school campus. This map will include the location, height, circumference and species of trees located on the urban Alexander W. Dreyfoos, Jr. School of the Arts campus. This map with corresponding data will be updated every year and analyzed, along with meteorological data by students for long-term trends in tree growth.

Students will then collect similar data on a cypress dome in the Loxahatchee Slough. In addition to tree and meteorological data they will also collect water quality data. The water quality data will be collected on a weekly basis and will be compared to data found at the Living Everglades data warehouse located on the internet. Electronic dialog will be set up between these students and students in other areas. Students will discuss local environmental issues that are can be related to the data they collected.

EllaJay Parfitt
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Middle school teaching has not lost its appeal for me even after 25 years. I have spent 24 of the 25 in Baltimore City in several different middle schools giving me a wide variety of experiences in an urban school setting. Now that I am settled (18 years) at Southeast Middle I have established several different programs that encourage students to spread their wings into the world of urban environment. The school is located on what is called a campus environment, which means we have large areas of green spaces. These areas include two stand of trees, large grassy area this is sometimes mowed (day before a soccer or baseball game) or most of the time it is left to it own growth patterns and a wetland area that is fed by a natural stream.

The main focus of the entire program is on the areas around the school and how to have the students take ownership to the land, plants, and wildlife that live on the school grounds. Students first take GPS readings to map the areas of the school ground. We compare these results with GIS maps of the area. Students then plan what part of the environment they want to work on for the school year. The mapping uses a quadrate method that is 50x50 cm for worm study or 25x25 m for general flora/fauna study, many of the quadrate overlap as the students decide their topic of study. The students have in the past worked on tree identification, by tagging and creating a booklet that is used by the elementary students when they visit the outdoor classroom. Each year students perform test on the soil looking for microinvertbrates and the earthworm population to add to the data used to measure the health of the soil, and by the soil scientists of the Ecostudies project this data is part of the Long-term ecological study of the urban environment. Finally students perform water quality test of the wetland area looking for high concentration of harmful chemicals (nitrates, iron) or bacteria (e-coli) that would endanger the plants and animals associated with the area this data is kept year to year to trace the health of the wetland area Students also use this information to show how it impacts the Chesapeake watershed.

All groups prepare a symposium presentation of their projects along with lesson plans for elementary students. After the symposium, which is attended by parents, mentors for the BES project, science supervisors and others, student prepared and presented their lessons to a live audience.

Brandwein Institute Grant Proposal:

The Brandwein Institute has opened my eyes to more ideas, which will increase the awareness of both my students, and community to the needs of our urban environment. The institute's grant will enable my students to continue monitoring the wetland and green space of the school grounds with the purchase of atmospheric equipment to chart and record the air quality. Money will also be used to create an on going greenhouse that will enable students to earn service learning hours and earn money for the continuations of the Schoolyard ecology project. This funding will be the start of many more grants to allow my students to study the urban school yard to its' fullest advantage and take away a better understanding of how fragile our planet really is and what they can do to increase our changes of keeping our natural resources by looking at the continuous loops that are present all around them.

Julia Polak
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Graduate Doane College 1970 B.A. in English. Taught High School English and Speech, Exeter High School 1970-1974 . Substitute Teacher 1974-1989 . Taught 6-7-8 English and Science, St. Joseph Catholic School, York 1988-1996. Graduate Work at UNL and UNK . State Finalist 2000, Presidential Award for Excellence in Science Teaching, Elementary Level . Master of Education in Curriculum and Instruction from Doane College 2001. Nebraska Math-Science Frameworks Writing, Assessment, and Professional Development Teams. Helped Clarify 8th Grade Science Standards for Nebraska .

1996 to the Present 5th and 6th Grade science and computer instructor, Exeter-Milligan Public Schools, Milligan Elementary. Nebraska Association of Teachers of Science Board of Directors 1997-2000
NATS President-Elect 2000-2001
NATS President 2001-2002

Brandwein Institute Grant Proposal:

Julia proposes expanding a project she began in the fall of 2001. Students in her Milligan, Nebraska, fifth grade class began conducting water quality testing "in the field" along Turkey Creek, two miles north of our school building. We also included wildlife activity observations, sketching land forms, and graphing weather conditions. Her sixth grade students tested soil samples from various locations within a thirty mile radius of our school.

The Brandwein Stipend will purchase environmental monitoring equipment and supplies that will allow her students to add to their established research, such as a secchi disk to monitor turbidity in the creek, a kick net to retrieve macro-invertebrates, soil and water testing kits, e-coli testing kits, hand-held surface weather monitoring instrumentation, resource books and other items needed to monitor the environmental conditions in and around Turkey Creek.

Julia will share the project and the results of the tests on the project website which is hosted by a teacher in Melbourne,Australia, so that four schools in the original water monitoring project can compare and contrast data. She will also share information about the project as a presenter at the Nebraska Association of Teachers of Science Fall Conference, the Kansas Association of Teachers of Science K.A.T.S Kamp, and the Nebraska Association of Teachers of Mathematics Annual Conference. Further, using PathfinderScience hosted by the University of Kansas, the school will be added to the "Stream Team" project, thereby sharing our data with many other students and instructors around the world. Julia also anticipates addressing civic and church groups in our area about the project and including students in these presentations whenever possible.

Julia would also like to facilitate an exchange of rock and soil samples between the schools represented by the participants in BSLI 2002, so that the students can compare and contrast geographically diverse samples.

Year two of the project will expand to include data and human resources from the Upper Big Blue Natural Resources District, Nebraska Game and Parks Commission, the Nebraska Conservation and Survey Division, and the Soil Conservation Service.

Students will apply the data collected over the length of the project to their study of how humans affect environmental quality.

The project will be sustained through grant-seeking, and donations of in-kind services and materials from local businesses and land owners. The school district will continue to subsidize the transportation costs of the field trips to the creek, computer and Internet access, and printing of materials for the students.

Jan-Petrina McCarty Puhl
Souhegan High School
Amherst, New Hampshire

I was raised in the central Sierra Nevadas and attended the University of Nevada Reno. I received my Bachelor of Science degree in Botany with a minor in Geology in 1976. I worked in jobs related to my botany degree for the next ten years. I was encouraged by my friends and family to become a teacher. In 1986 I returned to the University and completed the credits necessary to become a teacher. I was hired to teach at McQueen High School in 1987. Throughout my career in teaching I have taught all the basic science classes. I have twice participated in curriculum writing for Washoe County School District. I wrote the first Environmental Science class in Nevada in 1990. It was adopted by the district in 1992 and has been taught in Washoe County ever since. I taught the first AP Environmental Science class in Nevada in 1998-99. I passed my National Board Certification in November 2001. I was given the Presidential Excellence Award for Science teaching for 2001. Last spring I was acknowledged the Western Regional winner for the Subaru Science Excellence in Teaching award. Our local paper, the Reno Gazette Journal gave me the Best of Education award for secondary science teaching. One of the most exciting things this past year one of my students nominated me to carry the Olympic Torch. On January 21st of this year the dream that I have had since I was nine years old came true when I carried the Olympic Flame in Reno. All my students came out and cheered as I laughed and cried with joy. I am currently enrolled in a masters program with Nova Southeastern University. The latest course that I have written is Forensic Science and it will be taught at my site in the fall of 2003. On October 25, I was named first runner-up for the Nevada Teacher of the Year, 2002. presented their lessons to a live audience.

Brandwein Institute Grant Proposal:

I will develop with my students a plan to sample and monitor tardigrades along the Truckee River Canyon from Reno to the Sierra Crest. Data will be compiled and analyzed monitoring seasonal changes in the tardigrades along this highyl traveled freeway through the Sierras. Students will sample tardigrades proximate to the highway and one half mile into the surrounding habitat. Students will map, compile and anlyze the data referring to availavable research on tardigrades.

Students will work for three class meetings to select sample sites using topographic maps(purchased) and consulting with local watershed experts on the human impacts of the Truckee River Canyon. GPS will be used to determine exact locations of the sites and will need to be purchased for this project. My school site already has GIS and Arcview software that will be utilized for data analysis and sharing. We will also purchase sample vials and one additional dissecting microscope for use in the on this project.

This will be a long term data set that willbe gathered each year and expanded upon by subsequent groups of Environmental Science students.

The intention is to begin a second data set next year that will be collected concurrently along the Lee Vining Creek area, also an eastern Sierra river canyon but on a much less traveled route. This will occur on the Yosemit eField Trip that I coordinate each year in the fall. Students will use a field microscope for analyzing and releasing the tardigrades in the National Park.

Objectives

• Designate a series of collection sites along the Truckee River and Lee Vining Creek Canyons
•Establish a group of local teachers who would be interested in gathering additional data in other areas around the Reno area to establish a large data set which will be mapped and located using GPS.
•Review training in ARCView.
•Attend state science teacher's convention and local county science teachers meetings to establish a network of samplers.

Procedure

I will recruit a group of teachers to help with data collection on my field trip and for my classes. This will consits of other science and geography teachers.

I will recruit teachers from around the state to extend the investigation. I will discuss with the county science coordinator the possibility of developing a link to our district website for a data collection site. I will discuss the biodiversity along the Truckee Canyon with the biology department form University of Nevada Reno and The U.S. forest service as there was a fire in that canyon two years ago. I will need to do further investigation regarding coordinating and analyzing the data. I have one group of students that wants to compare the diferences between the two canyons and another group of students who wishes to compare data from the traffic areas versus deeper in the habitat.

Judy A. Reeves
Tongue River Middle School
Ranchester, Wyoming

Some of us find our niche after exploring other pathways. I was a medical technologist in temporary retirement as a fulltime mom, when my oldest son came home from school complaining about how "boring" science was! My shock that anyone could find SCIENCE boring lead to my returning to school to pursue a Master's in science education, and for the past ten years I've been doing what I was meant to do-- teach. The environmental part came naturally; I was always a horrible tomboy who would rather be outside than in.

Teaching non-college bound students in a rural high school in a fairly poor area requires a high input of energy and enthusiasm to get studentsinvolved. Our projects have included developing a 4 1/2 acre outdoor learning center and arboretum on our campus, beach cleanups, water watch sites, and for the past few years, service learning projects. The outdoor learning center was accomplished with massive cooperation from the community, and maximum work from my kids-- they designed it, surveyed it, scraped the trails, planted the trees, mulched, watered, and maintained the arboretum, dug the bog pond, cleaned out the big pond, etc.-- and this is ongoing! We've had virtually no vandalism; the efforts of too many students are involved and they're very protective of this area. Once we got to the "maintenance" stage, we started "Learn and Serve" projects with the fourth and fifth graders of our community. My high school students host all the intermediate school students from four different schools at all-day environmental field trips to two state parks in our county. The high-schoolers teach science concepts as the younger students cycle through fifteen different stations, doing water quality testing, seining and macroinvertebrate identification, leaf identification and leaf-printing tee shirts, making water cycle bracelets, building wetland models, acting out trees as factories, learning clouds and weather monitoring, etc. Last year, to add to our peer teaching program, my students built a 30-foot model of the spaceshuttle, and we ran shuttle "missions" with our fifth grade "astronauts", as well as activities on rocketry, flight, and living and working in space.

Brandwein Institute Grant Proposal:

This year, I have two new programs in mind: one, to get an aquaculture class on our campus (The Board has told me I can have it if I can fund it myself!); and two, to do a study of the county parks. Baldwin County has 37 parks, ranging from a dipping vat, on a 10'X10' piece of land, to a beach on the Gulf, a lake, a fresh-water springs, and numerous boat launches, Confederate and Creek Indian battle sites, Indian gravesites from 1000-year-old Mississippian culture mounds to Chief Red Eagle's grave, etc. Based on the type of studies we did at the Brandwein Institute, I'd like my students to survey these parks, using GPS and sampling quadrats, identifying flora and fauna, doing water quality sampling, etc. I'd like the study to be ongoing, and I'd like us to publish our results on the county website. Obviously, this is a long-term project! This year, I'll use my Brandwein grant to purchase surveying and monitoring supplies, pay for substitutes and transportation, and get started.

"When one tugs at a single thing in nature, he finds it attached to the rest of the world."

John Muir

Mary Smigel
Emporia High School
Emporia, Kansas

I am so excited to be named to the Brandwein Summer Leadership Institute! My name is Mary Smigel. For the past ten years, I have lived in Lancaster, PA, with my husband and three teenage children. I am in my third year of teaching first, second, and third year students in an early elementary classroom at the New School of Lancaster, which is a Montessori School. Before moving to PA, we lived in LaSalle, IL, where I was a stay-at-home mom. After moving to PA, I settled my children into school and I volunteered my time in the schools. This is when a principal encouraged me to complete my degree. I attended Millersville University and graduated magna cum laude in 1997 with a bachelor's degree in elementary education. I received a graduate assistantship in Women's Athletics at Millersville and completed my master's degree in Gifted Education in 1999.

Our school has been very fortunate to have a former school family convert their farm to educational purposes. The owners want children to learn how to be good stewards of the earth. The Montessori science curriculum concentrates on biology, zoology, and ecology. The farm provides us with a hands-on environment to help teach the children these concepts. Last April, as a part of our Earth Day celebrations, we planted some trees on the riparian buffer zone along Furnace Run, one of the streams on the property. To aid our school, I have attended workshops on various curriculums, such as; S.W.I.M.M., Project WILD, PA Songbirds, PA Amphibians and Reptiles, and others, to help become a resource person for our staff. I was a pilot teacher for the PA Fish and Boat Commission's curriculum on PA Amphibians and Reptiles. I spent time at Powdermill Nature Preserve experiencing fieldwork with that curriculum. I conducted an in-service program for the staff in August of 2001, to help show the connections between the Montessori curriculum, the new PA state standards, and constructivism. I helped our school obtain a Growing Greener Grant from the DEP to help us buy field packs and supplies for the children to use while at the farm. I am constantly looking for more ways to help teach our elementary students how to become better stewards of their world. I am thrilled to be joining a group of fellow teachers in learning and sharing more ideas that I can in turn share with the school's staff and the students.

Brandwein Institute Grant Proposal:

My proposal for my Brandwein Grant money is to use some of the funds to help defray travel expenses to the NSTA regional convention and to the NSTA national convention. Being an elementary teacher, my background lacks science courses. I would like to use some of the funds so that I can take a science course or two. I am interested in taking the online Jason Academy courses in the near future.

For my outreach program, I am making arrangements to talk to the school parents, teachers, and the school board. Hopeland Farm is going to have two teacher open houses, which I am helping at and speaking to the attendees about environmental lessons for the children. I have also been asked to speak at a PSTA drive in conference in October on the standards.

"Nature is an endless combination and repetition of a very few laws. She hums the old well-known air through innumerable variations."

Ralph Waldo Emerson

Jo Ann Staiti
Science Director
Winchester Public Schools
Winchester, Massachusetts
BuzzBayGal@aol.com

Graduate Stonehill College Summa Cum Laude BS Biology Graduate Suffolk University School of Law, Cum Laude J.D. Graduate Tufts University School of Engineering, Magna Cum Laude MS Environmental Healt Teacher 21 years, currently Science Director, Winchester Public Schools, Winchester, Massachusetts Married, mother of five Curriculum Consultant for Kendall Hunt Publishing Company Sports Editor, the Canton Citizen

Brandwein Institute Grant Proposal:

My proposal is to introduce and implement an environmental science course in Winchester High School. The proposal has been accepted by the High School, and the course will be available to juniors and seniors at the college level in the 2003-2004 school year. This summer curriculum will be written and materials purchased to enhance the program.

Jon Stern
New Paltz High School
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I realized I wanted to teach after spending many years working with teachers as a staff member of a sleep-away camp. It was there that I realized that working with children was what I was meant to do. Since moving to New Paltz from Long Island, NY in 1983 I have worked in the suburban Hyde Park School District and in the rural Hunter-Tannersville Schools. As a faculty member of New Paltz High School I have successfully written several environmental grants: a Toyota TAPESTRY Grant is now allowing students in four school districts to conduct a study of the microclimates created by the Shawangunk Mountains, just west of town.

Shawangunk Mountain Ridge

This teaching position has fulfilled a dream of working in the district where I live. I look forward to the time when my two children join me as a member of our high school community. Along with my wife of 13 years we spend our days happily hiking, skiing, biking, and running in the beautiful Shawangunk Mountains that brought us here in the first place.

I received my BA in Earth and Space Science from the State University of New York SUNY) at Stony Brook in 1983 and an MS in Education from SUNY New Paltz in 1992. I have been teaching for 17 years, the last 5 at New Paltz High School in New York's Hudson Valley.

that I can in turn share with the school's staff and the students.

Brandwein Institute Grant Proposal:

The Shawangunk Microclimate Project funded by a Toyota TAPESTRY grant is entering its second year. Elements of this year's Brandwein Institute will be integrated into the existing program, both enhancing the current design and enabling it to spread to additional schools. To facilitate this, the Pathfinder Science web site will become a tool for submitting and analyzing data. Additionally students will use it as a resource for structuring project related research. Specifically students currently involved in collecting weather data will be able to see their data mapped where it can be analyzed for trends. Both GIS and GPS related technology discussed at the Institute will be used in this project as well.

In order to disseminate project information and to encourage others to participate, a series of staff development opportunities will be available to earth science teachers at four regularly scheduled regional meetings. Teachers who are interested in having their students contribute to the project will be encouraged to attend a planned 4-day workshop in Project-based learning and GIS technology presented by Pathfinder Science. Teachers will be provided with equipment so that they can develop their own local climate project. The results of these endeavors will be documented and shared at the National Science Teachers Association and the Science Teachers Association of New York State annual conferences.

Brandon Thacker

R.L. Paschal High School
Ft. Worth, Texas

Brandon has been involved in helping students work collaboratively online. His ISTE recognized site, ExplorA-Pond (http://www.uen.org/utahlink/pond) and his SciLinks recognized site, Shadow A Swan (http://www.uen.org/swan) being two recent examples. The Shadow A Swan project allowed students nationwide to study the migration patterns of the Western Population of the Tundra Swan. Interaction with field experts, creation of migration corridor enhancement scenarios, and online graphing are important features of the site.

The Online Herbarium (http://www.uen.org/utahlink/pond/herbmain.htm) resulted from the summer leadership experience at the Paul F. Bradwein Institute. Classrooms around the world can classify and then preserve online, digital images of the dominant plants surrounding their school. The project is free to all K-12 classrooms and is designed to help students use "real world tools" like tree classification keys to develop a stronger sense of place.

Brandwein Institute Grant Proposal:

Overview:

Many teachers have already "adopted" ponds through the ExplorA-Pond website (http://www.uen.org/utahlink/pond). While these teachers have documented the size, geometry, and certain physical features of their adopted pond, none have surveyed the associated flora. This project will facilitate the creation of a collection of digital images of the flora surrounding their adopted ponds while creating an offline collection of pressed leaves at each of the school sites.

Timeline:

August 15, 2002 Publicize the opportunity via web sites such as Global School House, Youth Can, Pathfinder Science, and the Utah Educational Network.

September 1, 2002 Programming in place to allow for direct upload of digital images to the school's pond page via the Internet or posting from an E-mail attachment.

October 1, 2002 Each participating teacher will be contacted and offered a free plant press/ lesson plans/protocol kit if their school will guarantee the teacher access to a digital camera and scanner.

December 1, 2002 First digital images posted for each school. Critique of the plant press protocols and posting of teacher notes and suggestions coming out of the critique process.

Publicize the opportunity to teachers at the National N.S.T.A. convention in Philadelphia and at one of the regional NSTA conventions (Portland)

Budget:

Seed money for a Davis Foundation Grant and for a Home Depot grant to purchase materials for and creation of a plant press kit. 600.00

Travel funds for national N.S.T.A. presentation 400.00

Travel funds for regional N.S.T.A. presentation 200.00

Web site and programming Donated by Utah Education Network and Brandon Thacker Teacher Professional Development classes Donated by the Educational TechnologyCenter of the Davis School District Total 1,200.00

Ian Turoff
Navarre High School
Navarre, FL
Uf93@earthlink.net

The opportunity to participate in the Brandwein Institute is one of the most exciting things to occur in my professional career!

I have been teaching for six years, three in North Carolina and three in Florida. I currently teach Biology and Chemistry in Navarre High School, Navarre, Florida. I have also taught Physical Science, Earth Science, Anatomy and Physiology, and AP Environmental Science. I designed the curriculum for AP Environmental Science at both of my schools. APES is by far my favorite subject; it gives me the best chance to "teach outside the box." I tell my kids the reason I became a science teacher is so that I can play with toys and cut stuff up. I thoroughly enjoy my job.

In my other world, I have a beautiful wife, Ginni, and two kids, Riley and Emily. My wife and I have been married for eight years. I enjoy reading, sports, and watching University of Florida football (my passion). I also have been taking martial arts for two and a half years. It is a wonderful stress relief and great exercise.

Brandwein Institute Grant Proposal:

On our school campus, there is a storm-water retention pond supplied by canals running adjacent to local roadways. I propose to use the grant monies to buy chemical analysis kits to monitor the run-off that enters this pond and eventually seeps into the school's groundwater. The students will learn to see the relationship between development and groundwater. I will bring the wetlands surrounding our school into the study to look for trends and impacts on our local ecology.

I want to help teachers who are uncomfortable teaching science to belay their fears. I plan to do that by, first, co-presenting with another Brandwein fellow at the Florida State Convention, focusing on using field studies in the classroom. Hopefully, this will help the teachers enhance their curriculum.

Second, another planned workshop is on the use of Vernier probes which allow students to use modern technology while learning about the environment.

The grant money will be a great tool to enhance science education in and out of our classrooms and help teachers to think and teach "outside the box." Thanks for the opportunity to have participated in the Brandwein Institute.

BSLI Impact

The impact of the BSLI is varied and potent, stretching from the broad and deep influence of the national listserve which keeps all 78 fellows, scientists and professors in touch with each other, to ideas for networking with other schools, international student travel, a national soil exchange giving participants a data base from which to teach earth science, native American studies, opportunities for summer study and advice on all manner of other subjects.

The following reports from all three Institute participants and Fellows, in their own words, illustrate only a small portion of the total programs being shared.

Networking
George Radcliffe, Brandwein '2001Centreville Middle School (Maryland Eastern Shore) Radclifg@qacps.k12.md.us

Writes to update the fellows:

1. Networking - Patty McGinnis (also Brandwein '2001) and I just completed some intense networking. In March 20 students and I visited her for a weekend in PA. Kids got to know each other, and we did some great Birding at Willow Grove, Audubon's home, and a great BioBlitz at Valley Forge, awesome natural science-history connections. This past weekend, she and 20 of her students spent the weekend down here with my group. We camped on an island wildlife management area and worked on a number of biodiversity studies in this area. Great opportunity to interact and continue some of the sharing of last summer. A weekend with 40 7th graders - what a blast!

2. Biodiversity Middle School Style (both an update and seeking feedback from the middle school teachers amongst us): At Brandwein this summer I had 2 reactions to what we did: the scientific rigor was outstanding and welcome and just as important at the Middle School level, but how do we apply it to the middle school setting where we teach 120-150 in a day and where logistics sometimes impede our efforts.

Out of this I have started developing a model for a middle school biodiversity program called the Student Biodiversity Conservation Network. The focus is on biodiversity monitoring and measurement on the school property,

"I would feel more optimistic about a bright future for man if he spent less time proving that he can outwit Nature and more time tasting her sweetness and respecting her seniority."

Elwyn Brooks White

incorporating data from numerous sources, depending on what is available/feasible on that property. Included are:

- Macro invertebrate data
- Birding data
- Butterfly observations
- Wildflower data
- Monitoring of a schoolyard biodiversity plot
- Bluebird box data

The goal is long-term monitoring of a school property with GIS mapping to extend the data analysis. Been able to get financial support from our State Dept. of Education, our Department of Natural Resources, Univ. of MD/NASA (for GIS training), and the State Ornithological group. Will probably use that as matching for a 2003 Toyota Grant. Have about 75% of the program in place at my school, and should be 100% by summer's end (after more GIS training). Biggest obstacle is getting local maps on a school level or how to generate them from GPS data. Have Arcview for school and using on limited basis.

We will then inservice several other schools in the coming year. Students starting to develop the website for it at http://www.qacps.k12.md.us/cms/sci/bionet/BDVHOME.HTM.

3. Other News - great school year; taking another team up to the World Series of Birding again. Most of the students are from a "below average" section, and they can out bird most adults. Can't believe I get paid to do this job.

4. Feedback - Love some feedback, particularly from you Middle Schoolies. The best thing about what we're developing is the unifying concept and goal that biodiversity measurement lends to a lot of field activities that we already do. Middle schoolers need to see that concrete goal.

Radcliffe reports that this year he is able to do all the things in the plan. The water quality data gathered by the students is presented to Congress.

"Till now man has been up against Nature, from now on he will be up against his own nature."

Dennis Gabor

Smithsonian Connection
Dan Bisaccio - Natural Science Seminars
(Email: aedbisacci@aol.com)
PH: 603-313-0831
PO Box 98, Troy, NH 03465

I am a Brandwein Fellow - 1997.
This will be year three for a special summer program for teachers. I have been leading tropical/research programs for students and teachers for over 20 years to Costa Rica, Belize, Jamaica, and Mexico.

In 1996, I became involved with the Smithsonian Institute's Monitoring & Assessment of Biodiversity Program (SIMAB). Since then I have led students and teachers in developing field research programs on biodiversity using the SIMAB protocols. Both teachers and students have published their data and field reports at SIMAB.

The summer program I established 3 years ago trains teachers in developing this technique for programs at their home site and also for tropical programs they may be interested in developing.

The Summer Institute for Teachers: Connections: Tropical & Temperate America provides a cultural and ecological perspective on the Mexican Caribbean takes place in Quintana Roo, Mexico from July 10-18,2003. It will provide the opportunity to study, travel, and explore, while developing curriculum that incorporates actual experiences in the Mexican Caribbean. It will introduce teachers, particularly of middle and high school level, to tropical ecology by giving them an opportunity to explore tropical ecosystems firsthand with experienced naturalists and scientists; introduce teachers to reef ecology, identifying coral reef fishes, corals, sea creatures, and major goals and challenges of the reefs.

Teachers will explore selected major Mayan archeological sites, network with teachers, scientists, and local ecologists involved in conservation biology projects, and learn how to develop "your own" ecotourism travel program to the Riviera Maya region of the Yucatan!

Contact Dan Bisaccio for itinerary and more information.

Dan also reports that he returned from Mexico in February 2003 with 15 high school students as part of an ongoing project he has been directing since 1995 involving "students as researchers." Their work is reported to the Smithsonian Institute as well as to the field station in Quintana Roo.

Soil and Sand Exchange
Julia C. Polak
Brandwein Fellow '02

I would like to start a soil and sand exchange among ALL of the Brandwein Fellows and support staff. My 5th graders focus on the water quality testing in our little creek, and my 6th graders focus on soil quality. I would like to expand their "horizons" beyond the corn and soybean fields of our area, to the rest of the country. And, since there is such a wonderful geographic diversity among the Fellows, I am requesting your help.

All you have to do is fill one 35 mm film canister with a representative sample of soil fill one 35 mm film canister with a representative sample of sand tape each one securely closed label each canister with the location from which it was gathered mail to me at the address below.

In return, my students will send you the corresponding samples from our locale.

The 2002 Fellows have already agreed to participate, but we would like to include the 2000 and 2001 alumni as well. If you are interested in participating in this exchange, e-mail me directly at the address below, and hopefully we will keep the U.S. Postal Service operating another few months!!!
Questions??? e-mail me!!!

If you are interested in viewing our project from last year, go to:
http://www.burlheadss.qld.edu.au/home/practice/exeter/project.htm
(Yes, I know, it's hosted in Australia! That's part of the project's grand scheme!!)

The Lincoln, NE, Journal Star newspaper did an article on our Environmental Project in the December 30, 2002 paper. There were 5 more pictures that they didn't put in the link below, but with all the pictures, the article filled up most of the front page of the "Homeroom" section and half of the second page!!
http://www.journalstar.com/features.php?story_id=10688

Julia C. Polak, President
Nebraska Association of Teachers of Science
Brandwein Fellow 2002
Exeter/Milligan Public Schools
Milligan Elementary
Milligan, Nebraska 68402
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Gold Stars for Teachers
from Rick Tully
RickT@lee.k12.fl.us

About twice a year I pick up USA Today and have a chance to read it. Last Thursday, October 17, 2002, I was waiting in the lobby of a hotel at the Florida Association of Science Teachers conference and someone had left a copy of the paper on the couch. "Gold Stars for Teachers" caught my eye. "All-USA First Teamers work relentlessly to reach every child." Now, that sounds interesting. And there, on a two-page spread describing the best of the best, is none other than our own Hector Ibarra! Now I know that the teachers on those two pages are truly the best of the best. I've finally got a standard to which to compare all the rest!

Stream Ecology
Emily Janke
Brandwein Fellow '02

Emily wrote in response to a call for help:

My students in my Stream Ecology class collect data from the Kinderhook Creek in West Lebanon, NY. We collect water quality indicators, such as Dissolved Oxygen, turbidity, fecal coliforms, temperature, phosphates, nitrates, alkalinity, pH and benthic macroinvertibrates.

We use the "Guidance Document" from Hudson Basin River Watch (Kelly Nolan is the regional coordinator for Albany, NY area). I also use the text, Testing the Waters, which is published by Rivers Network (http://www.riverwatch.org/marketplace/category.cfm?Category=6). It is an incredible resource for teachers and students!!! I recommend it to every educator who teaches stream chemistry/ecology as there are explanations, data/worksheets and activities to help explain/explore each concept or index.

We send our data to the Data Exhange on the Hudson Basin River Watch website (www.hudsonbasin,org), as well as to our local library (this will be our first year doing this). We have also presented our findings at the Clean Water Congress in Albany, NY, which is, again, put on by Hudson Basin River Watch.

Patricia Dick
Brandwein Fellow "02

We have a Whale Fest every year at the end of October when the whales arrive where we have experts from all over come and teach about sea mammals, marine ecology, etc. Last year they asked me what I needed help with in the classroom during Whale Fest. They try and get some of the experts to come into the classroom and give small presentations while they are in town.

I said I need help with plankton (we collect plankton on the boat field trips). We have many

species of plankton here, and with the Toyota/TAPESTRY money I got a microscope video system to better try and identify them. It turns out there is a plankton researcher in Juneau who is available to come into my classroom for a whole week (during Whale Fest) and do plankton activities with ALL of my students. We will learn identification (my weak area) and many other things about them. The exciting thing about learning identification is we can start MONITORING the plankton once we can determine species and different forms of the same species.

Since our school is about a block from a harbor, my students can monitor the abundance and diversity of plankton in our harbor. With this skill, we could compare plankton populations in different harbors in town at different times of the year. Plankton are SO EXCITING! Did you know we get 80% of our oxygen from plankton? By monitoring the plankton in our area we will be able to find polluted sites, study effects of weather on plankton, etc. Once we establish the protocol for monitoring the plankton, we can link up with some teachers in Juneau and see if we could compare our data with Juneau which are considered "inside" waters and should be different from Sitka, which are considered "outside" waters.

Patty was one of the 32 out of 185,000 who received the Disney Teacher Award!

Reflections

A Jolt of Energy
By George Radcliffe

Brandwein was a jolt of energy for all of us but often for different reasons. Motivation and passion were brought along in most cases by the participants. For many the time and activities provided a flood of ideas that we could use to refocus or redirect our energies. For others it provided a time to mingle with our peers and redefine our path through continuing dialogue with colleagues. And for others still, who came already focused, it also surrounded us with the peace and tranquility necessary to fire those creative juices.

For those of us who see teaching as a passion rather than a job, our passion sometimes gets lost finding its way around state goals, administrative expectations, and the sheer stress (albeit joy) of working with youth. Ten days at PEEC, in spectacular scenery, removed from all that we usually encounter, was that necessary philosophical retreat that keeps us young and focused. To also be exposed to a barrage of exciting ideas and programs, taught by a low key staff, allowed all to assimilate at their own pace.

I personally returned to real life refreshed, able to persevere with my ideas even when encountering the seeming disinterest of many that I work with. I didn't have that retreat this past summer, and I see a change in myself this school year: excited but not handling the stress and frustration quite as I did last September. Doctor's orders: a week of the peace and stimulation of Brandwein

The Rolls Royce of Summer Programs
By Hector Iberra

The Brandwein leadership program reinforced activities and ideas that can be integrated in the Timber Stand Improvement program. Developing quadrat and transect mapping skills, determining canopy density, using GPS devices, stream studies, analyzing core extractions, and sharing projects made the summer institute program one of the best professional development programs in the nation.

The events are the Roll Royce of summer programs. The fellows were giving of their time. They were helpful, thoughtful, and worked cooperatively in completing tasks. Jack Padalino's leadership, preparation, and inclusion of all made this program outstanding and a special event to be remembered for a lifetime. Mary Brandwein's presence was inspiring. At 91 years of age and just days away from the hospital she still hosted a luncheon at her house.

Possibilities and Opportunities
By Emily Janke

I just wanted to let you know how much the Institute has meant to me as a new teacher. Being accepted into the Brandwein Institute can be counted as one of the greatest blessings of my life, and certainly of my career. The nine days spent at PEEC both encouraged and supported my desire to foster inquiry-based learning opportunities for my students, as it arouses their sense of wonder about the natural

world in their own backyards. The grant money has enabled me to first dream about possibilities and opportunities for this kind of hands-on learning, and then to put those dreams into action. I am limited neither by supplies nor by support from my colleagues. I have 19 new colleagues whom I can turn to for advice, suggestions or support; this is truly an interconnected world and we are not limited by state lines. Thanks again for all of the work that you, Jack, Mary and all of the other Brandwein Fellows have put in to make this once in a lifetime experience possible.

Increased Awareness

By EllaJay Parfitt

The Brandwein Institute has opened my eyes to more ideas, which will increase the awareness of both my students, and community to the needs of our urban environment. The institute's grant will enable my students to continue monitoring the wetland and green space of the school grounds with the purchase of atmospheric equipment to chart and record the air quality. Money will also be used to create an on-going greenhouse that will enable students to earn service-learning hours and earn m money for the continuations of the Schoolyard ecology project.

"He who would study nature in its wildness and variety must plunge into the forest, must explore the glen, must stem the torrent, and dare the precipice."

Washington Irving

The Future

Outwitting Time
By John (Jack) Padalino

Our vision is for Paul Brandwein's dream of a viable conservancy serving children, teachers and scientists interested in and committed to a healthful, healing and sustainable environment to continue to bear fruit through the work of the Institute.

The Institute continues to conserve the ecosystems, habitats, flora and fauna in the Rutgers Creek Wildlife Conservancy, a mini-conservancy of generalized deciduous woods interlaced with tributaries feeding a creek, Rutgers Kill, within the Township of Greenville in Orange County New York.

Focused on research in teaching and learning, the Institute and its Fellows use the Conservancy and Mary Brandwein's land for instruction and place-based learning. Land use is devoted to teaching research practices of selected biological and environmental sciences to teachers and students inclined to explore them. The Institute has been developing formal teaching and learning experiences in the conservation of eastern deciduous ecosystems. Teachers and students wishing to conduct research there are welcome to use the Brandwein lands as an outdoor learning laboratory.

It was Paul who noted, "…Once equality of educational opportunity is safeguarded for all, the young can be trusted to fulfill their special powers in pursuit of excellence. Thus both difference and likeness will become precious …when they do, we shall outwit time." Therefore, over the past eight years the Institute has become a teaching facility given over to the education of teachers and students in the principles and practices of long-term ecological research and sustainability.

The Institute will carry on its mission of advancing teaching, learning, and innovation, and of nurturing a family of educators and scientists by focusing on ten central priorities:

1. Serving as a national center, modeling techniques in local long-term ecological research.
2. Serving teachers, students, and the surrounding community.
3. Continuing its base line studies of the mini-conservancy at the Rutgers Creek Wildlife Conservancy and Mary Brandwein's lands.
4. Giving teachers on-site opportunities of varying durations for professional development.
5. Varying time frames for work at the Institute depending on the projects and programs offered.
6. Providing teachers, administrators, and curriculum developers opportunities to create instruments for measuring field-based learning, and to evaluate alternative assessments and performance-based examinations.
7. Advancing certain scientific priorities to enhance teaching and learning through investigation.
8. Advocating certain methods of teaching and learning based on field-based investigations.
9. Holding to certain practical goals.
10. Continuing projects employing state-of-the-art technologies to monitor environments as well as organize and analyze data from field studies.

"The sun, with all those planets revolving around it and dependent on it, can still ripen a bunch of grapes as if it had nothing else in the universe to do."

Galileo

Broadening the scope of the Institute will be accomplished by a number of means.

Advancing sustainability through encouraging mentors who can reach out to others.

The programs will be expanded strategically over the next three to five years by selecting projects focused on mini-conservancies.

Communications between and among fellows, directors and constituents will be maintained through the listserver and the interactive web site based on discussions of reality–based problems.

The lecture series will be perpetuated and the Second National Conservation Education Summit will be convened in 2004.

Our work honors teachers and instruction, keeping in mind and close to our hearts Paul's admonition, "The value of a person's advice about te4aching is inversely proportional to the square of the distance he or she is from the classroom."

The Institute Continues

Education for a Sustainable Future

By Keith Wheeler and Jack Byrne

The Brandwein Institute, in the vanguard of the future, will concentrate its efforts on teaching about and for a sustainable future in a variety of ways. One model from Education for a Sustainable Future follows.

In a recent validation of this goal, the National Council for Science and the Environment chose Education for a Sustainable and Secure Future as the theme for their annual conference. Over 700 educators, government, industry and non-government participants explored the status and future direction for teaching about it. Attendees acknowledged the crucial role of education in achieving a more sustainable relationship between people and the environment, reaffirming that education is essential for making informed choices about local and global environmental conditions.

Education for a Sustainable Future (ESF) is a project of the Center for a Sustainable Future (CSF) and the Cobb and Fulton County, Georgia, Schools, funded by a US Department of Education Technology Innovation Challenge grant and the Cobb and Fulton County school districts.

Its mission is to provide students nationally with the skills, vision, and knowledge to enable them to contribute to a sustainable, information-rich future.

ESF uses technology with teachers and school administrators to explore five different themes of sustainability:

- Thinking about and affecting the future
- Stewardship of natural resources
- Designing sustainable communities
- Sustainable economics
- Global issues

ESF started with 450 teachers in the two Georgia school districts and a national network of experts. Teachers and students have made a resource collection, which helps educators use technology to improve instructional skills and student engagement. Over 1,500 teachers now participate. The Cobb County school district has adopted ESF as their model for training teachers to use technology more effectively in teaching.

ESF assistance is available in a number of ways.

One-day, ESF staff-led seminars are given for K-12 teachers and school staff providing an understanding of where education for a sustainable future "fits" in the teaching profession, including an introduction to the resources developed for teachers.

Multiple-day (2 to 3) workshops for K-12 teachers and school staff designed to provide an in-depth introduction to the tools and resources developed by ESF experts and teacher practitioners: including curricula units, rubrics, curriculum development strategies and a template for building curriculum, ESF software, on-line courses, and web based collaboration with ESF's educators network. ESF staff, guest experts, and teacher practitioners lead the workshops.

Multiple-day (4-7) Institutes for schools or school districts which begin with an on-line netcourse that introduces students to the topic of education for a sustainable future, key concepts and skills for understanding and applying ESF to their teaching, and a beginning dialogue with colleagues that provides a basis for collaboration.

The institutes continue with a four-day intensive summer workshop with ESF experts

and teacher practitioners. Participants deepen their understanding and skill in sustainability, pedagogy, technology integration, software use, and strategies for helping students use the internet.

A three-day curriculum writing seminar in which participants write a two-week or longer unit for their classrooms which is then taught in the coming school year, revised and shared with teacher colleagues within the school or district and nationally via the ESF website.

Internet-based courses for educators help them become more knowledgeable about ESF's specific themes of sustainability. Existing courses are available, and courses are customized to focus on particular interests or needs.

Participants' can take internet courses on a flexible schedule or set up a course on a regular schedule, delivered with or without a moderator/facilitator. Courses range from twelve to 24 hours and generally consist of readings, journal writing, on-line discussions, investigation, and ESF software application

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For more information on Resource People, check the Brandwein website:
www.brandwein.org

"For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled."

Richard P. Feynman

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William D. Bavoso
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William Bavoso, JD, is admitted to practice law in New York, Florida, Pennsylvania, and the U.S. Supreme Court. He is a fellow and director of the New York Bar Foundation and member of the Ninth Judicial District Grievance Committee, overseeing ethical conduct of attorneys in five counties. He has served as president and director of the Orange County, New York Bar Association and as the Orange County delegate to the New York State Bar Association House of Delegates. William is the attorney for several towns in New York, and his column "It's the Law" appears monthly in the Tri-States Gazette.

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Marily DeWall
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Marily DeWall is director of the Jason Academy for Science Teaching and Learning, a new initiative of the Jason Foundation for Education. The Jason Academy began providing online science content courses for middle level teachers in Fall 2001. Marily previously spent many years with the National Science Teachers Association, most recently as associate executive director of corporate, legislative and public affairs. She also served as director of the Building a Presence for Science Program and oversaw many industry-sponsored programs, such as those affiliated with Duracell, Shell, Sears, Toshiba, and Toyota. In addition, she was editor of various NSTA journals and publications including Science Scope (for middle and junior high school science teachers), which she launched in 1978 and edited for nine years. She has been principal investigator for several National Science Foundation-supported programs, award programs, and student science competitions. Marily planned and coordinated two international NSTA conferences, was instrumental in the formation of the Academy of Mexican Science Teachers, and serves on numerous advisory boards.

Dr. William F. Hammond
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For more than three decades, William F. Hammond, Ed.D. and Ph.D. in curriculum theory and environmental education, was the director of curriculum development services and environmental education for the Lee County School District in Fort Myers, Florida. His career began with a decade of junior and senior high school science teaching. In the late 1960s, Bill became the Lee County science supervisor and coordinator of environmental education, positions he held until 1983. At that point, he became the district's director of the Department of Curriculum Services, retiring in 1993. From 1978 to the present, he has been consulting in corporate training for several Fortune 100 companies through his firm Natural Context. In 1997, Bill joined the faculty of Florida Gulf Coast University. During the course of his school, university, and consulting career, he has lectured, made presentations, and led workshops on curriculum and program development. He has presented in all 50 states, Canada, England, the former Soviet Union, and 19 Caribbean nations. He advises a wide range of private and public organizations, as well as more than 250 nonprofit organizations.

John "Jack" Padalino
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John Padalino, M.S. in field natural history, M.S. in conservation education, and Ph.D. candidate in science education, has been working at the Pocono Environmental Education Center (PEEC) since 1972, assuming his current post in 1986. PEEC, which cooperates with the National Park Service, is the largest residential center for the study of the environment in the Western Hemisphere. Before coming to PEEC, he taught precollege science and social science and directed Head Start programs. Since 1992, with support from the Rockefeller Foundation, Jack has been providing technical assistance to education specialists from nature

"Water is the driving force of all nature."
Leonardo Da Vinci

preserves in the former Soviet Union. Jack wears a number of other hats as well. In the late 1960s and early 1970s, he was a trainer of teacher trainers at New York University. In the early 1980's, he was principal investigator on two National Science Foundation-sponsored initiatives in field science, science leadership, and science for persons with disabilities. Late in the decade, he led a Wheels of the Mind project sponsored by the Apple Corporation. He is president of the John Burroughs Association and past president of three national science and education organizations. He is also an active member of the National Science Teachers Association and a fellow of the American Association for the Advancement of Science. Jack has received numerous awards, most recently the Thomas P. Shelburne Environmental Leadership Award from the Pennsylvania Environmental Council (1997).

Alan R. Sandler
Executive Director
Architectural Foundation of San Francisco
San Francisco, California

Alan R. Sandler is the executive director of the Architectural Foundation of San Francisco (AFSF). Alan joined AFSF in the summer of 1999 to develop, implement, and administer AFSF programs. Prior to directing AFSF, Alan was director of operations and education programs for the American Architectural Foundation (AAF) and the American Institute of Architects (AIA) from 1979 to 1999. At the AAF and the AIA, Alan was responsible for the development ofa Learning by Design, the AAF's elementary and secondary education program, which involved development and dissemination of information resources, teacher training, and instructional materials to the education and architectural communities. He also established a national technical assistance network. Alan served as an advisor for technology and instructional television programs, and served as the executive producer of The White House Is Our House: A CD-ROM Visit. Alan coordinated the management of Building Connections: Enriching Learning Through the Power of Architecture and Design, a concept paper released in 1999 by the Carnegie Foundation for the Advancement of Teaching and the AAF. This report explored the possibility that the design process used by architects to create buildings might also serve as a general model for teaching and learning, and it discussed the ability of architecture itself to be used as a tool for enriching curricula in a variety of subject areas. Alan has authored publications and articles on education and also has served as contributing editor to several education journals and magazines. Alan also has served as an education administrator in several school districts in Florida. He has also worked for the U.S. Forest Service and the Florida Governor's Office, as well as serving as a consultant to school systems throughout the nation.

Keith A. Wheeler
Director
The Center for a Sustainable Future
Shelburne, Vermont

Since 1997, Keith Wheeler, M.S. in soil science, has directed the Center for a Sustainable Future, an international nongovernmental organization whose mission is to educate learners of all ages to act sustainably on personal, family, community, and global scales. He was the first executive director of the 136-nation Global Rivers Environmental Education Network, an organization aiming to create formal and informal educational programs and networks that focus on watershed sustainability and stewardship. As the assistant director for the Adirondack Park Agency (New York, 1987-1993), he worked for sustainable development and sensible land use of the state's natural resources, both public and private. He has also worked in research, policy, and management capacities for the U.S. Department of Agriculture and as a research soil scientist for Cornell University (New York). Keith has also served as member and leader of many international, federal, national, and local organizations working for education for sustainability and the environment, for conservation, for science education, and for watershed protection. In addition, he consults in national and international policy settings to encourage creation of sustainable programs in developing areas. He contributes publications and makes presentations dealing with resource issues, education, and sustainability and is currently at work on a book tentatively titled Education for Sustainability: A Paradigm for the 21st Century.

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