

# energy EXCHANGE

A publication of the National Energy Education Development Project

SEPT/OCT 2004

## Youth Awards 2004

The 2004 Youth Awards Program for Energy Achievement was fantastic this year. Teachers and students from all over the country came to Washington, D.C. to meet new people, learn new NEED activities, tour around our nation's capital, and receive awards for outstanding energy education efforts. The national award winners are as follows:

### Distinguished Service Awards

John Weiner – Energy Information Administration  
Scott Sutherland – Rhode Island

### Students of the Year

Megan Thoma – Illinois  
David Graham – Virginia

### State of the Year

Kentucky

### Region of the Year

Barnstable County Cooperative Extension and Cape Light Compact – Massachusetts

### District of the Year

Upper Arlington City Schools – Ohio  
Project Advisers: Becky Grimm and Rhonda Welker

### Primary School of the Year

Morrow Elementary School – Ohio  
Project Advisers: Karen Dumais, Christi McEntire, and Linda Olinger

### Elementary Schools of the Year

Eaton Elementary School – Indiana  
Project Adviser: Larry Richards

Thaxton Elementary School – Virginia

Project Adviser: Viola Henry

### Junior Schools of the Year

St. Isidore School – Nebraska  
Project Adviser: Mary Lou Green

June Buchanan School – Kentucky

Project Adviser: Candace Slone

### Senior School of the Year

Harrison County High School – Kentucky  
Project Adviser: Kim Jenkins

## Celebrate with NEED

NEED is pleased to launch the 2004-2005 school year and to celebrate its **25<sup>th</sup> Anniversary** in March of 2005. Watch for new activities, training opportunities, and more in this celebration year!



## TEACHERS—IT'S THAT TIME

## Renew Your NEED Membership!

If you're an educator who received this newsletter, it's time to renew your NEED membership. All of the NEED materials have been up-dated for 2004–2005, and many new activities are available (see *page 4 for descriptions*).

It's simple to renew and receive our newsletter, as well as the 2004-2005 NEED Membership packet.

**Email [info@need.org](mailto:info@need.org)**

**or**

**Call 1-800-875-5029**

Check out our website at

**[www.NEED.org](http://www.NEED.org)**

to download the NEED Resource Catalog.

## Inside this issue....

What's New	1
NEED Calendar	2
NEED News	3
NEW Materials	4
From The Teacher's Desk	5
Primary/Elementary	6
Intermediate/Secondary	7
Short Circuits	Back

# The NEED Project

National Energy Education Development  
P.O. Box 10101  
Manassas, VA 20108  
TEL 1-800-875-5029  
FAX 1-800-847-1820  
EMAIL [info@need.org](mailto:info@need.org)  
WEB ADDRESS [www.need.org](http://www.need.org)

*The NEED Project is a 501(c)(3) nonprofit education association providing professional development, innovative materials correlated to the National Science Education Content Standards, ongoing support and recognition to educators nationwide.*

*A list of NEED sponsors is available on our website and in our Annual Report.*

## NATIONAL STAFF

Paul M. Donovan  
Executive Director

Mary E. Spruill  
Program Director

Martha Wise Callan  
Curriculum Director

Karen Reagor  
Associate Program Director

Keith Etheridge  
Associate Program Director

Troy Hill  
Program Administrator

Annie Rasor  
Associate Curriculum Director



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# CALENDAR OF EVENTS

For more information, email [info@need.org](mailto:info@need.org) or call 1-800-875-5029

## August

- 30-9/3 NEED exhibit & presentation at World Renewable Energy Congress—Boulder, CO
- 30 NEED Workshop—Brevard County, FL

## September

- 8 U.S. Department of Energy Hydrogen 101 Conference—Annapolis, MD
- 9-12 NEED Hydrogen Education Program Committee Meeting—Arlington, VA
- 14, 21 Energy Industry Study Program – U.S. Energy Information Administration—Washington, DC
- 27-10/1 National Association of State Energy Officials Conference—Chicago, IL
- 28 Energy Industry Study Program – U.S. Energy Information Administration—Washington, DC

## October—Energy Awareness Month

- 5 BP A+ for Energy Education Celebration – Universal Studios, CA
- 5, 12 Energy Industry Study Program – U.S. Energy Information Administration—Washington, DC
- 9-11 NEED Teacher Advisory Board Fall Meeting—Arlington, VA
- 14-16 A+ for Energy/NEED Sessions at CA Science Teachers Assn. Conference—San Jose, CA
- 16 Tennessee NEED Workshop—location TBA
- 18 NEED/NY Energy Smart Students presentation, STANYS Eastern Regional Meeting—Loudonville, NY
- 18-19 NEED Session: Interstate Oil & Gas Compact Commission Meeting—Oklahoma City, OK
- 19, 26 Energy Industry Study Program – U.S. Energy Information Administration—Washington, DC
- 26 Southwest Michigan NEED Workshop—Dowagiac, MI
- 26 NY Energy Smart Students Workshop—Yorktown Heights, NY
- 28-30 National Ocean Industries Association Meeting—Palm Beach, FL
- 29-31 NEED Sessions – Louisiana Science Teachers Association—Lafayette, LA

## November

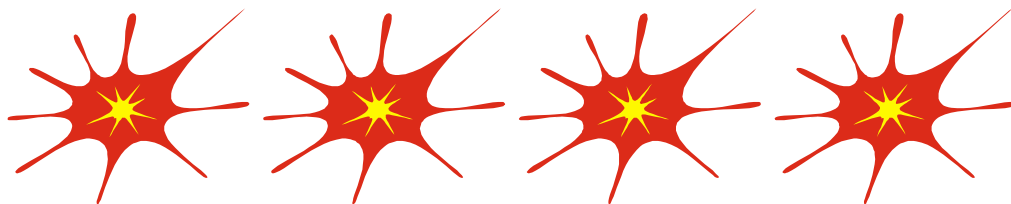
- 1-2 Nebraska Public Power District Workshop—location TBA
- 4 NEED Workshop—Syracuse, NY
- 4-6 NEED Sessions – National Science Teachers Association Regional Convention—Indianapolis, IN
- 4-6 NEED Sessions – Conference for the Advancement of Science Teaching—Corpus Christi, TX
- 6-10 North American Association of Environmental Education Conference—Biloxi, MS
- 9, 16 Energy Industry Study Program – U.S. Energy Information Administration—Washington, DC
- 11-13 NEED Sessions at the NC Science Teachers Association Conference—Greensboro, NC
- 18-19 NEED/NY Energy Smart Students sessions, Energy in Schools Conference—Albany, NY
- 18-20 Kentucky Science Teachers Association Conference—Lexington, KY
- 30 Energy Industry Study Program – U.S. Energy Information Administration—Washington, DC

## December

- 9-10 NEED Workshops—Victoria, TX

\* For information about Ohio workshops, go to [www.ohioenergy.org](http://www.ohioenergy.org).

\*\* Go to [www.need.org](http://www.need.org) for up-dated NEED workshops and events.



## October is Energy Awareness Month!

Thanks to the support of the U.S. Department of Energy, the U.S. Minerals Management Service, and the membership of the National Ocean Industries Association, NEED is pleased to offer the **Discoveries for Everyone** offshore coloring poster and activity book for students to learn more about the science of offshore exploration. To receive a class-set of the posters and activity guides, contact NEED at 800-875-5029 or email [info@need.org](mailto:info@need.org). Visit [www.need.org/energyawarenessmonth.html](http://www.need.org/energyawarenessmonth.html) for activities and ideas to celebrate energy during October!

# NEED NEWS

## **New NEED Board Members**

NEED is pleased to announce the election of several new members to its Board of Directors: Tom Fry, President of the National Ocean Industries Association (Washington, DC), Kevin Galligan, Program Manager of the Cape Light Compact (Barnstable, MA), Diane Lear, Director of the Hydropower Research Foundation (Washington, DC), and Robert Lazar, NEED Lead Teacher at Cleveland Middle School (Albuquerque, NM). Tom, Kevin, Diane, and Robert will work with NEED staff to support the mission and goals of the organization. They each bring many years of experience in their respective fields to NEED. Welcome!

## **Thanks and Farewell**

As we greet new board members, we also say farewell to Tom Michels, NEED's former vice chairman, who is leaving the National Ocean Industries Association to return to graduate school at the University of Chicago this fall. Tom's wit, generosity and experience have provided NEED with many opportunities for expansion during his tenure. We wish him well!

## **Welcome!**

NEED continues to expand to meet the needs of classroom teachers in several key states. Todd Rogers joins NEED as the New York Energy Smart Students coordinator through our new partnership with NYSERDA. Todd comes to NEED with experience in middle school education as a classroom teacher and in energy management with Viron. He brings a wealth of knowledge to the NEED team and, from all accounts, the New York teachers think he's just great!

Lynn Marlowe and Cindy Welchko join NEED in California, thanks to the support of BP. Lynn coordinated the first year of the BP A+ for Energy Education grant program for California teachers and will continue to provide support to teachers and students as the program grows in year two. Cindy Welchko brings a background in education and curriculum development and is currently helping develop new NEED **Simple Machines** activities to be field-tested in the spring. Watch for Cindy and Lynn at California workshops and events this fall!

## **NEED Energy Conferences for Educators – 2004**

The month of July was busy for new NEED teachers and those returning to brush up on their energy curriculum and see newly developed NEED materials. The 2004 Energy Conferences for Educators, conducted in Hyannis, MA, Galveston, TX, and Long Beach, CA provided over 300 educators with opportunities to expand their energy knowledge, find valuable resources for their classrooms, and visit a variety of energy facilities up close! NEED appreciates the hard work and support of its prime sponsors of the three conferences: the Cape Light Compact, the Offshore Energy Center, and BP.

## **A new look for the EIA Kid's Page and Energy Ant!**

Thanks to great suggestions from NEED teachers and students, the Energy Information Administration has released the new EIA Kid's Page! Visit [www.eia.doe.gov/kids](http://www.eia.doe.gov/kids) to find new materials, a wonderful user-friendly home page, and more! Be sure to hit refresh on your browser if you've had the Kid's Page marked as a favorite.

## **Florida**

Congratulations to Carolyn Wuest and Nancy Stanley, NEED Lead Teachers in Pensacola, FL (Escambia County) on their new positions as energy educators for the school district. Nancy and Carolyn will be focusing their attention on curriculum support of energy education efforts in the district with the goal of reducing energy consumption and increasing student knowledge of energy.

## **North Carolina**

Thanks to a grant from the Department of Administration, State Energy Office, NEED is launching its North Carolina Schools Going Solar program this fall. Six schools will receive photovoltaic installations, training, and curriculum materials. To receive an application package for your school, contact NEED at 800-875-5029 or email [info@need.org](mailto:info@need.org).

## **New York**

NEED is pleased to partner with the New York State Energy Research and Development Authority (NYSERDA) on its new Energy Smart Students program designed to provide classroom educators with curriculum and training programs to energize their classrooms! Great plans are being made for the fall and spring to include sessions at state science teacher conventions, technology teacher conventions, one-day local workshops, and Building Performance training sessions for vocational students.

In August, the NY Energy Smart Students Key Leader Conference brought together 30 educators from across the state to train as Key Leaders in their region. These teachers, working with Todd Rogers, Program Coordinator, will provide outreach and support to schools throughout New York. In late fall, NYSERDA and NEED will launch their NY Hydrogen Education Program for schools. For information about the New York Energy Smart Students Program or the Hydrogen Education Program, contact Todd Rogers at [trogers@need.org](mailto:trogers@need.org).

## **Hydrogen**

The NEED Project is thrilled to have been selected as the U.S. Department of Energy's partner for the Hydrogen Education Program initiative. Working with Sentech Inc. of Bethesda, MD, NEED and our Hydrogen Committee of longtime science educators will roll out a national hydrogen education program in the 2004-2005 school year. The grant will provide middle school hydrogen curriculum, training, and classroom equipment for schools nationwide. For more information, contact NEED at [info@need.org](mailto:info@need.org) or at 800-875-5029.

## **4-H Light and Lighting**

With support from the U.S. Department of Energy, NEED and the National Association of State Universities and Land-Grant Colleges (NASULGC) launched a pilot program for the 4-H Afterschool program. The new hands-on unit on Light and Lighting is being piloted this fall in seven states. Thanks to the dedication of Cooperative Extension staff in Vermont, Texas, Arkansas, Tennessee, Iowa, West Virginia, and Nevada, the programs have already begun or are soon to be underway.

# From the Teacher's Desk

This year, over 300 educators attended NEED Summer Conferences. Participants came from all over the country and had varied backgrounds. Some are new to energy education, others have been teaching it for years. In Kentucky, educators had the opportunity to learn about the energy resources available in their state through NEED materials and a variety of site tours. One participant, who has been teaching at the same high school for 50 years, decided to share his view. (For information on the Kentucky Energy Conference for Educators, contact Karen Reagor at [kreagor@need.org](mailto:kreagor@need.org).)

## NEED'S 2004 EASTERN KENTUCKY TOUR

*By Dale Faughn  
A Kentucky Poet Laureate*

We teachers took a learning trip,  
And it was special, yes, indeed;  
It was a conference-tour we took,  
Conducted by the Project NEED.

Now, NEED has grown, and grown, and grown—  
It's really mushroomed through the land;  
And as the months and years go by,  
It still continues to expand.

We came from all across the state,  
And "amiable" describes our team;  
Our tour was in the Eastern part,  
With energy the stated theme.

We visited many places there,  
And varied were the sights there seen;  
It was a blast from start to end—  
From June fourteen to June eighteen.

Hydro we saw, coal mining, too—  
And how landfill produced methane,  
And how it then was harnessed up  
To generate electric gain.

We saw where natural gas was used,  
And fractionated into parts;  
We heard the process there explained,  
And saw percentage on the charts.

In West Virginia, there we viewed  
Just how the coal was loaded out—

Just how the boxcar dumps were made—  
It's something we had heard about.

Science Center gave us much to see,  
With games to play that were quite rare;  
Enjoyable the show they gave—  
The planetarium that was there.

Challenger Center: this we saw—  
Memorialized that fateful flight;  
It's one of three that's in our state—  
Quite truly, it's a learning site.

Berea had much to offer us,  
Where artisans have much to show;  
And Eco-Village was the place  
To conserve the energy flow.

Our thanks go out to all who helped—  
To sponsors and to our many hosts;  
In recognition of them all,  
We'd like to launch our many toasts.

What helped the trip to be so great  
Were Bill and Dennis on the scene;  
And Pam who helped so many ways,  
And Karen, our Director, Queen.

If NEED should offer you the chance  
To take their great enlightening tour,  
Jump at the chance without delay  
For memories that will long endure.

# What's New at NEED for 2004–2005

## Energy Infobooks (grades K-12)

This year, new factsheets on conservation and efficiency have been added to the intermediate and secondary infobooks, which are included in the membership packet. All of the other factsheets at all reading levels have been up-dated with the latest facts and figures from the Energy Information Administration. *(Also available online)*

## Energy Flows (grades 5-12)

Included in the 2004–2005 NEED membership packet, this new hands-on activity explains forms of energy and energy transformations. It can be used as a stand-alone activity or as a companion activity to the Elementary and Secondary Science of Energy Kits.

## Energy Analysis (grades 7-12)

Watch your mail for the new Energy Analysis activity and the Energy Information Administration's *Energy Perspectives* booklet. All teachers who renew their NEED membership will receive this packet. The Energy Analysis activity was developed to teach students about energy statistics, analysis, and forecasting. It emphasizes research and analysis of information in graph format to discern energy trends. This activity meets math graphing and analysis standards.

## Schools Going Solar (grades K-12)

NEED's new Schools Going Solar Guide is a series of research and exploration activities for schools that have solar installations. The guide was created to facilitate student research and exchange between schools. A Schools Going Solar discussion group is also on the NEED website, [www.need.org](http://www.need.org), for schools to exchange data and ideas about using their photovoltaic installations for classroom learning. *(Also available online)*

## Alternative Fuels Debate Game (grades 5-12)

Students evaluate the advantages and disadvantages of alternative fuels. Teacher instructions and transparency masters are included. *(Also available online)*

## Alternative Fuels Expo (grades 5-12)

Students work in groups to develop exhibits and make presentations on alternative transportation fuels. Teacher and student instructions are included. *(Also available online)*

## Alternative Fuels Rock Performances (grades 4-12)

Student rock bands write songs and sing about transportation fuels in this entertaining activity. Audiences learn more from these energy rock stars as they tell their stories to interviewers out to get the latest scoop in vehicle fuels. Teacher and student instructions are included, along with sample songs and interviews. *(Also available online)*

## Biodiesel (grades 4-12)

Students explore biodiesel as a renewable transportation fuel with backgrounders on three reading levels, student activity sheets, and suggested extension activities. *(Also available online)*

## Ethanol (grades 4-12)

Students explore ethanol as a renewable transportation fuel with backgrounders on three reading levels, student activity sheets, and suggested extension activities. *(Also available online)*

## Energy Around the World (grades 4-12)

Sixteen new country profiles have been added to this activity and all of the information for the other countries has been up-dated. *(Also available online)*

# PRIMARY/ELEMENTARY ACTIVITY: Active Energy Sources

**Background:** Active Energy is a game best played in a large defined area such as a basketball court, either indoors or outdoors. It can be easily adapted for a variety of topics and age levels.

**Time:** Five minutes to explain rules, five-ten minutes to play the game

**Goal:** To reinforce energy source knowledge

**Play:**

1. With all students on the playing field, explain the game. When the leader calls out a word, the students must complete the correct action before the leader counts to five. Explain the ways that players are eliminated and that the decisions of the leader are final. *(Posters representing the words can also be held up by the leader.)*
2. Choose a number of word/action combinations (depending on the age and ability of the students) and demonstrate them to the students. Have the students practice the actions until they understand the game.
3. Begin game play with all students on the playing field. As students are eliminated, have them move to one side until the next round begins.
4. Continue until only one student remains on the playing field.
5. The last student becomes the leader of the next round.

**Ways that players are eliminated:**

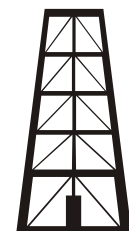
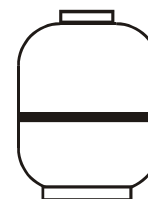
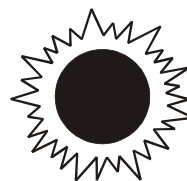
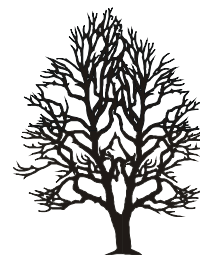
1. Not completing an action in the allotted time.
2. Being the last person to complete an action.
3. Not forming a group with the correct number of students.
4. Continuing to move after the 'freeze' command is given.
5. Performing an incorrect action.

**Word**

Solar  
 Geothermal  
 Wind  
 Hydropower  
 Biomass  
 Coal  
 Natural Gas  
 Petroleum  
 Propane  
 Uranium  
 Nonrenewable  
 Renewable

**Action**

Run to north side of the playing field.  
 Run to south side of the playing field.  
 Run to west side of the playing field.  
 Run to east side of the playing field.  
 Run to center of the playing field.  
 Squat in place.  
 Two players link arms and spin in a circle.  
 Three players form a chain and hop.  
 Four players form a circle holding hands.  
 Five players form a line holding hands and perform a wave.  
 Freeze command. Stand still until 'release' command is given.  
 Release command. Players are no longer frozen.



# INTERMEDIATE/SECONDARY ARTICLE: Underwater Oil Recovery

During World War II, the U.S. Navy used oil tankers to refuel ships and planes assigned to overseas duty. These large refueling ships were vital to the success of the U.S. Navy fleet. One such ship, the USS Mississinewa, had only a brief stint of action, but it became important again many years later.

In May 1944, the Mississinewa began its tour of duty in the Pacific. It was 553 feet long and weighed 24,425 tons, and was home to a crew of 298 men. In September 1944, the U.S. took control of Japanese-occupied Ulithi, a well-protected lagoon with a series of islands located only 1,300 miles south of Tokyo. The U.S. had a large armada of battleships, aircraft carriers, destroyers and support ships in the area. Ulithi was used as a central supply and repair facility.



In November 1944, the Mississinewa was fully loaded with several types of fuel and lubricating oil needed for the ships and aircraft in the Ulithi lagoon. On the morning of November 20, a manned Japanese torpedo called a Kaiten, the underwater version of a Kamikaze, struck the Mississinewa, causing a massive explosion. Nearby ships rescued over 200 of the sailors and attempted to put out the ensuing fires. Unfortunately, due to the extensive damage, the ship sank into the lagoon.

For the next 57 years, the Mississinewa rested quietly on the bottom of the lagoon, serving as a home to many species of coral, fish, and other marine life. An unknown danger was lurking, however; the tanks of the ship still held almost two million gallons of oil and marine diesel fuel.

An independent team of divers located the wreckage of the Mississinewa 130 feet below the surface in the Ulithi lagoon in April 2001. They discovered that the ship lay upside down in two pieces on the ocean floor. Out of respect for the watery grave of about 50 Mississinewa sailors, the team did not enter the ship. A short time after this dive, a tropical storm hit the area. Oil began leaking from the piping in the ship, threatening the marine life, as well as the island ecosystem.

In August 2001, the U.S. government assembled a team of experts to survey the wreckage and determine the feasibility of stopping the oil leak. The leak was quickly located and successfully repaired. The team surveyed the wreckage, however, and discovered extensive corrosion on the piping. While this leak had caused minimal environmental damage, there was a real possibility of future leaks and greater damage.

By December 2001, another leak had been found and repaired. A new survey estimated that nearly two million gallons of oil remained on board. A spill of this magnitude would threaten the marine life, including several endangered species, as well as the inhabitants of islands that rely on the fishing industry to sustain their way of life.

After considering a variety of options, the Navy decided that the best course of action was to remove the oil from the Mississinewa as it lay underwater. The oil offload operation began in early 2003. Divers drilled a 3.5-inch hole into the hull of the inverted ship and secured a valve over the hole. A large hose was attached, the valve was opened, and the oil was pumped out of the wreck up to a barge at a rate of 450 gallons per minute. When the accessible oil was pumped out, the valve was removed and the access hole was sealed.

In all, a total of 20 holes were cut into the hull to retrieve oil from the cargo tanks. Two additional holes were used to remove oil from internal tanks. It took four weeks to remove approximately 1.95 million gallons of oil from the 21 tanks, the engine room, pump room, and various piping. At the completion of the \$4.5 million recovery project, an estimated 14,000 gallons remained onboard the Mississinewa in inaccessible locations.

Due to an innovative underwater approach, almost two million gallons of oil were recovered and a pristine marine habitat was preserved.

*Summarized from the Summer 2003 edition of Currents.*

# Short Circuits

## The Incredible Shrinking Robot

With decreasing size and increasing performance, robots are being designed to help humans with many different tasks. One area of robotics is called micromechanics technology. This area focuses on microrobots. Microrobots are very small, functional robots.

The newest microrobot to join the scene, developed by the Seiko Epson Corporation, is called  $\mu$ FR-II. Made of ultra-thin materials, this miniature robot is generating a lot of excitement. This new development in microrobotic technology weighs only 12.3 grams with its battery and measures 85 millimeters high.

The  $\mu$ FR-II microrobot resembles a helicopter; with two blades mounted on top of it, the microrobot can fly. Unlike the first version of the flying microrobot, the  $\mu$ FR-II is wireless. The microrobot is capable of independent flight, which means it follows a flight plan set by a computer program. As it flies, the microrobot can transmit aerial images to a monitor on land.

Microrobots have many potential uses such as working in places unsafe for humans, venturing into space, conducting surveillance, and performing unmanned military missions. In the energy industry, robots like this could be used for many applications, such as inspecting pipelines and dangerous areas of nuclear power plants.

