25 Years & Growing!

March of 2005 marks NEED’s 25th year of providing innovative, hands-on energy education programs for teachers and students. New activities will be headed your way in 2005. Mark your calendars now for our celebration of the 25th Youth Awards Program for Energy Achievement from June 24-27, 2005, at the Hyatt Regency Crystal City in Arlington, Virginia.

Careers in Energy Fair

To coincide with the Youth Awards Program on June 24–27, 2005, NEED is seeking partners for a Careers in Energy Fair to be held during the conference. We are looking for companies to host tabletop displays about career opportunities in energy-related fields, with representatives to talk with students of all ages about their jobs. Interested companies, agencies, and organizations should contact the NEED Project at 703-257-1117 or via email to mspruill@need.org.

Students Help Hurricane Victims

NEED Students in Indiana decided to reach out to their peers in Florida to provide much needed support after the recent string of hurricanes. Students were asked to bring coins to school on a specified day. During a special fire drill called “Treats and Relief for Longleaf,” NEED students stood outside and collected the money in Halloween containers. They plan to send the donations to Longleaf Elementary School in Pensacola, Florida, a school that suffered major hurricane damage.

Another way for students to reach out to Florida students is to become email pen pals. These interactions provide students diversion from the day-to-day upheavals caused by the hurricanes. If your school or NEED group is interested in contacting or supporting Florida students, email Carolyn Wuest (info@need.org), NEED Lead Teacher, to make a connection with a Florida school.

For more information about ways to support hurricane victims, contact your local Red Cross (www.redcross.org).

A New Face at NEED

NEED announces the addition of Brighid Moran as a new program associate in our Northern Virginia headquarters. Brighid grew up in Wilmette, Illinois, and has a degree in biology and environmental studies from Bowdoin College in Brunswick, Maine.

After graduation, Brighid was an AmeriCorps volunteer for a year on Cape Cod, Massachusetts. Her experience there included working with Barnstable County’s energy program—Cape Light Compact—where she was introduced to NEED materials and training. Some of you might have met her at the Hyannis Conference for Educators this summer.

We are excited to have her experience and skills supporting many aspects of our program. Welcome, Brighid!

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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
WEB ADDRESS 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.

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Executive Director
Mary E. Spruill
Program Director
Martha Wise Callan
Curriculum Director
Karen Reagor
Training Director
Keith Etheridge
Training Director
Troy Hill
Program Administrator
Brighid Moran
Program Associate
Annie Rasor
Program Associate
Cynthia Welchko
Program Associate

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CALENDAR OF EVENTS
For more information, email info@need.org or call 1-800-875-5029

November 2004
1-2 Nebraska Public Power District Workshop
4 NEED Workshop – Syracuse, NY
4-6 NEED Sessions at the Conference for the Advancement of Science Teaching – Corpus Christi, TX
8 Kentucky NEED Workshop – Hazard, KY
9 Kentucky NEED Workshop – Whitesburg, KY
10 Kentucky NEED Workshop – Pippa Passes, KY
11-13 NEED Sessions at the North Carolina Science Teachers Association Conference – Greensboro, NC
12 Kentucky NEED Workshop – Florence, KY
12 NEED Workshop – Oklahoma City, OK
14-20 American Education Week (for more information, visit www.nea.org/aw)
15 America Recycles Day (for more information, visit www.americarecyclesday.org)
15 Illinois Renewable Fuels Workshop – Edwardsville, IL
18-19 NEED/ New York Energy Smart Students sessions at the Energy in Schools Conference – Albany, NY
22 Kentucky NEED Workshop – Bowling Green, KY
23 Kentucky NEED Workshop – Princeton, KY
29 Rhode Island Solar on Schools Workshop – Cranston, RI

December 2004
1 Kentucky NEED Workshop – Murray, KY
2 Kentucky NEED Workshop – Owensboro, KY
3-5 NEED Hydrogen Committee Meeting – Chicago, IL
7 Kentucky NEED Workshop – Alexandria, KY
8 Kentucky NEED Workshop – Grayson, KY
8 New York Energy Smart Students Workshop – Syracuse, NY
9 Kentucky NEED Workshop – Prestonburg, KY
9-10 NEED Workshops – Victoria, TX
10 Kentucky NEED Workshop – Pikeville, KY
14 Kentucky NEED Workshop – Lexington, KY

January 2005
11 Kentucky NEED Workshop – Independence, KY
25 New York Energy Smart Students Workshop – Albany, NY

April 2005
8-10 Teacher Advisory Board Meeting – Chicago, IL

June 2005
13-17 Kentucky Traveling Energy Conference for Educators
24-27 NEED Youth Awards for Energy Achievement – Washington, DC

July 2005
9-13 NEED Energy Conference for Educators – Alexandria, VA
16-20 NEED Energy Conference for Educators – New Orleans, LA
24-28 NEED Energy Conference for Educators – Las Vegas, NV

* For information about Ohio workshops, go to www.ohioenergy.org
** Go to www.need.org for up-dated information about NEED workshops and events.

Energy Analysis
NEED, in partnership with the Energy Information Administration, recently released Energy Analysis, a companion activity guide to EIA’s Energy Perspectives data and forecasting publication. The new activity develops graphing and data analysis skills, and encourages students to predict energy trends, challenges, and opportunities.

Energy Hog Challenge Materials Available Now!
Energy Outreach Colorado and NEED are pleased to have the Energy Hog Challenge Teacher and Student Guides available from NEED. If you’d like to be an Energy Hog Buster, email energyhog@need.org to order your classroom set of materials.

Mark your calendars for July 2005!
NEED’s Energy Conferences for Educators are scheduled for:

July 9-13, 2005 Alexandria, Virginia
July 16-20, 2005 New Orleans, Louisiana
July 24-28, 2005 Las Vegas, Nevada

If you would like to sponsor teachers to attend, please contact Mary Spruill at 703-257-1117. If you’d like to attend, watch your mail for the brochure and registration form coming soon!
Iowa
Bill Wright, a teacher from Panora, will join the Energy Center at the Iowa School Board Association Annual Conference in November. He’ll bring two students and a NEED unit to talk with attendees about NEED Energy Conferences and how he is implementing what he learned in his classroom. Information about Energy Center sponsorships for the summer 2005 NEED Conferences will also be available.

Florida
Brevard County District Inservice Day was held on August 30, 2004. Science teachers met at Eau Gallie High School, where one of the sessions focused on NEED’s Science of Energy materials. Presenters were Laura Headley, NBCT, and Elizabeth Youngs, NBCT. Teachers experienced hands-on learning using the Science of Energy Kit and discussed how NEED could enhance the curriculum for Brevard County students as they prepare for the Florida Comprehensive Assessment Test in science. NEED materials are aligned with National Science Standards as well as Florida’s Sunshine Standards. Laura Headley and Carolyn Wuest (NEED Coordinator – Escambia County) also conducted sessions at the Florida Association of Science Teachers Conference in October.

During the aftermath of Ivan, the Pensacola News Journal in Education produced K-12 curriculum newspaper books entitled “Survivin’ Ivan School.” The newspaper book provided parents with activities and suggestions for using the newspaper to facilitate students learning while schools were closed. NEED activities were featured. Certified teachers were available each day by telephone to answer questions and to help parents and students with the activities.

West Virginia
Thanks to WV NEED Lead Teachers Wayne Yonkelowitz and Linda Fonner, energy workshops were hosted for teachers throughout the summer and fall. In June, PPG Industries sponsored an Environmental Workshop that included NEED programs for the five Northern Panhandle counties. In July and August, NEED programs were presented at the Governor’s Summer Institutes in Bridgeport, Sutton, and Parkersburg. In October, two NEED workshops were conducted as part of the West Virginia Science Teachers Association Convention.

NEED Teacher Advisory Board
The October meeting of the NEED Teacher Advisory Board was a great success. The group continues to work on exciting additions to NEED curriculum and training programs. Upcoming additions include Energy on Public Lands – activities and workshops – sponsored by the Bureau of Land Management, U.S. Department of the Interior; the Middle School Hydrogen Education program – H2 Educate; new activities for the U.S. Department of Energy’s EnergySmart Schools programs; Careers in Energy resources, and innovative ideas for the celebration of NEED’s 25th Anniversary Year 2005! The NEED Project is grateful for the hard work the Teacher Advisory Board puts into making NEED better every year and bringing the needs of classroom teachers to our attention!

NEED Receives Interstate Oil and Gas Compact Commission Stewardship Award
On October 18, NEED received the Interstate Oil and Gas Compact Commission’s Chairman’s Stewardship Award for outstanding energy education efforts. Recognition from the IOGCC is a testament to the comprehensive energy education programs NEED makes available to schools across the country. NEED appreciates the support it receives from so many IOGCC members.

California
Almost 200 California teachers have a lot to cheer about! The BP–sponsored A+ for Energy Awards Ceremony was held on October 5, 2004, at Universal Studios in California. With Ed Begley, Jr. as the master of ceremonies, 183 California classroom teachers received awards in amounts of $5,000 or $10,000. Over $2 million in cash grants and curriculum resources are being provided to the teachers in this program. Each teacher receives a NEED Science of Energy Kit, a class-set of Energy Infobooks, and NEED Curriculum Packet. In July 2005, all awardees can attend one of NEED’s California Energy Conferences for Educators. For more information about the program, visit www.aplusforenergy.com.

California Science Teachers Association!
Over 70 educators received NEED resources and brainstormed ways to increase their energy activities in the classroom at the recent CSTA Annual Conference in San Jose. Attendees exchanged ideas about applying for future grants, planning programs in their classrooms and implementing integrated energy units in their schools.

Mississippi and Tennessee
Thanks to support from the Mississippi Development Authority—Energy Division and the Tennessee Energy Education Network, teachers from Mississippi and Tennessee worked across state lines at a recent MS/TN NEED Workshop. Mississippi and Tennessee are working together to build strong energy education programs by providing NEED curriculum materials and training.

New York
NEED’s New York program, the Energy Smart Students Program, is now underway with major sponsorship from the New York State Energy Research and Development Authority (NYSERDA). The first full-day workshop in the Hudson Valley was attended by over 40 teachers and upcoming workshops are scheduled in Syracuse and Albany. The NY program also includes an innovative component for vocational students in building trades courses that is being developed in partnership with Onondaga Cortland Madison (OCM) BOCES, a regional, state-funded, educational services organization. These students will experience a one-day introduction to the growing field of Home Performance. During the workshop, students will get hands-on exposure to energy auditing skills and the basics of building science. The intention is to develop a more extensive program that will enable students to receive a state-recognized certification as part of their coursework. Other programs include an energy bike program, summer day camps, and a student community connections program. Be sure to stop by the NY web site (www.need.org/newyork) and download the first issue of the program newsletter Energy Smarts.

Conference for the Advancement of Science Teaching
Attendees at the Conference for the Advancement of Science Teaching (CAST) in Corpus Christi, Texas were treated to hands-on NEED activities and classroom curriculum materials, provided by Doris Tomas and Joy Sloan, NEED Lead Teachers in Rosenberg, Texas.
**Activity: Weather Patterns**

**Concepts:**
- Weather changes from day to day.
- Weather changes with the seasons.
- Weather is not the same in all areas of the country or the world.
- Weather can be described in measurable quantities.

**Time:**
Three-five minutes each day for a week, month, or year

**Materials:**
- Blank calendar (one for each student or a large one for the entire class)
- Examples of weather symbols such as sun, cloud, rain drop, snowflake, lightning
- Crayons, markers or colored pencils

**Procedure:**
1. Each day at the same time, have the students record the weather by drawing the appropriate symbol on the calendar. Older students can also record the temperature, amount of precipitation, and wind speed and direction.
2. Use the weather data to create tally charts, bar graphs, or line graphs.
3. Compare and analyze the data over the selected time period.

**Conclusions:**
- Ask the students what the most prevalent weather was over the time period.
- Ask the students what patterns they see in the graphic depictions of the weather data.
- Have the students predict what the weather will be in the coming weeks or months.

**Extensions:**
- Save the weather calendar data each year to have historical data for students to compare.
- Compare weather data for the same time period with weather in other geographic areas.

<table>
<thead>
<tr>
<th>November 2004</th>
</tr>
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<tbody>
<tr>
<td>Monday</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>8</td>
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<td>22</td>
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<td>29</td>
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**ELEMENTARY ACTIVITY: Reading Weather Maps**

**Directions:** Use the weather map below to answer the questions at the bottom of the page.

**Background:** Weather maps use symbols like the ones below to show the weather in different areas of the country.

- **HIGH** and **LOW** show where the centers of air masses are located. High pressure areas usually move toward low pressure areas.
- With a **WARM FRONT**, warm air slowly pushes away cold air. Slow steady rain is usually followed by warm, damp weather.
- With a **COLD FRONT**, cold air pushes away warm air. Storms are usually followed by cool, clear weather.

1. Name two cities where it is raining today. ______________________ ______________________

2. What do you predict the weather will be in Miami tomorrow? Draw the symbol here.

3. What do you predict the weather will be in Denver tomorrow? Draw the symbol here.

4. What do you predict the weather will be in Denver in a few days? Draw the symbol here.

5. What do you predict the weather will be in Seattle tomorrow? Draw the symbol here.

6. Name a city that you predict will have clear weather for the next few days. ______________________
INTERMEDIATE ARTICLE: The Energy in Hurricanes

Hurricanes are huge rotating storms called tropical cyclones. Hurricanes form in the Atlantic or eastern Pacific Ocean. When similar storms form in the western Pacific, they are called typhoons. In the Indian Ocean, the storms are called cyclones.

Tropical cyclones have distinct characteristics. They are tropical because they form in the ocean near the equator. They are cyclonic, which means the storm winds spin around an eye located in the center of the storm. Tropical cyclones are low-pressure systems that have wind speeds of at least 74 miles per hour. The average hurricane contains energy equal to 200 times the world’s electricity generating capacity.

A tropical cyclone, or hurricane, begins as a thunderstorm. A hurricane in the Atlantic Ocean often forms as a storm off the west coast of Africa. It moves west toward the southern United States, picking up energy along the way.

As it crosses the ocean near the equator, the thunderstorm travels across warm, humid air. Water vapor condenses in the storm clouds and heat is released in the process. This heat provides much of the energy for the developing storm. The heat causes the air to rise, leaving a place for additional warm, moist air to fill. As the cycle of evaporation, condensation, heat release, and rising air continues, a circular pattern of wind develops around the center of the storm. This center becomes the eye of the hurricane.

Wind is all around the developing storm. When surface winds come together from different directions in the area where the storm is developing, they push up more warm, moist air. This push strengthens the storm’s winds, giving the storm more energy. As the storm continues to build, high altitude winds push the rising air away from the top, resulting in a continuous flow of air through the storm.

Since a hurricane is a low-pressure storm, it is affected by high-pressure air in the area. As the storm continues to grow and rise, it reaches altitudes where the air pressure is higher. This higher-pressure air helps to remove heat from the rising air. It can be pulled toward the center of the storm, where the air pressure is lowest. When the high-pressure air moves into the center, it fuels the storm’s growth and increases wind speeds.

A storm becomes a hurricane in three stages. First is a tropical depression, which has wind speeds up to 38 miles per hour. As the storm grows, it becomes a tropical storm, with wind speeds between 39 and 73 miles per hour. When wind speeds reach 74 miles per hour or more, the storm is called a hurricane.

Once a tropical depression develops into a tropical storm, it is given a name to help track it. If the storm develops into a hurricane, the name stays the same. Each year, names are chosen by the World Meteorological Organization, with a different list of names for Atlantic and Pacific storms. The list alternates between male and female names. The first storm of the year has a name that begins with the letter A. The storms that recently hit the east coast of the United States and the Gulf of Mexico were Hurricane Charley, Hurricane Frances, Hurricane Ivan, and Hurricane Jeanne.

For more information about hurricanes and satellite imagery of hurricanes, visit the National Hurricane Center at www.nhc.noaa.gov. For information about the people that fly airplanes into hurricanes to record data and take photos of the storms, visit www.hurricanehunters.com.
SECONDARY ARTICLE: Controlling Hurricanes

A hurricane is a huge rotating storm called a tropical cyclone that forms in the Atlantic or eastern Pacific Ocean. If similar storms form in the western Pacific, they are called typhoons; if they develop in the Indian Ocean they are called cyclones. The following characteristics define a tropical cyclone:

- They are tropical; they form in the ocean near the equator.
- They are cyclonic; storm winds swirl around a central eye.
- They are associated with low-pressure systems.
- They have sustained wind speeds of 74 miles per hour or more.

Hurricanes have massive amounts of energy within their systems; the average hurricane contains energy equal to 200 times the world’s electricity generating capacity, by one estimation. They also cover vast areas. When hurricanes approach populated areas, they can cause extensive devastation to buildings and human and animal life. When the latest string of hurricanes hit Florida and the Gulf of Mexico, 107 people lost their lives and at least $20 billion of insured damage was reported. It is estimated that at least $20 billion more in uninsured damage occurred.

There are three basic pieces of information that are needed in the effort to control the path and severity of a hurricane. First, the predicted path of the hurricane needs to be extremely accurate. Second, physical changes, such as air temperature, that affect the path and strength of the hurricane need to be understood. Third, ways that humans can make those physical changes happen economically need to be explored.

Hurricanes are researched in a variety of ways. Satellite images of clouds and storms provide information about the stages of hurricane formation and path direction. Aircraft or ships can enter the hurricane area to collect data or release airborne sensors that travel through the storm while transmitting data to a land-based computer. Buoy systems have weather stations that transmit data throughout the hurricane as well. More recently, computer simulations and models play an important role in hurricane research.

In the past, attempting to control hurricanes was not successful. In the 1960s, the plan was to seed clouds with silver iodide particles to encourage precipitation formation in the higher altitudes of the hurricane. It was assumed that greater precipitation formation would cause the eye to increase in size and therefore weaken the strength of the hurricane. The trial did not accomplish its goal in part due to the fact that there is not enough water vapor present at the higher altitudes in a hurricane.

Current research into controlling a hurricane has utilized computer simulations. By using current weather forecasting technology, in conjunction with past hurricane information, meteorologists can test the impact of changing certain variables that contribute to a hurricane’s path and intensity. The variables that seem to have the most impact upon the storm are temperature and wind.

By initiating planned disturbances in the temperature or wind in and around a hurricane, meteorologists believe they can shift the path or decrease the intensity of the storm. But how can humans impact the temperature and wind around a hurricane? There are several possible options. One is to use solar powered satellites that can concentrate microwaves from the sun and direct them to specific areas in the ocean. Since water readily absorbs energy from microwaves and solar energy is abundant in space, this is a potentially viable option. Another is to limit the ability of the storm to accumulate water vapor, by spreading a thin film of biodegradable oil across an area of water over which the hurricane will pass. Since hurricanes are fueled by the heat released when water vapor condenses, this could decrease the energy available to the storm.

There is also a possibility of controlling hurricanes by directing jets to specific flight paths that would cause the contrails (the condensation trails left behind jet engines due to warm, moist exhaust mixing with cool, dry air) from aircraft to interact with and impact the storm.

While computer simulations are not perfect, initial tests show promise. Tested models of past hurricanes showed changes to the path and wind velocity of the storms. It appears that even small atmospheric changes have the potential to greatly decrease the amount and severity of damage done by hurricanes.

For more information about hurricanes and controlling weather, visit the National Hurricane Center, www.nhc.noaa.gov, and the National Oceanic Atmospheric Administration Hurricane Research Division www.aoml.noaa.gov/hrd/.

Article summarized from the October 2004 edition of Scientific American.
Hurricane Moves More Than Houses
When Hurricane Ivan hit the Gulf of Mexico, more than just buildings on land were affected. Two offshore oil rigs disappeared after the storm hit. All operations had been shut down and the crews from both rigs had been evacuated before the storm engulfed the area where the rigs were moored.

The Deepwater Nautilus, one of the largest drilling rigs in the Gulf, was found more than 70 miles from its original location. The other rig, the Ocean Star, was moved 12 miles by the powerful winds and waves. Both rigs appear to be in good condition, but additional inspections are being conducted before they are returned to regular operations. No oil was spilled into the Gulf when the rigs were moved.

High-Tech Thermostats
Changing to a programmable thermostat in your home has the potential to save up to $100 a year on heating and cooling bills. Most of these thermostats provide the opportunity to customize seven days worth of programming. A new model on the market is wireless and portable. It allows the ability to warm up specific rooms. Even more advanced models work with home security systems, allowing consumers to make adjustments from their computers or phones, even when they are not home.

Other thermostat advances include models that monitor home energy use and turn off certain appliances to take advantage of off-peak rates. For more information, visit www.energystar.gov, www.residential.carrier.com, and www.homeauto.com.