

# ENERGY EXCHANGE

## Idaho Energy Workshop Brings NEED Curriculum and Materials to Teachers Throughout the State

“Thanks to the energy curricula developed by NEED, we were able to bring in more than 100 K-12 teachers to our recent workshop and send them home with both the knowledge they need and the resources they will use in their classes to reach literally thousands of students around the state,” said Melinda Hamilton, Director of Educational Programs at the Idaho National Laboratory (INL).

Melinda explained that while INL has conducted a number of teacher training programs in the past, the August “Idaho Energy Workshop for Teachers” kicked off a major new effort to enhance an inquiry-based approach to STEM (Science, Technology, Engineering, Math) education around the state. “The premise is that the more teachers you can reach and teach how to go into the classroom and use this material,” she said, “the more students you will reach, especially in the many rural communities throughout Idaho. We wanted to give teachers the tools and the knowledge to integrate information on all the major energy sources with an inquiry-based approach. The NEED materials gave us those tools that we needed to teach the teachers. We’ve worked with NEED before in other workshops and know how great the materials are.”

Justin Taylor, a third-grade teacher at Hawthorne Elementary School in Idaho Falls, said that he and the other teachers at the workshop all felt they “not only got a great deal of information from the presentations and hands-on activities, but also now had the confidence to go back to their schools and teach the topics. I think this is probably most valuable for me and the other elementary school teachers who are teaching the very basics of energy – a new concept to the younger students – and we can now explain the principles and details in an understandable way. This is huge to teachers who can now take what they learned and put it to use immediately.”

Melinda added that “An important aspect of this program was that we worked with teachers who really organized the program, and interns working with us at the lab helped put it all together. Having the teachers involved gave the program instant credibility with other teachers and really made sure it was geared toward the class materials and background information that participants would find most valuable.”

The workshop was sponsored by INL and the Idaho Department of Education, and was held at Skyline High School in Idaho Falls. Topics covered at the program included the science of energy, wind, solar, nuclear, geothermal, fossil fuels, biomass, and energy conservation and consumption. “It was really a thorough look at energy for teachers at all levels, and we were even able to provide each participant a NEED energy kit of their choice to

give them more useful classroom materials,” Melinda said. “The feedback we got from teachers confirmed what we had expected – they greatly appreciated having the NEED materials to take back to their classes to help them gear the material toward the appropriate grade levels.”

The learning didn’t end when the conference finished, though. This was just one of the first steps in INL’s development of a new website, [www.energyforeducators.org](http://www.energyforeducators.org), that will have a number of classroom lessons for all grade levels. Trevor Smuin, an intern working at INL, has been putting together lesson plans for the website and has already posted a number of them. He noted that “one of the requirements for workshop participants to get continuing education credits is that they develop new lesson plans.

When these get submitted to us, we will be putting these lessons online for everyone to be able to use in their classes. I envision the site continuing to grow as more teachers supply classroom materials for the use of other teachers. This will prove to be an especially valuable tool for the many teachers in rural areas of the state who are not able to travel to conferences and workshops to gather information like this.”

Melinda added one final comment on the workshop that will ensure its usefulness to teachers throughout Idaho. “Teachers respect what other teachers do, so when they learn directly from another educator, they are very open to what they see and hear. Ten of the teachers involved with this workshop actually received NEED facilitation training so they can provide professional educational programs around the state. This strategy will be effective in reaching teachers about today’s energy technologies by providing the information and the materials, especially in rural communities, that might not otherwise have been discussed and shared.”



*Gary Seifert, INL’s lead for Power Transmission, talks to the media visiting the recent workshop. A main emphasis of the workshop was on giving teachers hands-on demonstrations to help their students experience energy technologies. The solar cookers are used to teach about radiant energy transformation to thermal energy.*

# NEED NEWS

## State Standards Correlations

All NEED materials are aligned to the National Science Education Standards, and NEED is currently in the process of updating the correlations between NEED materials and all 50 states' science standards. There is a spreadsheet for each state with tabs at the bottom leading to the specific grade or subject area. Educators can scroll through the NEED guides to find standards met by each activity, or they can scroll through their standards and find NEED activities that match. Visit [www.need.org](http://www.need.org) to find the spreadsheets. If your state isn't there yet, check back soon!

## Curriculum Updates

NEED reviews and updates its curriculum each year with new data and information available from the U.S. Energy Information Administration. These updates ensure that students and teachers are learning and teaching about energy with the most current information available. More substantial upgrades were completed in the past few months to the four levels of the Wind curriculum and the *Energy Infobooks* were updated with more timely information about the electric grid and the energy sources we use today. NEED welcomes comments about its curriculum, including both the content and its use in the classroom. Please let us know what you think! Email [info@need.org](mailto:info@need.org) with recommendations, suggested additions, and more.

## NEED Expanding in Kentucky

Since the start of the school year, NEED has launched two new programs in the Commonwealth of Kentucky. A regional Children's Energy Education Program began with Kentucky Utilities Company (KU) and Louisville Gas and Electric (LG&E) Company (both E.ON U.S. companies) to provide energy education and energy-efficiency programs to local schools. Regional coordinators work directly with schools to educate about energy and to incorporate energy efficiency in their school buildings. With support from the Kentucky Department of Energy Development and Independence (DEDI), an expanding Kentucky NEED Project now has regional energy coordinators across Kentucky. These funds, provided as part of the 2009 American Recovery and Reinvestment Act, provide three years of support for energy education and energy efficiency in Kentucky schools. We thank KU, LG&E, and DEDI for their support of Kentucky NEED.

## NEED Welcomes Dena Foster To Our Team

Dena comes to NEED Headquarters from Lafayette, Louisiana, where she was a classroom teacher. She has grown up in the energy business, working with her father's energy communication and marketing firm – Foster Marketing of Houston, Texas and Lafayette, Louisiana. Dena joined NEED during a very busy summer and quickly became part of the success of the 2009 NEED Youth Awards for Energy Achievement and the 2009 NEED Energy Conference series. Her work includes editing and review of curriculum, evaluation and data collection, and teacher and classroom support. In her spare time, she loves baseball (especially rooting for the Red Sox) and exploring her new city with her dog Chandler.



Dena Foster

## NEED Celebrates Its 30th Anniversary in 2010!

Watch for big news coming soon about activities planned throughout the coming year to celebrate NEED's 30 years of providing K-12 teachers with classroom-ready energy information, easy-to-use curriculum, and detailed resource materials.

Did you know that NEED materials are used in more than 65,000 classrooms every year? Or that NEED hosts as many as 700 workshops and training programs annually? It's all true.

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## Japanese Educators Surprise NEED Staff With Translated Curriculum Materials

Takeshi Fujii and Hiroshi Odajima, high school teachers from Japan, attended the 2009 National Energy Conference for Educators in Nashville, TN. They surprised the facilitators by presenting them with copies of NEED's *Energy Infobook*, *Science of Energy*, *Transparent Energy*, *Blueprint for Success*, *Learning and Conserving*, *EnergyWorks*, *Electroworks*, *Energy in the Balance*, and *Games and*



Hallie Mills, Don Pruett, Keith Etheridge, Doug Keaton, and Shelly Baumann, facilitators at the conference, discussed the translated NEED materials with Takeshi Fujii (third from left) and Hiroshi Odajima (on his left).

*Icebreakers* that had been translated into Japanese. After the conference, Mr. Fujii and Mr. Odajima visited with the staff at NEED's headquarters in Manassas, VA.

Mr. Odajima explained that "In Japan, there is no curriculum for energy education. The NEED Program is very excellent."

Energy is part of Japan's national standards, but many teachers don't

know how to teach about it. The translated NEED materials have given many Japanese teachers a resource to use in their classrooms. The goal is for students to develop critical thinking and decision-making skills as they think about their energy choices.

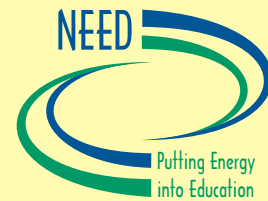
So far, more than 500 sets of curriculum have been distributed to K-12 and college teachers. They are currently using NEED materials with data reflecting the United States' energy production and consumption, and the next step for the project is to revise the books using Japanese data.

### NEED and NOIA Energy Awareness Month Workshop and Offshore Activity Books

Educators from around Colorado Springs will join NEED and the National Ocean Industries Association (NOIA) for an Energy Awareness Month workshop on October 8. The educators will participate in the *Science of Energy*, *Energy Enigma* (for teaching about the nation's energy sources), and will hear from speakers involved in the development of energy off the nation's coasts. NEED partners with the National Ocean Industries Association on the *Offshore Activity Book* with lessons about offshore energy. For a class-set of books, email [info@need.org](mailto:info@need.org).

### NEED Calendar Now Offers Online Registration

The NEED calendar at [www.need.org/calendar](http://www.need.org/calendar) is an up-to-date list of the workshops and events coming up, and this school year we have made online registration available for workshops. It takes just a few clicks for you to register for the workshop of your choice. As you can see from the October calendar on page 7 of this issue, there's more going on now than ever! Check out the full Fall calendar online today.



### The NEED Project NATIONAL ENERGY

#### EDUCATION DEVELOPMENT

P.O. Box 10101, Manassas, VA 20108

Phone: 800-875-5029

Fax: 800-847-1820

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

Web: [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.*

#### NEWSLETTER STAFF

Mary Spruill

Executive Director

Hallie Mills

Curriculum Director

Ken Sheinkopf

Editor/Designer

*Energy Exchange* is published four times a year by NEED for educators and students. We welcome your questions, comments and suggestions.

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## Teacher Talk ... with Shelly Baumann



Shelly Baumann

Shelly Baumann is a 6<sup>th</sup> grade teacher at North Rockford Middle School, North Rockford, Michigan. She is also a NEED workshop facilitator.

I especially enjoy using Science of Energy (SOE) in my 6<sup>th</sup>-grade classes.

One of the best things about it is that it fits our curriculum so I always get to use it. (NEED Note: Science of Energy uses six separate stations and one teacher demonstration to teach students about energy transformations).

I like being able to introduce the material and let the students explore, inquire, and peer teach. Once I get them going, I always find that they are engaged and are thinking and explaining.

Someone once told me that when the teacher is working harder than the students, there is something wrong. I always feel that with SOE, students are doing the work they need to do to really understand the concepts. I find that after I teach SOE in the fall in seminars, I can come back to the students in February or March and say I have a NEED Workshop coming up and I need to do SOE. I ask them to review their station, and they will get it out and in about 10 minutes they are good to go. They remember it! My daughter was in my class in 6<sup>th</sup> grade. She says that a highlight of that school year was the energy unit, SOE, and the way we run

it. The students learn the station, then explain the station, and share it with their peers. They become such an expert at that one station, while learning the others, too.

We have 10 science teachers in our district in 6<sup>th</sup> grade and it took two or three years for me to get them all involved. Now they use the unit and at least half of them tell me it is their favorite unit of the year. Many think we should really do more of our



Students demonstrate in Station 1 how gravitational and stored mechanical energy transform to motion energy.

units to incorporate the same instructional approach.

Station 1, the kinetic energy station with the happy and sad balls, the toy car and the balloon, is always popular. The kids love that and can really connect to it. They really enjoy the chemical reaction station with the exothermic/endothermic chemical

reactions because the vinegar and baking soda bubble up. I find I can put an essay question on a test and the students come up with coherent, thoughtful explanations for their energy stations.

The students become the energy experts in the classroom, and they teach the other kids in the class. I have taken many of them to my NEED workshops and had them teach teachers. Their growth in that is

awesome as well because when you start out the first time, they are quiet with little voices, but by the third or fourth time teaching the lesson, they get animated. You can see the confidence they build as the teachers compliment them. When I do these programs, I ask the class who's interested in doing this with me, and I've had volunteers from gifted and talented students to the special education students who really want to be involved and when they are on, they are on, and they know it.

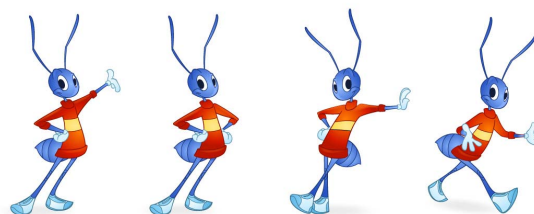
I can't say enough good things about the Science of Energy unit and how much my students learn from it and how much they enjoy it.

To use Science of Energy with your students, download the guide at [www.need.org](http://www.need.org).

## Energy Ant Gets a Make-Over

Over the summer, the U.S. Energy Information Administration gave Energy Ant and the Energy Kids site (<http://www.eia.doe.gov/kids>) a fresh new look. Energy Ant is now sporting sneakers instead of booties, and the site has the same great content but with a colorful new look. Check out the "For Teachers" section!

You'll also enjoy reading EIA's blog post about energy education at [http://blog.usa.gov/roller/govgab/entry/what\\_do\\_you\\_know\\_about?comment=view](http://blog.usa.gov/roller/govgab/entry/what_do_you_know_about?comment=view). The post, which ran on August 24, has links to great energy articles on EIA's website that are written in plain language. Check it out.



## Grades K-5 Lesson: Energy Awareness Month

### A Sustainable Energy Future: Putting All The Pieces Together.

## How We Use Energy

**Introduction:** Energy is light, heat, sound, motion, growth, and energy powers technology. Think about all of these forms of energy. We don't often think about it, but we use energy every day in everything we do. As a country, we need to be more aware of how we use energy, and make choices to use energy wisely so we have energy to meet our needs now and in the future.

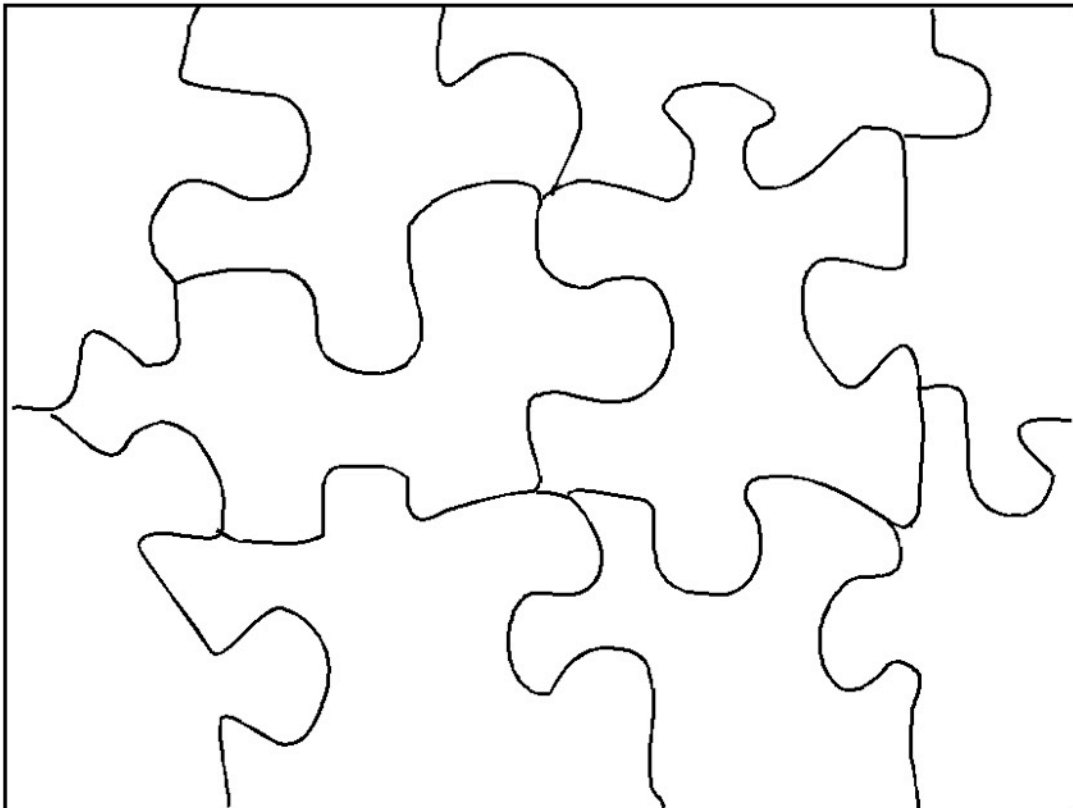
#### **Directions:**

1. Have your students brainstorm a list of all of the ways you use energy at home or at school. You may want to take your students on an energy survey around school and point out everything that is using energy. If students don't bring it up, remind them that energy is used to transport them to and from school also.
2. Discuss how students can save, or conserve, energy.
3. Copy a puzzle for each student. Students should create an energy- saving illustration and message on the puzzle and carefully cut apart the pieces.
4. Students should then take their puzzles home and share them with their families. Ask students to talk with their families about how they use energy at home and see if they can find ways to reduce their energy use. They can all work together putting the pieces in place.

#### **Resources:**

*Primary and Elementary Energy Infobook, Saving Energy Flipbook, Building Buddies:* [www.need.org](http://www.need.org)

Interactive website for students, teachers and parents about saving energy at home and school: [www.energystar.gov](http://www.energystar.gov)



## Grades 6-12 Lesson: Energy Awareness Month

### A Sustainable Energy Future: Putting All The Pieces Together. **Becoming Aware of Energy Costs**

**Goal:** Students will become aware of how much energy they use at school, and the cost financially and environmentally.

**Introduction:** It takes energy to run the appliances and machines we use everyday. The national average commercial cost to use this energy is \$0.10/kilowatt hour. In addition to the financial cost, there is also an environmental cost in the form of carbon emissions. The general rule of thumb is that every kilowatt-hour of electricity produces 1.6 pounds of carbon dioxide. Some sources don't emit carbon dioxide, but more than 70% of our electricity is produced by fossil fuels. Fossil fuels play an important role in allowing us to have lifestyles we're accustomed to, but they do emit carbon dioxide and we want to be good stewards of our resources.

**Directions:**

1. Have students make a list of the appliances or electronic devices used at school.
2. Teach students to read an electric nameplate. Show students where they can find the current (measured in amperes, A) and voltage (V). Some nameplates may also include the wattage (W). If the wattage is not listed, teach your students to calculate it with the following formula:  $W = V \times A$ .
3. Students should conduct an energy survey by finding the wattage for each object using information on electric nameplates. If you have access to a "Kill A Watt" meter, students can measure wattage using this tool. They can also find the average wattage online. Many utility companies list estimates on their websites.
4. Students should calculate the economic and environmental cost of using each appliance during the school year.
5. Discuss their findings. Brainstorm with the class ways that energy could be used more efficiently or how it can be conserved.
6. Extensions: Have your students create informational posters or write school announcements to help their peers become more energy aware. Ask students to analyze their use of electrical appliances and devices at home and design a plan with their families to conserve more energy (the average rate for residential electricity is \$0.11).



Use the formulas below to find the values needed:

- Yearly Use = hours used/week x weeks used/year = hours/year
- One kilowatt is equal to 1,000 watts. To find kilowatts, divide by 1000
  - $kW = W/1000$
- Yearly Cost = Hours Used x Kilowatts x Cost of Electricity (kWh)
- $CO_2$  a year =  $W \times \text{hours/year} \times \text{rate of } CO_2/kWh$

**Sample Table:**

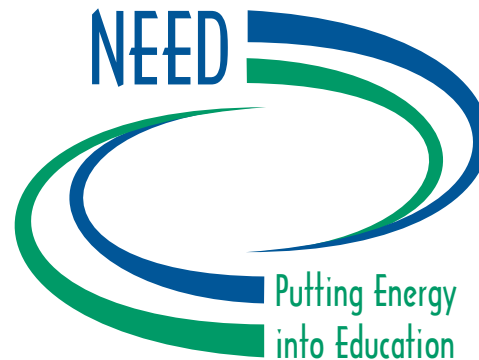
Device or Appliance	Watts W	Kilowatts kW	Hours/Week	Hours/Year	Rate \$/kWh	Yearly Cost	CO <sub>2</sub> /kWh lbs	CO <sub>2</sub> /year lbs
					\$0.10		1.6	
					\$0.10		1.6	
					\$0.10		1.6	
					\$0.10		1.6	

**Resources:** *Monitoring and Mentoring, Learning and Conserving, School Building Survey, Energy Conservation Contract, Saving Energy Expo*, all available at [www.need.org](http://www.need.org). Learn more about energy conservation at [www.energystar.gov](http://www.energystar.gov).

## October Calendar of Events

- 1** Illinois Solar Energy Workshop, sponsored by ComEd (Chicago, IL)
- 1** New England Energy Workshop, sponsored by IPAA (New Bedford, MA)
- 3** Colorado Wind for Schools Workshop, sponsored by NREL (Burlington, CO)
- 6** New England Energy Workshop, sponsored by IPAA (Westport, MA)
- 6** Virginia Energy Workshop, sponsored by Dominion - North Anna Nuclear Information Center (Mineral, VA)
- 6** Illinois Solar Energy workshop, sponsored by ComEd (Oak Brook, IL)
- 6** Colorado Energy Resources Workshop, sponsored by EnCana (Rifle, CO)
- 7** Louisiana Energy Resources Workshop, sponsored by EnCana (Bossier City, LA)
- 7** Illinois Energy Workshop, sponsored by ComEd (Oak Brook, IL)
- 7** Virginia Energy Workshop, sponsored by Dominion - Surry Nuclear Information Center (Surry, VA)
- 7** Ohio Energy Workshop, sponsored by ConocoPhillips (Columbus, OH)
- 7** Energize Your Classroom Workshop, sponsored by SPE and ExxonMobil (New Orleans, LA)
- 7-9** 2009 Summit, Center for Energy Workforce Development (Indianapolis, IN)
- 7-10** NEED workshops at the North American Association of Environmental Education Conference (Portland, OR)
- 8** Energy Awareness Month Workshop, sponsored by the National Ocean Industries Association (Colorado Springs, CO)
- 10** TXU Solar Academy Workshop (Nacogdoches ISD)
- 13** Lubbock Energy Workshop, sponsored by ConocoPhillips (Lubbock, TX)
- 13** Kentucky Energy Workshop, sponsored by DART Foundation (Cave City, KY)
- 14** Kentucky Energy Workshop, sponsored by ConocoPhillips (Owensboro, KY)
- 15** Illinois Energy Workshop, sponsored by ComEd (Joliet, IL)
- 15** Indiana-Michigan Workshop, sponsored by Indiana-Michigan Power/American Electric Power (Elkhart, IN)
- 15** TXU Solar Academy Solarbration (Ector County ISD)
- 16** Kenton County Energy Teams Workshop, sponsored by Duke Energy (Kenton County, KY)
- 17** New York Energy Workshop, sponsored by ConocoPhillips (Brooklyn, NY)
- 19** Henderson County Energy Teams Workshop, sponsored by Henderson Energy Committee (Henderson, KY)
- 20** TXU Solar Academy Workshop (Celina ISD)
- 20** Colorado Energy Resources Workshop, sponsored by EnCana (Erie, CO)
- 20** Kentucky Energy Workshop sponsored by LG&E and KU (London, KY)
- 21** Kentucky Energy Workshop, sponsored by Kentucky River Properties (Hazard, KY)
- 22** Alaska Energy Workshop, sponsored by ConocoPhillips (Anchorage, AK)
- 22** NEED Workshops at the Massachusetts Association of Science Teachers Conference (Boxboro, MA)
- 22** Kentucky Energy Workshop, sponsored by Kentucky River Properties (Harlan, KY)
- 22-23** Wyoming Energy Resources Workshop sponsored by EnCana and Wyoming Ag in the Classroom (Riverton, WY)
- 22-25** NEED workshops at the California Science Teachers Association Conference (Palm Springs, CA)
- 26** Texas Energy Resources Workshop, sponsored by EnCana (Ft. Worth, TX)
- 27** Texas Energy Workshop, sponsored by ConocoPhillips (Sweeny, TX)
- 28** Kentucky Energy Workshop, sponsored by KY Dept. of Energy Development and Independence (Morehead, KY)
- 29** H<sub>2</sub> Educate Workshop, sponsored by the U.S. Dept. of Energy (Highland Heights, KY)
- 29-31** NEED workshops at the NSTA Regional Conference (Minneapolis, MN)

Visit [www.need.org/calendar](http://www.need.org/calendar) for a complete listing of all Fall events.



## October is Energy Awareness Month

On September 13, 1991, President George H.W. Bush issued a proclamation declaring October as "Energy Awareness Month." Since then, the U.S. Department of Energy has been conducting energy-awareness campaigns each October to educate people about energy efficiency and conservation and to encourage Americans to make wise energy choices.

This year's theme is *A Sustainable Energy Future: We're Putting All the Pieces Together*. As our energy demands continue to rise, some areas are already facing energy shortages. The federal government and private industry are working to develop new technologies and infrastructure that will increase our energy capacity. Every individual also plays an important role in shaping our energy future.

NEED has lots of great ideas for ways you can celebrate this event with your students. Consider hosting workshops and information sessions for your school and local community. Have your students do a home energy audit and share their results. Make a commitment to reduce energy use at home. Learn about the energy resources in your local area. Participate in Energy Star's Change the World Campaign! NEED is a pledge driver for the campaign so join our group! Sign up today on [www.need.org](http://www.need.org).

For lots more ideas and activities to get your students involved in this year's Energy Awareness Month, visit [www.need.org/EnergyAwarenessMonth](http://www.need.org/EnergyAwarenessMonth).

**A Sustainable Energy Future**  
WE'RE PUTTING ALL THE PIECES TOGETHER

Be part of the solution to climate change and help build a clean energy economy.

Here's how you fit in:

- Change to compact fluorescent bulbs
- Purchase ENERGY STAR® equipment
- Turn off lights when not in use
- Combine trips and share rides
- Use mass transit
- Drive a hybrid or fuel-efficient car

Find out more:  
[www.femp.energy.gov](http://www.femp.energy.gov)

U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy  
For more information contact: EERE Information Center  
1-877-438-2642 | [www.need.org](http://www.need.org)