

ENERGY EXCHANGE

A publication of the National Energy Education Development Project

January 2008

Change a Light Event

On November 14, 2007, students from St. Margaret Catholic School performed an energetic skit to inform the community about the Change a Light, Change the World Campaign. The students also registered people and handed out flyers and Change a Light Pledge statements. Approximately 100 people attended the event.

Have you taken part in an event to celebrate the campaign? If so, send pictures and information about your event to info@need.org.



Students from St. Margaret Catholic School at their Change a Light event.

NEED Youth Awards Program

Remember that **April 15, 2008**, is the deadline for submission of entries to NEED's Youth Awards Program for Energy Achievement. Details can be found in NEED's *Projects and Activities Guide* and online at www.need.org/youthawards.php. The Youth Awards Conference will be held **June 20-23, 2008**, at the Hyatt Regency Crystal City in Arlington, VA.

2008 Summer Energy Conferences

Galveston, Texas July 13-17, 2008

Las Vegas, Nevada July 20-24, 2008

Plan now to attend one of NEED's popular five-day energy education conferences. The registration fee is \$1,100 and includes double occupancy lodging, most meals, and classroom materials.

Registration forms and information are available by emailing info@need.org or on the NEED website at www.need.org/summertraining. Register today to ensure you get a spot!

NEED Receives NAAEE Award

On November 17, 2007, the NEED Project was awarded the "Outstanding Service to Environmental Education by an Organization at the Regional Level" award from the North American Association for Environmental Education (NAAEE). The award is given each year to an organization that has made a significant contribution to environmental education in an area of the organization's country that extends beyond a local impact. For info, go to www.naaee.org/programs-and-initiatives/awards.

Global Warming Guide

NEED is excited to be featured in Scholastic's new *Down-to-Earth Guide to Global Warming* written by Laurie David and Cambria Gordon, which features our *Kids Teaching Kids* approach to education, as well as Youth Awards projects showcasing ways that students can have a positive impact on global climate. You can go to www.scholastic.com/downtoearth/index.htm for more information. The site also has kid friendly e-cards, a quiz, a green check list, links, and a discussion forum.

ConocoPhillips Launches Program

NEED is pleased to partner with ConocoPhillips on an academic program focused on educating America's teachers about key energy topics. In January 2008, NEED and ConocoPhillips will begin one-day energy classroom workshops for K-12 teachers in 24 cities across 15 states.

The seminars will create awareness of today's energy challenges and the importance of using energy wisely. Workshops will feature the science of energy, energy sources and energy efficiency among other topics. Participating teachers will receive training, standards-based, grade-appropriate energy curriculum sets and hands-on student kits. ConocoPhillips also will sponsor training opportunities for educators through workshops at national and regional conferences for educators throughout the year.

For more information, contact NEED at 1-800-875-5029 or visit www.need.org/conocophillips.

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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.

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A list of NEED sponsors is available at www.need.org and in our Annual Report.

Energy Exchange is published five times a year by NEED for educators and students, and is available at www.need.org.

NEED welcomes questions, comments, and suggestions. Please contact info@need.org.

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Educators may reproduce articles and activities for classroom use.

Calendar of Events

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

January 2008

- BP A+ for Energy Program Grant Applications available at www.aplusforenergy.com
- 9-11 NASULGC/4H Training – Washington, DC
12 Hydrogen Education for Middle School Teachers Workshop – Brooklyn, NY
14 Saving Energy Workshop – Fort Wayne, IN
15 NEED Workshop – Cranston, RI
16 NEED Workshop – Cranston, RI
18 Saving Energy Workshop – New Albany, IN
22 NEED Workshop at BP Solar – Frederick, MD
24 Kentucky NEED Workshop – Georgetown, KY
TBA Conversation on Energy Workshops – sponsored by ConocoPhillips
TBA PG&E Solar Schools Workshops – sponsored by Pacific Gas and Electric Company

February 2008

- 5 Virginia NEED Workshop at North Anna Power Station – Mineral, VA
6-8 NEED sessions at Hoosier Association of Science Teachers Conference – Indianapolis, IN
12 NEED ESL Workshop – Cranston, RI
24-26 NEED sessions at Tennessee-Kentucky Energy Efficiency Conference – Nashville, TN
TBA NEED Workshops sponsored by AEP in Louisiana, Texas, Oklahoma, and Arkansas

March 2008

- 6 Energy Efficiency and Renewable Energy for Schools Conference – Lansing, MI
7 BP A+ for Energy Grant Applications Due
17-18 Kentucky High Performance/Sustainable Schools Conference – KY
18-20 Renewable Energy Workforce Education Conference – Troy, NY
27-30 NEED sessions at NSTA National Conference – Boston, MA

April 2008

- 5-9 NEED Courses at SchoolDude University – Myrtle Beach, SC
9 Cape Light Compact Teacher Conference – Hyannis, MA
13-16 NEED Hydropower Workshop at the National Hydropower Conference – Washington, DC
15 Youth Awards for Energy Achievement Report Deadline
26 West Virginia Energy Workshop – Bridgeport, WV

May 2008

- 3-8 NEED Sessions at Solar 2008, the American Solar Energy Society Conference – San Diego, CA
6 Kentucky NEED Youth Awards for Energy Achievement – KY
8 Offshore Technology Conference NEED Teacher Workshop – Houston, TX

June 2008

- 1-4 NEED Wind Workshop at Windpower 2008 Conference sponsored by the American Wind Energy Association – Houston, Texas
9-13 Kentucky Energy Tour – KY
20-23 NEED Youth Awards for Energy Achievement – Washington, DC

July 2008

- 13-17 NEED National Energy Conference for Educators – Galveston, TX
20-24 NEED National Energy Conference for Educators – Las Vegas, NV
TBA BP A+ for Energy Teacher Conferences – for more information visit www.aplusforenergy.com
TBA West Virginia/Virginia Teacher Conference – sponsored by AEP
TBA Texas/Louisiana/Oklahoma/Arkansas Teacher Conference – sponsored by AEP

For details on Kentucky programs, contact Karen Reagor at kreagor@need.org.

NEED News

American Electric Power

Calling all fourth grade teachers in AEP's service area! If your school receives electricity from American Electric Power, we have good news for you! The AEP Foundation has approved a grant to NEED to provide compact fluorescent light bulbs to fourth grade students throughout the AEP service area – Virginia, West Virginia, Kentucky, Ohio, Indiana, Michigan, Oklahoma, Texas, Louisiana, and Arkansas. To be added to the list of classrooms to receive the CFLs and associated classroom activities, please email Mary Spruill at mspruill@need.org.



BP A+ for Energy Program

The BP A+ for Energy Grant Program is now accepting grant applications. The program provides \$5,000 and \$10,000 grants to classroom teachers in several states. Grant winners receive NEED curriculum materials and sponsorship to attend the A+ for Energy Educator Conference co-facilitated by NEED. For eligibility and to apply, visit www.aplusforenergy.com.

Change a Light, Change the World

Thanks to your help, NEED has already reached 100 percent of our goal of 1,000 pledges for the 2007-2008 campaign. It's not too late to register your school group and participate in the Change a Light Campaign. To learn more, or to download a teacher's guide with activities to support the campaign, visit www.need.org.

Congratulations, Ramona!

Ramona Nelson, Energy Education Specialist and NEED's Tennessee Energy Education Network coordinator, from Huntingdon, TN, is receiving the TN Science Teachers Association's **TSTA Distinguished Educator of the Year Award** for 2007. The Tennessee Energy Education Network (TEEN) develops, disseminates and implements energy education programs for K-12 schools statewide. The network provides classroom presentations, in-service training workshops for teachers, free materials, a bi-monthly newsletter, and annual contests and awards. Congratulations, Ramona, on this prestigious award!

Engineering Students Work with Greenbrier Intermediate School

Engineering students from NEED Teacher Advisory Board member Tom Spencer's class at the Chesapeake Center for Science and Technology (CCST) collaborated with NEED teacher John Sammon's robotics team at Greenbrier Intermediate School to solve problems with their robotics design. Students from Greenbrier came to CCST to work on recording "Energy Management Minutes" and to discuss problem-solving and robotics. A wiki (Web enabled collaboration tool) was used to exchange ideas and work together when students could not meet in person.



Expanded Climate Change Offerings

Thanks to the support of Dominion, NEED is working with several organizations to expand its climate change curriculum activities at all grade levels. The new materials should be available starting this summer.

National Environmental Education Week

National EE Week seeks to enhance the educational impact of Earth Day (April 22nd) and provide recognition to educators who are committed to implementing environmental education programs in their classrooms. This year, EE Week is April 13-19, 2008. EE Week Educators have access to free resources, including online K-12 environmental education curricula and activities at www.eeweek.org.

NEED News

Illinois

Over 250 educators received energy education training this fall with support from ComEd. Participating teachers returned to their classrooms with more than \$700 of hands-on kits and materials to meet Illinois state education standards and teach about energy transformations, electricity, energy efficiency, and real-time pricing. In addition, 80 educators were sponsored by ComEd to learn about solar energy and solar schools. The Illinois Clean Energy Community Foundation sponsored a workshop and solar kits for schools from central Illinois.

Indiana

The Indiana NEED Project is pleased to announce that the 2007-2008 school year will be filled with workshops, the ever-popular NEED hands-on kits and curriculum materials, and the Indiana Saving Energy Program – with classroom lessons and home energy efficiency kits for students and their families. The program is sponsored by Duke Energy Indiana, the Indiana Office of Energy and Defense Development and the American Electric Power Foundation.

Interstate Renewable Energy Council Workforce Education Conference

Look for NEED at the second National Conference on Renewable Energy and Energy Efficiency Workforce Education on March 18-20, 2008 in Troy, New York. Conference sessions will address best practices and teaching models for a wide variety of renewable energy and energy efficiency job sectors. The sessions will focus on instructional strategies, curricula development and related training and market trends. For more information, contact Jane Weissman at IREC at jane@irecusa.org.

National Refrigerator Retirement Campaign

Did you know that roughly 10.8 million “second” refrigerators over 10 years old are in operation in the U.S.? These refrigerators are costing consumers an average of \$1.72 billion per year in energy costs and represent approximately 15.5 billion kWh/year in energy usage. The Time is Right to properly dispose of these inefficient refrigerators and replace them with new, ENERGY STAR® qualified models.

ENERGY STAR®’s The Time is Right Campaign launches in May 2008 and runs through July 2008. During the busy summer sales season, this U.S. Department of Energy-led campaign will work with manufacturers, retailers, energy efficiency program sponsors, recycling partners, and others on a national scale to remove as many of these refrigerators as possible from the grid and replace them with new, ENERGY STAR® qualified models. Want to get involved in spreading the message? The NEED Project is partnering with ENERGY STAR® to create a Teacher Guide for the campaign. Watch for details this spring.



NSTA Regional Conferences and the NSTA National Conference in Boston

NEED will host an exhibit and facilitate a series of workshops at the NSTA National Conference in Boston. In addition, the traditional NEED teacher dinner will be hosted for teachers who actively use NEED in order to provide them an opportunity to network and share experiences. If you are planning to attend the National Conference in Boston, email Mary Spruill at mspruill@need.org to receive more information about the gathering as the event gets closer.

NEED.org

Make sure to watch www.need.org for new curriculum guides, workshops, conferences, grant opportunities, and more. The “What’s New” section will always have links to the newest offerings from NEED. NEED’s new wind curriculum guides were recently added, as well as the 2008 summer conference brochure.

Virginia

Virginia teachers enjoyed a fall with many workshop opportunities sponsored by AEP Foundation, Dominion, the Virginia Department of Mines, Minerals, and Energy and the Virginia General Assembly. Teachers participated in one-day energy workshops on the science of energy, energy sources, electricity, efficiency, and hydrogen.

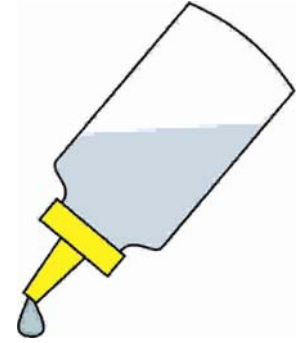
Primary/Elementary Activity: What's In A Drop?

OBJECTIVES

1. To explore the force of gravity.
2. To explore variables that affect the energy of falling water.

QUESTIONS TO EXPLORE

1. How does the height from which water falls affect the energy of the water?
2. How does the amount of falling water affect the energy of the water?



PREDICTIONS

Read the procedure. Make predictions to answer the questions on a separate piece of paper.

MATERIALS

- 1 bottle of water
- 1 piece of construction paper
- 1 pencil
- 1 meter stick

PROCEDURE

1. Place the construction paper on the floor.
2. Hold the water bottle about 20 cm above the construction paper.
3. Squeeze ONE drop of water onto the paper.
4. Use your pencil to draw a circle around the “splat” that the water drop made on the paper.
5. Label the circle with the height from which it was dropped.
6. Raise the water bottle to 40 cm and repeat Steps 3-5 on a different area of the paper.
7. Raise the water bottle to 60 cm and repeat Steps 3-5 on a different area of the paper.
8. Repeat Steps 1-7 using TWO drops of water. Make sure both drops of water hit the same spot!
9. Repeat Steps 1-7 using FOUR drops of water. Make sure all of the water hits the same spot!

CONCLUSIONS

1. How does the height of a drop of water affect the energy of the falling water?
2. How does the amount of water dropped affect the energy of the falling water?

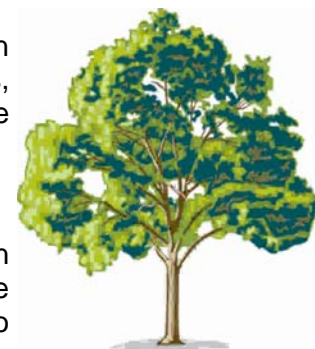
EXTENSIONS

1. What characteristics of a river would you look for if you were going to build a dam to make electricity using the energy of the moving water?
2. Why might the amount of electricity produced by a hydropower dam change with the seasons?

Elementary/Intermediate Activity: Photosynthesis Simulation

Background

Photosynthesis is the process by which plants convert radiant energy from the sun into chemical energy in the form of glucose (a sugar), which they store in their leaves, stems, roots, and fruits. The plants absorb water from the ground and carbon dioxide from the air and convert it into glucose and oxygen gas.



Overview

Students representing hydrogen, oxygen, and carbon atoms form water and carbon dioxide molecules, then absorb radiant energy and are transformed into a glucose molecule with stored energy and oxygen gas. Thirty-six (36) students are needed to represent the following roles: 12 hydrogen atoms (H), 18 oxygen atoms (O), 6 carbon atoms (C).

Materials *(template of hangtags is on the next page)*

- 1 flashing bulb (NEED strobe) representing energy
- 1 atom hangtag for each student
- 6 water signs
- 6 carbon dioxide signs
- 1 glucose sign
- 6 oxygen gas signs
- 1 ball of yarn

Preparation

1. Make 36 atom hangtags as listed above using 30-inch lengths of yarn.
2. Make 6 water signs, 6 carbon dioxide signs, 6 oxygen gas signs, and 1 glucose sign using poster board.
3. Write the photosynthesis conversion formula on the board:



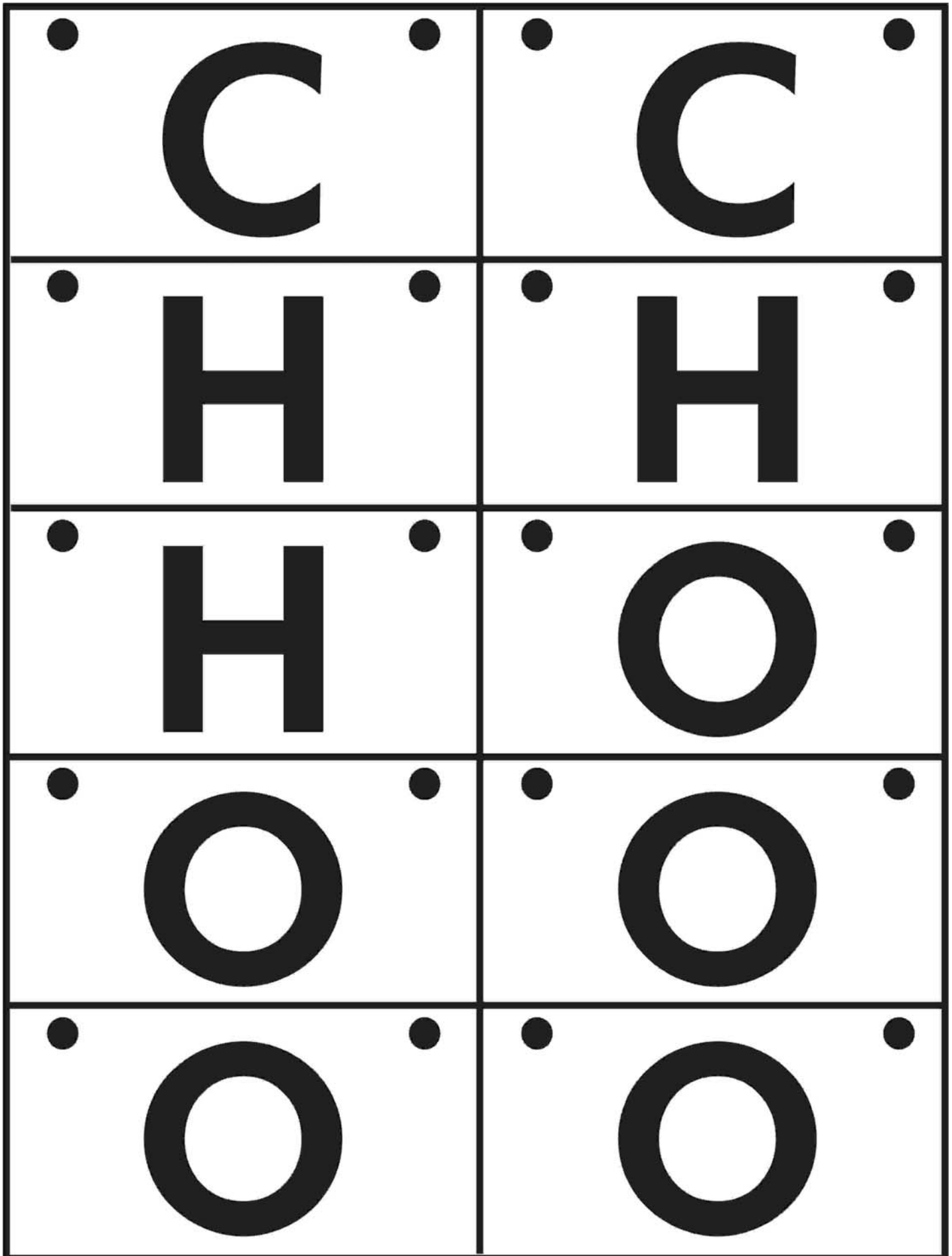
Procedure

1. Give each student a hangtag to wear around his/her neck.
2. Point out the conversion formula on the board and instruct the students to form water and carbon dioxide molecules by linking arms, then hold the appropriate molecule signs.
3. Turn on the flashing bulb and explain that it represents radiant energy.
4. Instruct the students to drop arms and transform into glucose and oxygen gas molecules by linking arms and holding the appropriate signs. Give the flashing bulb to the glucose molecule to represent the stored energy.
5. Have students trade hangtags and repeat the simulation.
6. Discuss photosynthesis.

Extension

Discuss the following questions:

1. Plants absorb carbon dioxide and produce oxygen; what about animals?
2. Why do fossil fuels contain chemical energy that was once stored in plants and animals?
3. When fossil fuels are burned, what is the impact on oxygen and carbon dioxide levels in the air?
4. What role do trees play in reducing global warming?



Short Circuits

ENERGY STAR® Awards

The **ConocoPhillips** refinery in Billings, Montana earned the Environmental Protection Agency's (EPA) 2007 ENERGY STAR® for superior energy performance. In 2006, the facility became the nation's first refinery to earn the ENERGY STAR® designation. The EPA works closely with the petroleum refining industry as well as eight other industries to promote strategic energy management at all levels.

"We are proud to earn our second ENERGY STAR,®" said Mike Wirkowski, refinery manager, ConocoPhillips Billings refinery. "Receiving this designation two years in a row is a testament to the dedication of our employees and reflects the company's commitment to reducing energy consumption."



The Billings refinery earned this award by emphasizing energy-efficient equipment design and operational excellence, placing the facility among the top 25 percent of refineries nationwide for energy efficiency. The plant is particularly efficient in capturing and recycling thermal energy, an important factor in helping to reduce greenhouse gas emissions.

For more information, visit www.conocophillips.com.

In the retail industry, four **JCPenney** stores located in Washington are the first retail buildings in the country to earn the ENERGY STAR® label for superior energy efficiency and environmental performance. Compared to similar stores nationwide, the JCPenney stores collectively spend almost a quarter of a million dollars less per year on energy, and avoid emitting over three million pounds of carbon dioxide (CO₂) per year, equal to the greenhouse gas emissions associated with electricity use of nearly 200 homes.

For more information, visit www.jcpenny.net/jcpmedia/index.htm.

