

# Energy Hog

## CHALLENGE

### TEACHER'S GUIDE



*Information and activities to explore sources of energy, how energy is used and wasted—and the importance of saving energy*

**Grade Levels:**  
2–6

**Subject Areas:**  
*Science*  
*Math*  
*Technology*  
*Language Arts*  
*Social Studies*

## UNIFYING CONCEPTS & PROCESSES

- ALL GRADES

**SYSTEMS, ORDER, & ORGANIZATION:** The goal of this standard is to think and analyze in terms of systems, which will help students keep track of mass, energy, objects, organisms, and events referred to in the content standards.

**(Activities: Reading & Discussion, Busting the Energy Bill, Student Daily Energy Journal, The Power Path)**

**EVIDENCE, MODELS, & EXPLANATION:** Evidence consists of observations and data on which to base scientific explanations. Using evidence to understand interactions allows individuals to predict changes in natural and designed systems.

**(Activities: Reading & Discussion, Energy Hog Scavenger Hunt, Energy Hog Buster House, Student Daily Energy Journal, The Power Path)**

## STANDARD D: EARTH & SPACE SCIENCE

- PRIMARY K–4

**PROPERTIES OF EARTH MATERIALS:** Earth materials are solid rocks and soils, water, and the gases of the atmosphere. The varied materials have different physical and chemical properties, which make them useful in different ways; for example, as building materials, as sources of fuel, or for growing the plants we use as food. Earth materials provide many of the resources that humans use.

**(Activities: Reading & Discussion, The Power Path)**

**OBJECTS IN THE SKY:** The sun provides the light and heat necessary to maintain the temperature of the earth. **(Activity: Reading & Discussion)**

**CHANGES IN EARTH AND SKY:** Weather changes from day to day and over the seasons. **(Activity: Reading & Discussion)**

## STANDARD E: SCIENCE & TECHNOLOGY

- PRIMARY K–4

**UNDERSTANDING ABOUT SCIENCE & TECHNOLOGY:** People have always had problems and invented tools and techniques to solve them. Trying to determine the effects of solutions helps people avoid some new problems. **(Activities: Reading & Discussion, The Power Path)**

## STANDARD F: PERSONAL & SOCIAL PERSPECTIVES

- PRIMARY K–4

**TYPES OF RESOURCES:** We get resources from the living and nonliving environment to meet the needs and wants of a population. Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety. The supply of many resources is limited. Resources can be extended through recycling and decreased use.

**(Activities: Reading & Discussion, Energy Hog Jeopardy, Media Center)**

## STANDARD B: PHYSICAL SCIENCE

- INTERMEDIATE 5–8

**TRANSFER OF ENERGY:** Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways. The sun is the major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths. **(Activities: Reading & Discussion, The Power Path)**

## STANDARD F: SCIENCE IN PERSONAL & SOCIAL PERSPECTIVES

- INTERMEDIATE 5–8

**NATURAL HAZARDS:** Human activities can induce hazards through resource acquisition, urban growth, land-use decisions, and waste disposal. Hazards can present personal and societal challenges because misidentifying the change or incorrectly estimating the rate and scale of change may result in either too little attention and significant human costs or too much cost for unneeded preventive measures.

**(Activity: Reading & Discussion)**

**RISKS & BENEFITS:** Students can use a systematic approach to thinking critically about risks and benefits. Important personal and social decisions are made based on perceptions of benefits and risks. **(Activities: Reading & Discussion, Student Daily Energy Journal, Family Hog Buster Pledge)**

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## About The Energy Hog Challenge

The Energy Hog Challenge is a fun way to bring energy education into the classroom. The activities and lessons help develop skills in science math, technology, language arts, critical thinking and social studies. The Energy Hog is a dastardly character who puts an exciting face to the invisible concept of energy waste. He makes learning about energy fun, while empowering student to take the lead at home and make wise energy choices.

# Overview & INSTRUCTIONS

## Key Concepts

- Energy makes our lives more comfortable and easier.
- Climate and seasons affect how much energy we use.
- The energy we use comes from many different sources.
- When we are aware of how we use energy we can use it more wisely.
- Energy efficiency and conservation save money and help protect the environment.

## Objectives

- To develop an awareness of how energy use changed in the United States as the country industrialized.
- To develop an awareness of how we use energy today and the energy sources used at home.
- To develop an awareness of how to use energy wisely and the effects of saving it.
- To encourage families to develop energy-efficient practices to save money and energy.

## Getting Started

1. Distribute a Student Guide to each student.
2. Introduce the lesson by reading the “Reading and Discussion” sections individually, in groups, or out loud in class. There are four short reading activities (*Teacher Guide pages 7–9; Student Guide pages 4–5*):

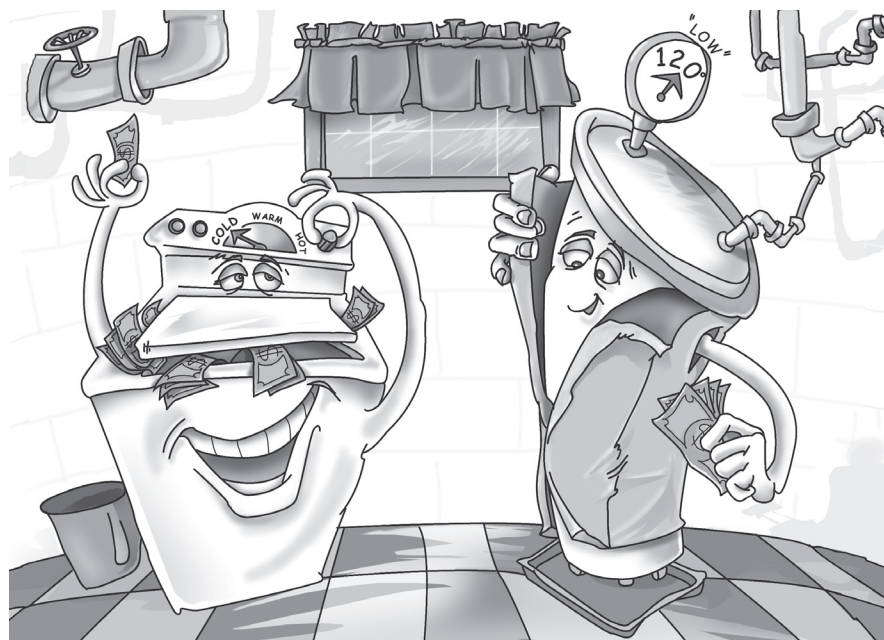
- 1) ENERGY HISTORY
- 2) HOW DO WE USE ENERGY?
- 3) WHERE DO WE GET ENERGY & FIND 7 SOURCES OF ENERGY?
- 4) LOOKING FOR ENERGY HOGS

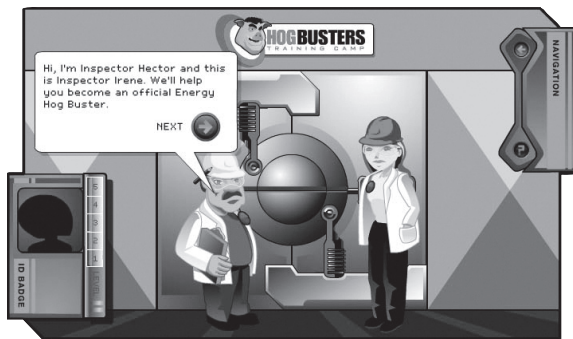
3. Use the questions in this guide to lead a discussion and reinforce student’s understanding about energy. Have students reference the glossary of energy terms as needed (*Student Guide page 3*).
4. Complete the activities below.
5. Assign homework to allow kids apply classroom lessons to their real-world at home.

## CLASS Activities

These activities reinforce the reading concepts, and use math and creative thinking skills. Instructions are in this guide on the page number below:

- ENERGY HOG JEOPARDY, 20 MINUTES, PAGES 10–11
- BUSTING THE ENERGY BILL, 10 MINUTES, PAGE 12
- ENERGY HOG BUSTER HOUSE, 15 MINUTES, PAGE 13





EnergyHog.org

## Internet Activity

MEDIA CENTER: [www.EnergyHog.org](http://www.EnergyHog.org), 20–30 MINUTES

The media center is an exciting resource for kids—and adults too. At [ENERGYHOG.ORG](http://ENERGYHOG.ORG) students can play educational games to become an Official Energy Hog Buster and to reinforce energy waste reduction strategies learned in class. Instructions and discussion ideas are on page 14 in this guide.

## HomeWork Activities

Students should do the following activities at home with their families, after they complete the readings and discussions in class. These activities will encourage them to apply what they've learned in class to their own homes—and help their parents reduce their monthly energy bills. Instructions are on page 14 of this guide.

- ENERGY HOG SCAVENGER HUNT, 15 MINUTES, STUDENT GUIDE PAGES 8–9
- STUDENT DAILY ENERGY JOURNAL, 15 MINUTES, STUDENT GUIDE PAGE 10
- FAMILY HOG BUSTER PLEDGE, 10 MINUTES, STUDENT GUIDE PAGE 11

## Extension Activities

Want to do more? Check out the extension activities from the Alliance to Save Energy's Green Schools Program and the NEED Project on page 15 of this guide.



### ENERGY INFORMATION RESOURCES:

- Energy Hog web site, adults & kids sections:  
[www.EnergyHog.org](http://www.EnergyHog.org)
- DOE's Energy Ant web site:  
[www.eia.doe.gov/kids/](http://www.eia.doe.gov/kids/)

# Energy Hog Challenge

## GLOSSARY

(STUDENT GUIDE PAGE 3)

**BIOMASS:** a renewable energy source from organic material of biological origin such as wood, straw, manure, and other by-products from agricultural processes.



**COAL:** a dark colored, burnable fossil fuel formed by the breakdown of vegetable material trapped underground for years without access to air.



**ELECTRICITY:** the flow of electrical power. We produce power by converting other sources of energy, like coal, natural gas, oil, or uranium into electricity. Typically, anything plugged into a wall (like a toaster or the TV) uses electricity to run.

**ENERGY:** the ability to do work or the ability to move an object.

**ENERGY STAR®:** a government-backed program helping businesses and individuals protect the environment through superior energy efficiency. Appliance and electronics that earn the ENERGY STAR® are more energy efficient than standard models.



**FOSSIL FUELS:** materials that were formed from ancient plant and animal life that were compressed underground over millions of years. Examples are coal, oil and natural gas.

**FUEL:** any material that can be used as an energy source.

**GEOHERMAL ENERGY:** the heat energy that is produced by natural processes inside the earth. It can be taken from hot springs, reservoirs of hot water deep below the ground, or by breaking open the rock itself.

**HYDROPOWER:** the energy of moving water. A hydroelectric power plant uses moving water to power a turbine generator to produce electricity.



**INSULATION:** material that helps keep your home cool in the summer and warm in the winter because it resists the flow of heat. It should be found in places like behind your walls, underneath your floor and in the attic.

**NONRENEWABLE ENERGY:** fuels that cannot be made (or renewed) in a short period of time. Nonrenewable fuels include oil, natural gas, and coal.

**NATURAL GAS:** an odorless, colorless, cleaner-burning fossil fuel, usually found underground in fossil fuel deposits.

**OIL:** raw material from which petroleum products are made.



**POWER:** the rate at which energy is transferred. For example, electrical energy is usually measured in watts.

**PROGRAMMABLE THERMOSTAT:** a device that can be programmed to control the temperature in your home for you. It can automatically turn the heat or air conditioning down when you are not home.

**RENEWABLE ENERGY:** fuels that can be used over and over again and never run out. Renewable fuels include solar, wind, hydropower, biomass, and geothermal energy.

**SOLAR:** the radiant energy of the sun, which can be converted into other forms of energy, such as heat and electricity.

**TURBINE:** a device for converting the flow of a fluid (air, steam, water, or hot gases) into mechanical motion. Turbines can be connected to generators that convert the motion of the turbine into electricity.



**WIND:** the term given to any natural movement of air in the atmosphere. It is a renewable source of energy used to turn turbines to generate electricity.

*The United States gets 93 percent of its energy from nonrenewable sources and 7 percent from renewable energy sources.*

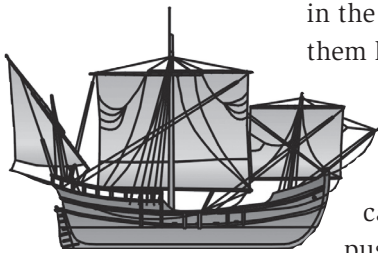
# Reading & DISCUSSION

(STUDENT GUIDE PAGE 4)

## Energy History

A long time ago, the Native Americans (Indians) used biomass for energy. Biomass is anything that was alive a short time ago, like plants and animals. They burned wood [biomass] to cook food and warm their homes. Sometimes, they burned dried animal dung [biomass].

Some Indians lived in tents made of animal skins, called teepees. Others lived in rock and mud homes or sometimes in caves. The caves were deep in the earth and stayed warm in the winter. Heat from inside the earth [geothermal energy] kept them warm. Light bulbs didn't exist back then, but the sun gave them light in the day—and their fires and the moon gave them light at night.



Then new people, known as the early settlers, arrived in America. They traveled on boats with sails. The sails captured the energy in the wind and pushed their boats to the New World.

The settlers built houses out of wood. They also burned wood to keep warm and cook their food. They had no electricity for fans or air conditioners to keep them cool in summer. They made candles from animal fat to see in the dark. Most settlers rose at dawn and went to bed when the sun went down.

The settlers learned to use water wheels to capture the energy in moving water [hydropower]. They were able to run sawmills to cut wood by using hydropower.

As the nation grew and became industrialized, people developed many different energy sources, such as coal, oil, hydropower, and natural gas, to make heat and electricity. Later, scientists discovered that uranium from inside the earth could create nuclear energy by splitting atoms. Electricity changed people's lives.



## Discussion:

1. How would your day be different without modern energy?
2. What would you miss most without electricity?
3. How has industrialization changed America's demand for energy?

## HOW DO WE USE ENERGY?

(STUDENT GUIDE PAGE 4)

We need energy to live. Think about what you did from the moment you woke up today until now. You probably used energy to turn on the lights, heat your shower water, listen to music on the radio, or cook your breakfast.

It takes a lot of energy to heat and cool our homes, and to heat water. Think about how much heat people in Alaska need to stay warm in the winter—or how much air conditioning people in Florida need to stay cool in the summer!

The more energy you use, the more it costs. Energy bills show how much energy you use every month and how much money your family pays for that energy. The pie chart on page 6 shows how the average U.S. home uses energy.

## Discussion:

1. In what months of the year do you think your energy bills are the highest and why?
2. How does the weather affect how much energy you use?
3. What are some other ways that your family uses energy on a daily basis?
4. Let's look around us now. Where do we use energy in this classroom?

# Reading & Discussion

## Where Do We Get Energy?

(STUDENT GUIDE PAGE 4-5)

Before we can use energy in our homes, we need to get it from somewhere. So where does energy come from? Some is found underground and some is found above ground. There are two main kinds of energy sources: nonrenewable and renewable.

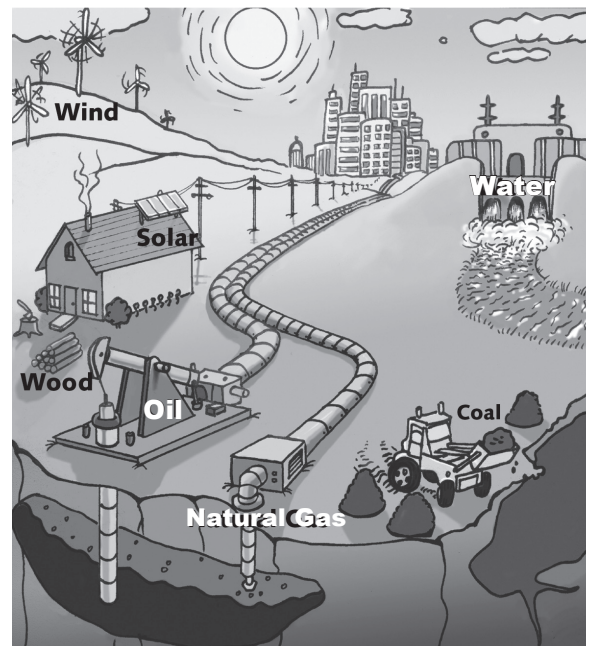
**NONRENEWABLE:** Coal, oil, natural gas, and uranium are found underneath the ground. Coal, oil, and natural gas came from dead plants and animals, called fossil fuels, that lived a long time ago and decayed under pressure deep inside the earth. They take millions of years to form. We can dig them up or put a long pipe into the ground to get them out. For example, natural gas and oil move through pipelines underground. We call these sources of energy nonrenewable. Once we use them up, they are gone forever.

**RENEWABLE:** Scientists have developed ways to get energy from the sun (solar power), the wind (wind power), moving water (hydropower), and plants (biomass). We call these sources renewable because we will never run out of them. The sun is our main source of energy. The sun's energy arrives to earth as light with a range of wavelengths. Long wavelengths turn into heat when they touch the earth. This heat causes air to rise, creating wind energy. Wind turbines capture the energy from the blowing wind. We capture energy from the sun and turn it into electricity by using solar panels. We also use dams to get energy from moving water. Biomass, such as wood, creates heat energy when it is burned. These sources of energy are turned into electricity which travels through power lines underground or above ground.

## Discussion:

1. What are some energy sources and how do they differ?
2. How does energy get to your home?
3. What is the role of the sun?
4. Have students find the 7 energy sources in the picture below.

.....  
**Answer Key: "Find 7 Sources of Energy," page 5 in Student Guide, clockwise from top-right: water, coal, natural gas, oil, wood, solar, wind.**





## Looking For Energy Hogs

(STUDENT GUIDE PAGE 5)

An Energy Hog is anything that wastes a lot of energy, like an old refrigerator running in the garage or basement, or a drafty door. If your family uses a lot of energy, you might have Energy Hogs in your home! Some electronics in your home use energy all day long. Did you know that even when you are not using the DVD player, its clock still uses energy? You can help your family save energy by learning about Energy Hogs and how you can bust them. When you save energy at home, your energy bills are lower, and your family saves money.

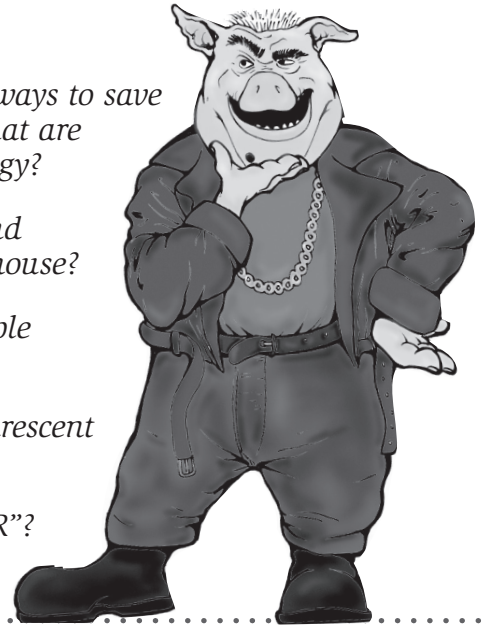
At home, this means doing things like turning off lights and appliances when you are not using them, and taking shorter showers. When you want to warm up in winter or cool down in summer, remember that cranking the thermostat past the desired temperature will not warm or cool your home any faster—and if you forget to put it back you'll waste energy. A programmable thermostat makes this job easy because it automatically adjusts the settings for you. You can also use compact fluorescent light bulbs (CFLs) instead of "old-fashioned" incandescent light bulbs. CFLs use about two-thirds less energy and last up to 10 times longer than regular light bulbs. Over 90 percent of the energy used by incandescent bulbs is wasted heating the bulb. Your family can caulk or weatherstrip around windows to stop air leaks. Weatherstripping looks kind of like tape and caulk looks like glue. Both are designed to seal gaps or spaces where energy is leaking from your home. Your home also needs plenty of insulation. Insulation is found in walls, in the attic, in floors and in the basement or crawl space. A properly insulated home keeps you cooler in the summer and warmer in the winter.

Your family can replace old appliances and electronics with energy efficient ones that have the ENERGY STAR label on them. The ENERGY STAR label means that the product uses less energy than other products.

Watching out for the Energy Hogs in your home is easy and fun when you're energy smart. Using energy wisely will save your family money and help the environment too!

### Discussion:

1. Can you think of some ways to save energy in your home? What are the benefits of saving energy?
2. What is "insulation" and where is it found in your house?
3. What is a "programmable thermostat"?
4. What are "compact fluorescent light bulbs (CFLs)"?
5. What is "ENERGY STAR"?



# Energy Hog JEOPARDY

## INSTRUCTIONS

Familiarize yourself with the game categories, questions and answers. Make an overhead transparency of the game board provided on page 11. Cover the answers with slips of paper that can be easily removed (Post-Its® are ideal).

## PLAYING THE GAME

Students can play as individuals or in teams. If playing in teams, each team may select a spokesperson to signal and answer the questions. The rules of the game are as follows:

- One team begins the game by selecting an energy topic and a clue in numerical order, beginning with 100. Example: “Energy Hog or Not for 100.”
- The clue and the topic provide the information for the answer, which must be posed in the form of a question.  
For example,  
Topic: “Sources of Energy for 100;”  
Clue: “We will eventually run out of this kind of energy;”  
Answer: “What is nonrenewable?”
- After the topic and number are selected, reveal and read the clue. The first team to raise a hand gets to pose the question. If the question is correct, the points are awarded and the student gets to choose the next clue. If the question is incorrect, the points are subtracted and the opposing team may try to pose the question. If the question is correct, the points are awarded and that team chooses the next clue.
- When the first topic is complete students can select another topic. Students and teams are required to keep track of their points. You can award prizes to top performers—or try applying the total winning points as money saved on home energy bills and suggest that students use the savings to “buy” extra time for recess or in the computer lab.

ANSWER KEY				
	Sources of Energy: <i>What is...</i>	Energy Hog or NOT: <i>What is...</i>	Household Energy Use: <i>What is...</i>	Busting Energy Hogs: <i>What is...</i>
100	...Nonrenewable Energy?	...an Energy Hog?	...the Furnace (or Heating)?	...Insulation?
200	...Renewable Energy?	...an Energy Hog?	...the Refrigerator?	...Compact Fluorescent Light Bulbs?
300	...Natural Gas?	...NOT a Hog?	...Insulation?	...the <b>ENERGY STAR®</b> Symbol?
400	...Hydropower?	...NOT a Hog?	...Electricity?	...Using Caulk or Weatherstripping?

# ENERGY HOG JEOPARDY GAME

	Sources of Energy:	Energy Hog or NOT:	Household Energy Use:	Busting Energy Hogs:
100	We could eventually run out of this kind of energy.	A really, really old refrigerator.	In the winter, this uses the most energy in your home.	A great way to bust Energy Hogs at home is to add more of this to your attic.
200	This kind of energy lasts forever.	A house without insulation in the walls and attic.	Of all kitchen appliances, this one is the biggest Energy Hog (uses the most energy).	Old fashioned light bulbs waste energy in the form of heat. These new ones are cool!
300	This nonrenewable energy source is used to heat more homes in the U.S. than any other source.	A refrigerator with an <b>ENERGY STAR</b> ® label on it.	The more of this stuff you have inside your walls, the lower your energy bills will be.	When buying a new TV, computer, dishwasher, or refrigerator, what label means that it is NOT an Energy Hog?
400	The energy in water flowing through a dam is used to make electricity.	A home with a programmable thermostat.	Things that are “plugged in”, like a computer or a lamp, need this kind of energy to work.	Energy Hogs sneak into homes that have small gaps around windows and doors. You can keep them out by doing this.

# BUSTING THE ENERGY BILL

(Student Guide page 6)

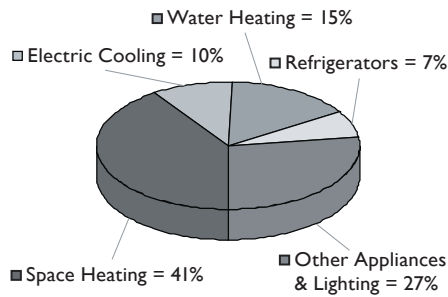
On a separate sheet of paper, students will help the Swine family understand how they use energy by calculating and graphing their energy use—and make recommendations on how to reduce it.

The Swines saved their monthly energy bills for a year. They added up all the bills and determined they spent a total of \$2,700 on energy. Refer to the pie chart for percentage amounts.

How much did it cost them to (Answer Key):

## U.S. Household Energy Expenditures (\$)

Alliance to Save Energy, 2006

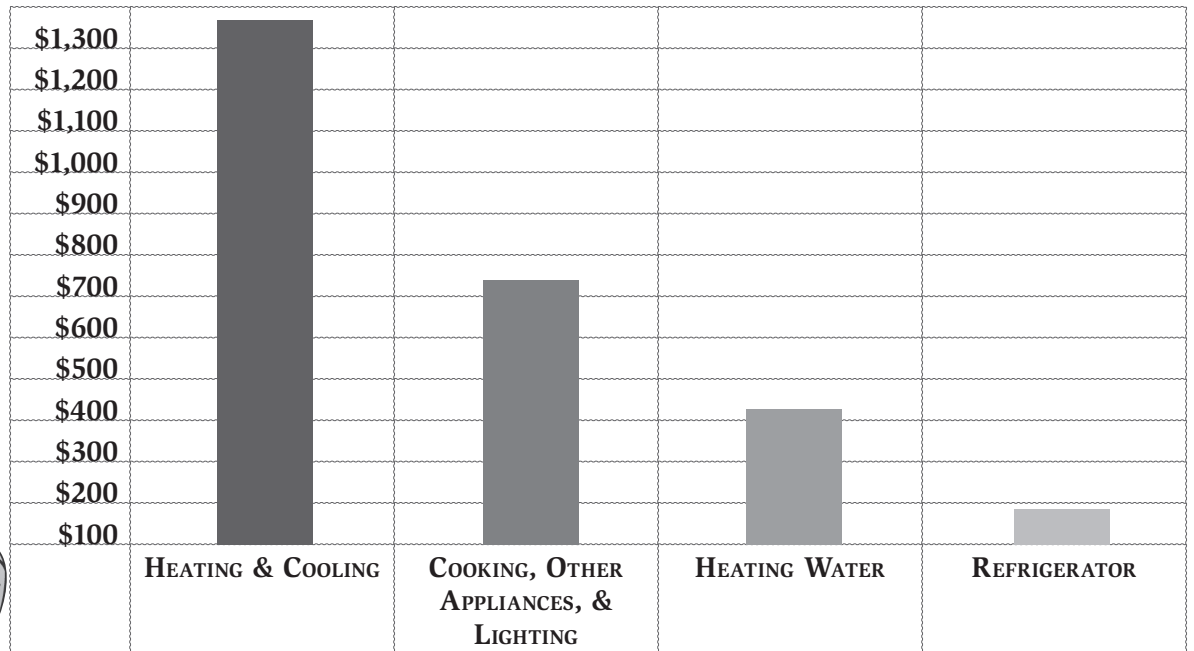


The average U.S. household spent more than \$2,000 on home energy bills in 2008. This amount varies significantly depending on your region and climate.

	TOTAL ENERGY BILL	× PERCENT (%)	(=) EQUALS PER YEAR
1) Heat and cool their home?	\$ 2,700	× 51% % Heating + Cooling	\$ 1,377 a year
2) Cook, light their home, and run appliances?	\$ 2,700	× 27% % Other Appliances & Lighting	\$ 729 a year
3) Heat their water?	\$ 2,700	× 15% % Water Heating	\$ 405 a year
4) Run their refrigerator?	\$ 2,700	× 7% % Refrigerator	\$ 189 a year

On a separate sheet of paper, students should graph the Swines's energy costs for each category. and make recommendations on how the Swines can lower their energy bill for each category.

(Answer Key)



How does your family compare? Use this same exercise with your family's energy bills to estimate how much is spent on energy each month—or year—and how it is used. Perhaps you can convince your parents to pass some of the savings on to you if you help find ways to lower your energy bills!

# Energy Hog Buster HOUSE

(Student Guide page 7)

Students find and bust Energy Hogs that are wasting energy in an inefficient house, then design their own energy efficient house. This activity helps them consider where they get energy, how energy is used at home, and how they can save energy. Critical thinking, creativity, art and writing skills are reinforced.

## Materials

Two to three pieces of paper per student; pencils, crayons, or markers.

## Step 1

Have students search the Energy Hog House illustration on page 7 of the Student Guide to find and list ten ways to keep Energy Hogs from sneaking in.

## Step 2

To prepare for drawing their own efficient homes, students complete each statement below.

1. To keep the temperature in my home comfortable, I will... (example answers: add insulation, use a programmable thermostat, use fans, etc.)
2. My home's energy will come from... (examples: sun, natural gas, oil)
3. For light, my home will use... (examples: compact fluorescent light bulbs, sun)
4. To heat water, my home will use... (examples: sun, natural gas, oil)

Encourage students to come up with some of their own ideas...

## Step 3

On a separate sheet of paper, students draw their own energy-efficient home. They should not trace or copy the house from their guides.

## ANSWER Key: Step 1

Examples of How to Keep Hogs Out

1–2) **ATTIC & WALLS:** add insulation

3–5) **BEDROOM:** replace light with a CFL bulb | get an ENERGY STAR® TV | turn off lights and electronics when not in use

6–7) **BATHROOM:** take a 5 minute shower | turn off water when not in use

8–10) **KITCHEN:** Put lids on pots—or use a microwave for cooking | keep refrigerator door shut | get an ENERGY STAR® refrigerator

11–13) **WINDOWS:** close window | add sealing or weather stripping | replace windows with double-pane ENERGY STAR® windows

14–16) **WATER HEATER:** add insulation blanket | set water temperature to WARM or 130° F | get a more efficient water heater

.....  
*Step 3: The picture below is an example of a home drawn with energy-efficiency improvements to keep Hogs out.*



## Internet ACTIVITY

**Media Center:** [www.EnergyHog.org](http://www.EnergyHog.org)

(*Student Guide page 10.*)

**PREPARATION:** Familiarize yourself with the kid's web site games so you can answer questions and help students.

**MATERIALS:** Computers with an Internet connection and Flash Player installed. (Most computers already have Flash installed. It is a free download at [Adobe.com](http://Adobe.com).)

**TIME:** Allow students about 15 to 20 minutes to spend on [www.EnergyHog.org](http://www.EnergyHog.org).

**FOLLOW-UP:** Lead a discussion about what students learned from the web site:

1. *What are some places where Energy Hogs might hide in your home, and why?*
2. *How can you keep Energy Hogs out of the attic?*
3. *What are some ways to use less energy in your home?*



## Homework ACTIVITIES

The complete versions of these homework activities are found in the Student Guide on the pages listed below.

### Energy Hog Scavenger Hunt

The Energy Hog Scavenger Hunt is a two-page, multiple choice questionnaire *on pages 8–9 of the Student Guide*, or online at: [EnergyHog.org](http://EnergyHog.org).

Instruct students to take the Scavenger Hunt home and fill it out with their family to determine if they have Energy Hogs lurking in their home. They will only answer 10 out of 12 questions that best apply to their home.

### Student Daily Energy Journal

Instruct students to record a journal of their daily activities, the energy used, and then list actions they can take to reduce their energy use, using the form provided *on page 10 in the Student Guide*.

### Family Hog Buster Pledge

Instruct students to take the pledge home and complete it with their family, *on page 11 in the Student Guide*. Families should discuss and agree on how they will save energy at home. They will choose several energy-saving actions then commit to implementing those actions by signing the pledge. You may ask that students bring it back to school to share and discuss with the class. Finally, students should display their pledges at home in a prominent place as a reminder.

For more ways to save energy and lower your energy bills, go to:

[EnergyHog.org/adult/checklist.htm](http://EnergyHog.org/adult/checklist.htm)  
to get the "Ultimate Checklist."

# EXTENSION ACTIVITIES

## THE POWER PATH:

### HOW ENERGY GETS TO A HOME

This activity requires critical thinking, research, and creativity. It will deepen and broaden students understanding of energy, the different sources of energy, and how energy gets to our homes.

### INSTRUCTIONS

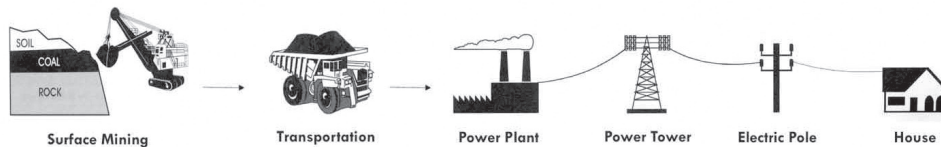
Divide students into groups of five. Assign each group an energy source (coal, oil, natural gas, solar, wind, or hydropower). Instruct each group to research how the source is found,

harvested, transported, processed, converted, and used in homes. Each group constructs a power path for its source. See example below for the power path for coal—encourage your students to be creative with their paths. Have students present their paths to the class.

### MATERIALS

Students can use magazines, the Internet, books, markers, crayons, paint, poster boards, and more to create a power path. Consider displaying the students' power paths on posters around the classroom or school.

*Example of power path for a non-renewable energy source (coal).*



## ADDITIONAL RESOURCES

### ALLIANCE TO SAVE ENERGY'S GREEN SCHOOLS PROGRAM

The Alliance's Green Schools Program expands students' energy awareness by using the school as a laboratory.

The program helps schools save money on their energy bills and redirect these funds to better uses. Visit the Green Schools web site to learn more and to download energy-focused lesson plans developed by teachers, including: "Conservation for the Ages"; "Why is it so hot when I sit next to the window?"; "Why is it hotter when I wear black in the summer?" plus others: [www.greenschools.com](http://www.greenschools.com)



### THE NATIONAL ENERGY EDUCATION DEVELOPMENT (NEED) PROJECT

The NEED Project offers useful energy related activities for Primary, Elementary, Intermediate and Secondary levels. Lesson plans include: "Building Buddies", "Monitoring and Mentoring", "Energy House", "Energy Conservation Contract", and "Today in Energy". To access these activities and other energy reference materials visit [www.need.org](http://www.need.org).





ALLIANCE TO SAVE ENERGY'S  
**Green Schools Program**  
Empowering Schools through Energy Efficiency

*The Alliance to Save Energy promotes energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and greater energy security. Energy efficiency is the quickest, cheapest, cleanest way to extend our world's energy supplies.*



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The **Energy Hog** was originally founded by Energy Outreach Colorado.  
Ad Council, Tracy Locke and the Ebeling Group/Lobo are responsible  
for the creation and production of the **Energy Hog**.  
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*Revised August 2008 Acknowledgment: This material is based upon work supported by the Department of Energy {National Nuclear Security Administration} under award number DE-FG44-05R410963. Disclaimer: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes and warranty, express or implies, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, of favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.*