

Cool School Challenge



Home Energy Audit

TEACHER GUIDE

Students will learn about energy conservation and energy efficiency. By conducting an audit of their own homes, they will learn to identify energy-efficient features and conservation practices; assess how energy efficient their own homes are; and finally, explore ways to reduce home energy consumption.

Objectives:

Students will be able to:

- Clearly state the difference between energy efficiency and energy conservation.
- Conduct a home energy audit.
- Identify ways to save energy in the home, either through energy efficiency or energy conservation.

Class Time:

- 20 minutes pre-lab in class.
- 50 minutes to conduct the audit as homework.
- 30 minutes post-discussion in class.

Materials:

- Home Energy Audit Introduction
- Student Worksheet

Teacher Directions:

1. Lead a discussion using the [Home Energy Audit Introduction](#) or have students read it themselves.
2. Distribute the [Home Energy Audit Student Worksheet](#) and set as homework.

Grade level: 7-12

Subjects:

Science; Environmental Science; World/Global Studies; Social Studies.

Concepts:

Energy efficiency; Energy conservation

Washington State EALRs:

Science: 1.2, 1.3, 3.1, 3.2

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3. Use the post-audit questions on the Student Worksheet to:

- a) Lead a group discussion;
- b) Have small groups discuss issues; or
- c) Have students individually reflect on their answers either in class or as homework.

Extension:

- Pair this activity with the Energy Star Appliance activity for more detailed investigations into energy efficiency.

Glossary:

Energy efficiency - refers to products or systems using less energy to provide the same or better level of energy service as conventional products or systems.

Energy conservation - refers to reducing or avoiding energy consumption.

Resources:

“It’s time for a carbon clean sweep!” This poster illustrates the numerous ways a household can reduce its carbon footprint through energy efficiency and conservation. Produced by the Seattle Times.
<http://onehundredthings.files.wordpress.com/2007/05/seattle-times-climate-challenge.pdf>

Alliance to Save Energy - Home Energy Audit, available from
http://www.ase.org/uploaded_files/educatorlessonplans/audit.pdf

Alliance to Save Energy - Energy Efficiency vs. Energy Conservation, available from
http://www.ase.org/section/_audience/consumers/conservationvsefficiency

Consumer Research Council - Consumer Guide to Buying Energy Efficient Products for the Home.
<http://www.consumerfed.org/pdfs/saveenv.pdf>

Efficiency & Conservation - Secondary Energy Infobook. The Need Project.
http://www.need.org/needpdf/infobook_activities/SecInfo/EfficiencyS.pdf

ENERGY STAR: www.energystar.gov

Energy Savers - Tips on Saving Energy & Money at Home. U.S. Department of Energy guide.
http://www1.eere.energy.gov/consumer/tips/pdfs/energy_savers.pdf

U.S. Environmental Protection Agency - Glossary with definitions of terms
www.epa.gov/greenpower/whatis/glossary.htm

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Home Energy Audit

INTRODUCTION

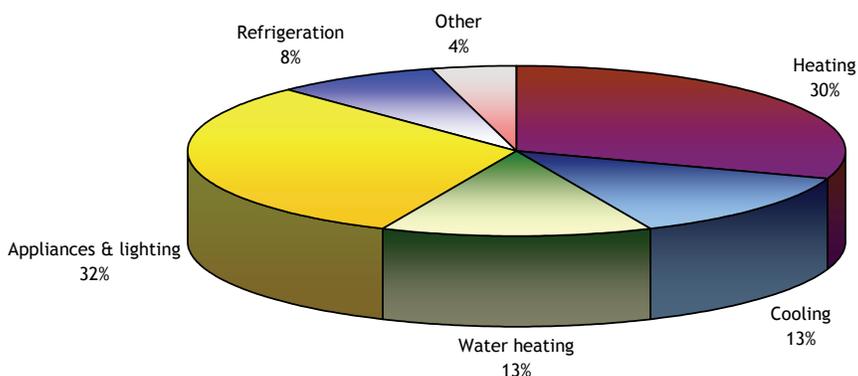
Energy plays a fundamental role in the way we live our lives. Energy keeps our homes a comfortable temperature, heats our water, lights our lights, chills our food, and keeps our televisions and other appliances running. All of this requires a lot of energy: Households consume nearly one-fifth of the total energy used in the United States each year.¹ Most of this energy is generated by burning fossil fuels - coal, natural gas and oil - which results in greenhouse gas emissions. Home energy use contributes 20 percent of the nation's annual carbon dioxide (CO₂) emissions from fossil fuel combustion.² Figure 1 below compares the CO₂ emissions from different household energy categories. Finding ways to use less energy, more efficiently is important to reducing our climate impact.



In this activity you will conduct an energy audit of your home to assess its energy efficiency. You will investigate some of the features that make a building an energy-waster or an energy-saver, and identify

steps you could take to reduce how much energy you use - and ultimately, how much CO₂ is generated by your household energy consumption.

Figure 1: Percent CO₂ Emissions from Household Energy Consumption, by category



Source: 2007 Buildings Energy Data Book, <http://buildingsdatabook.eren.doe.gov/>

Use less energy

It may seem obvious, but using less - or *conserving* - energy is a straightforward strategy for reducing greenhouse gas emissions. Energy conservation involves reducing or eliminating unnecessary energy use or loss. Turning down your thermostat when you're not home, for example, is a conservation strategy.

Your heater isn't working to keep an empty house warm, which means it uses less energy than if it were kept on all day. Turning off lights when you don't need them and taking shorter showers are additional examples of conservation. Energy can also be conserved if your home has certain design features, such as south-facing windows. South-facing windows receive more direct sunlight, and the natural energy from the sun can increase the interior temperature of our homes. In the winter, this solar energy can offset the amount of energy that would otherwise be used to heat that room. In the summer, closing window shades can help keep that room cool. Deciduous trees outside south and west-facing windows also provide summer shade.

Use energy more efficiently

Energy efficiency refers to products or systems that use less energy to do the same or better job than others. Consider light bulbs, for example. A compact fluorescent light bulb (CFL) is more energy efficient than a standard, incandescent light bulb. For the same amount of light output, CFLs use up to 75 percent less energy.³ Plus, they can last up to ten times longer! So by using CFLs and taking other steps to make our homes as energy efficient as possible, we can get more out of every unit of energy we consume.



For your home energy audit you will examine a variety of features and behaviors that affect home energy use, such as windows, insulation, heating systems, water use and electricity. In each category, identify the features and behaviors in effect at your home, and whether they represent an energy efficiency or energy conservation feature or behavior.

When you have completed the audit, you will discuss your results in class and brainstorm ways to use less energy make your home more energy efficient.

¹U.S. Department of Energy, Energy Efficiency & Renewable Energy, *2007 Buildings Energy Data Book*, Table 1.1.3.

²U.S. Environmental Protection Agency, *Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*. February 2008. http://epa.gov/climatechange/emissions/downloads/08_ES.pdf

³ Source: ENERGY STAR website, www.energystar.gov

Name: _____

Class: _____

Date: _____

Home Energy Audit

Student Worksheet

CATEGORY		YES	NO	N/A	Efficiency (E), Conservation (C)	COMMENTS
WINDOWS & DOORS	Do most windows face south?					
	Are south or west facing windows shaded by overhangs or trees in the summer?					
	Do most windows have shades, curtains or blinds?					
	Are the windows double-paned?					
	Is there weather-stripping around windows and doors?					
HEATING AND COOLING	Are furnace air filters cleaned and changed once a year?					
	Does your home have a programmable thermostat?					
	In the winter, is your thermostat... • ...set at 68° F or lower when you're at home?					
	• ...set at 60° F or lower overnight?					
	• ...set at 60° F or lower when you're away on vacation?					
	In the summer, is your thermostat set at 73° F or higher when you're home?					
	Is your ceiling/attic insulated?					
	If you have a fireplace, do you keep the flue closed when not in use?					
	Are areas in front of baseboard heaters and water heaters clear of furnishing, curtains or other objects that block air flow?					
	Are the exterior walls of your home insulated?					
WATER USE	Is your water heater set at 120° F or lower?					
	Are the water heater pipes insulated?					
	Are all showers fitted with a low-flow shower-head?					
	Do most household members turn the faucet off while washing faces, shaving, etc.?					
	Do all faucets have water-saving faucet attachments?					
	Do most household members take 5-minute or less showers?					

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CATEGORY		YES	NO	N/A	Efficiency (E), Conservation (C)	COMMENTS
APPLIANCES	If you have a dishwasher, is it ENERGY STAR-rated?					
	Do you run the dishwasher only with a full load?					
	Is the refrigerator ENERGY STAR-rated?					
	Is there at least 2 inches of clearance around the refrigerator (front, back & sides) to permit proper air circulation?					
	Is the top of the refrigerator free of clutter, which blocks air circulation?					
	Is the washer/dryer ENERGY STAR rated?					
	Do you usually only do laundry when you have a full load?					
	Most of the time do you wash clothes in cold water?					
	Do you usually clean the lint filter of your dryer after each load?					
	Do you sometimes line-dry your clothes instead of using the dryer?					
	Is the TV ENERGY STAR-rated?					
	If you have a DVD player, is it ENERGY STAR-rated?					
	Are any appliances plugged into power strips that are turned off when not in use?					
	Do household members usually turn the lights off when leaving a room?					
	Are most light bulbs compact fluorescent (as opposed to incandescent)?					

Name: _____

Class: _____

Date: _____

Home Energy Audit

Student Worksheet

1. What is the difference between energy efficiency and energy conservation?
2. In your opinion, based on the results of this audit, how energy efficient is your home? Explain.
3. What area of your household do you think needs the most work to become more efficient?
4. What are three things your household could do to conserve more energy?

