



Girl Scouts®
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Girl Scouts of Santa Clara County



Energy Conservation

Patch Program

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Energy Conservation Patch Program

Dear Troop Leader/Adult,

As we begin to understand the impact that humans have on the environment, and the value of our resources, we begin to understand the importance of teaching our youth the responsibility of taking care of this planet. This patch program was designed to learn what energy is, how the world uses energy, the importance of conserving energy, and ways we can practice conservation. This patch program is ideal for Brownies and Juniors, with the ability to adapt the requirements for older age levels.

Included in this packet:

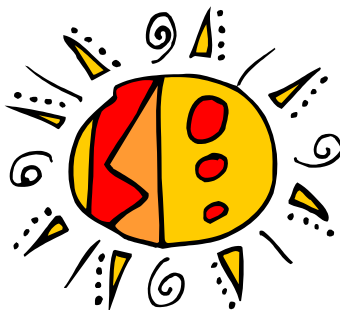
- Introduction Letter
- Background Information
- Worksheet (you will need to copy one per participant, the answers are found in the background information.)
- Energy Contract for Family Members (you with need to copy one per participant.)
- Resource List
- Evaluation and Order Form

Congratulations on taking another step towards an environmentally sound community. Thank you for participating in the Energy Conservation Patch Program, and have FUN!

Energy Conservation Patch Requirements

Complete 6 of the 8 requirements, including the two starred numbers.

- ★ 1. Discuss with your troop what energy is, and how energy is used in our world today.
2. Choose a room of your home and list all of the uses of energy you can find. After you finish your list, ask someone in your family to help you think of other ways your family uses energy. Compare your list to at least one other person's list in your troop.
3. Complete the energy worksheet included in the Energy Conservation Patch packet. Afterwards, discuss your answers with your troop/group.
4. Pretend you are a reporter and invite a science teacher or engineer to visit your troop to talk about the ways people use energy and methods of conservation. Prepare a list of interview questions ahead of time for your guest, and record the interview on paper, on a audio cassette, or on video.
5. Visit a power plant, or library, and find out where energy comes from, and why we need to practice conservation. Share this information with a neighbor, friend, or relative and explain what you have learned about energy.
- ★ 6. Ask your family to discuss the ways you use energy in your house an possible ways to practice conservation. Fill out the energy contract with your family.
7. Create a poster that shows the cause and effects of pollution, or create a collage with magazine clippings of ways we use energy today. Display your poster so others may view it.
8. Try this experiment which demonstrates the concept of solar heating. You will need 5 shoe boxes, plastic wrap, aluminum foil or black construction paper, and at least two thermometers. First place a thermometer inside an empty box and cover the box with clear plastic wrap. Take the other four boxes and line them with aluminum foil or black construction paper. Put the plastic wrap box, and the two of the lined boxes in direct sunlight for 5 minutes. Place the other two boxes in a shady place. Record the temperatures before and after five minutes. Compare your results. Think about what happens when you wear dark clothing on a hot day. How could we use solar energy in our homes?



Background Information

During the 1970's an environmental movement formed as people around the world began to understand that the balance of the natural environment was being disturbed and how this directly affects quality of life. The realization that the world's energy supply is not infinite spurred people into environmental education, not only to teach others understanding, but how to act in environmentally sound ways. Energy is the basis of the industrial civilization and modern life as we know it. The combined resources that the world's nations use to try to meet their energy needs is called the world energy supply. Currently, we rely heavily on oil, natural gas, and wood to supply our energy needs, however, these resources will eventually run out. For now, conservation practices may provide time to research alternative sources of energy.

Energy is the capacity of matter to perform work. For us, we see energy in various forms, including mechanical, thermal, electrical, radiant, and atomic. Industrial nations use most of the world's energy through transportation, communication, and manufacturing products. Our current energy practices contribute to acid rain, the greenhouse effect, and the production of health threatening pollutants.

Fossil fuels, natural gas, oil, and coal, are formed from the decay of once living organisms deep below the ground under heat and pressure. Oil, coal, and gas must be mined, which disturbs coastal habitats and wilderness areas, in addition, transportation of these fuels is inefficient and uses extra energy. Coal causes a major health risk to workers in the mines, and releases sulfur dioxide when it is burned. Acid rain, which pollutes forests and lakes far away from factories, is believed to be caused when industrial emissions such as these mix with atmospheric moisture. Problems occur with oil not only with spills, but the sulfur in crude oil is also released into the air when oil is burned. Natural gas, a cleaner alternative because it is a gas at room temperature, does not pollute water, and contains no sulfur, so it burns cleanly.

Options to fossil fuels are often costly. Nuclear energy, created by splitting uranium atoms, uses heat from this process to drive a turbine which generates electricity. Safety and economy are still major issues of this energy source, like low level radiation or a potential of an accident at a power plant. Biomass includes synthetic alcohol fuels, dung, and wood to create energy. The major problem with this source is that it takes a lot to create energy. Windmills and water falls, a form of mechanical energy, can be used to turn turbines that generate electricity. Furthermore, new research on geothermal energy, based on the fact that the earth is hotter deep below the surface, brings steam to the surface to power a turbine that produces electricity. Building windmills, hydroelectric plants, and drilling is very expensive and disruptive to wildlife habitat. Solar energy is different from any other energy source because it is inexhaustible. The sun can be used for heat and electricity. Architects are using more environmentally sound plans that include solar panels in buildings. Photovoltaic (the use and storage of solar energy) cells convert sunlight into electricity and are currently being used for remote locations such as orbiting space satellites. However, it is not cost effective.

Solar energy, or Photovoltaics, safe nuclear power, use of natural gas for transportation, more efficient lighting, Biomass development, wind power, and geothermal and ocean thermal energy conversion are alternatives that need to be explored and supported through continual research. While research continues, conservation practices of our current energy supply must be our focus. There are three basic types of energy conservation. First is doing without, for example, hanging up your clothes to dry instead of using a clothes dryer. Second is overhaul, changing people's living habits, and the production of goods and services. Third is the more efficient use of energy such as using more fuel efficient cars, capturing waste heat in factories, and insulating houses. We must conserve the use of energy to protect our natural resources and reduce air and water pollution.

Energy Conservation Patch Program Worksheet

1. What is energy? [the definition]

2. Circle the most common sources of energy production in the United States:

natural gas	oil (petroleum)	coal
wood	mechanical (wind/waterfalls)	solar
atomic	chemical (batteries)	geothermal (steam)

3. Draw a line from the energy source to its potential problem(s) [there may be more than one answer]:

natural gas	safety
oil	drilling
coal	cost of installation/maintenance
wood	gives off sulfur dioxide when burned
mechanical	creates toxic waste
solar	disturbs habitat
atomic	locations of source are limited
chemical	disturbs wildlife habitat
geothermal	health hazard for workers mining

4. Design and draw a picture of an environmentally sound house. Label places you use alternative energy sources such as solar panels, hanging laundry outside, turning off the lights, etc.

Energy Contract For Family Members

This family agrees to help make the environment a cleaner, healthier place by conserving energy. These are the three things this family agrees to do:

1.

2.

3.

Signed:

Date: _____

X _____

X _____

X _____

X _____

X _____

X _____

X _____

X _____

X _____

Resources

LIBRARIES:

The easiest way for girls to utilize this resource would be for the leader to check out several books to take to a troop meeting. This way all the girls could share them. Another possibility is to take the troop on a field trip to the local library. A good idea would be to call the librarian ahead of time to ensure a more successful visit. The following is a list of helpful, easy-to-understand books on energy:
Shelf number 333.7 in the children's section

- Energy and Power, by Sally Morgan & Rosie Harlow 1995
- Exploring Energy Sources, by Ed Catherall 1991
- The Super Science Book of Energy, by Jerry Wellington 1994

PACIFICE GAS & ELECTRIC:

PG&E is an excellent resource for energy conservation education. There is the Pacific Energy Center in San Francisco, where girls can do lots of interactive learning about energy conservation. Call ahead to plan this trip at 800-933-9555. PG&E also has an energy conservation education lesson plan that contains stickers, posters, and ideas to get children interested in conserving energy. Call customer service Speaker's Bureau: 415/973-1979 or 415/972-5421.

OTHER RESOURCES:

Silicon Power - City of Santa Clara County	Larry Owenson	615-5687
SCValley Water District	Kathy Machado - Educational Director - Water Pollution programs	265-2607 x2331
Waste Management	Jeannette Hasscold	982-0100 x2221
Sunnyvale Water District/ Pollution Control Plant	Roxan Nasiri	730-7716

INTERNET:

The Internet is another great source for obtaining information on the various topics of energy and usage.

- www.factmonster.com
- www.epa.gov/teachers
- www.realgoods.com/renew

GIRL SCOUTS:

Brownie Girl Scout Try-Its Handbook: "Earth Is Our Home", "Movers"
GSUSA Contemporary Issues: Earth Matters
Girl Scout Council Office

Currently the Girl Scouts of Santa Clara County has a workbook called **Energy Conservation** by Yvonne Ryan for sell at \$8. Contact Susie Henderson for more information (408) 287-4170 ext 246 or Email: shenderson@girlscoutsofsc.org