

Girl Scouts of Chesapeake Bay, Inc.
Zip, Zap, Zoom: Energy Stewardship Patch Program



Developed in cooperation with Delmarva Power.

Patch Requirements:

Daisy Girl Scouts: complete 3 activities.

Brownie Girl Scouts: complete 4 activities.

Junior Girl Scouts: complete 6 activities.

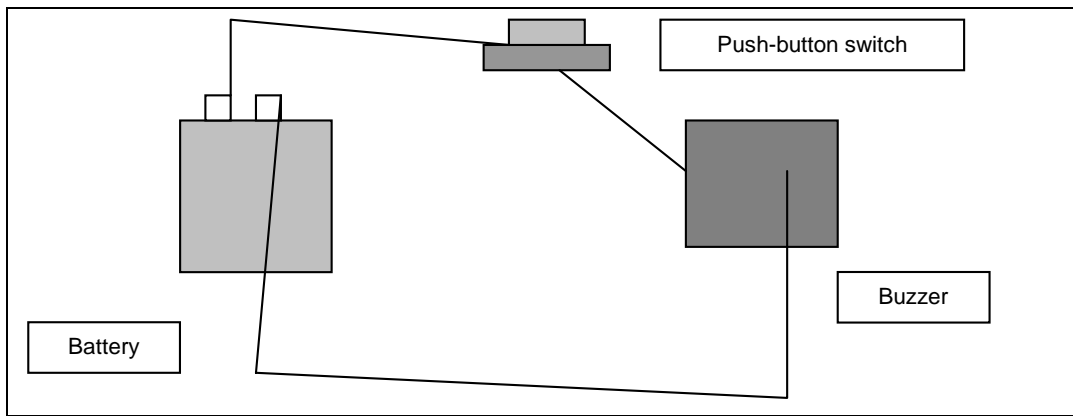
Teen Girl Scouts: complete 8 activities.

Patches may be purchased from the Bay Shop for \$1.80 each. Contact the Bay Shop at 302-456-7176.

1. Arrange to visit your local electric company or one of its power plants. Ask about the problems that utility companies face today in having to provide energy to more and more people. Is the company using any alternative energy sources?
2. Just how much electricity do your family appliances use? Look at the wattage information on each appliance you use – it's usually on the back or side of the appliance. Then multiply the wattage by the number of hours your family uses the appliance each day. Don't forget to count the watts used by light bulbs. Do this for 3 days. Which appliances use the most electricity?
3. Learn more about how to handle and fix electrical problems properly. Do at least three of the following:
 - Have someone show you what to do if the lights go out while you are home alone.
 - Show that you know how to follow three or more safety rules when using electricity.
 - Look at the electrical panel box where you live.
 - Find out about fuses and circuit breakers and how to change or reset them.
 - Find out how to turn off the electricity in case of flood, storm or other emergency.
 - Know how and whom to call in your community or in your building (owner, superintendent) in case of an emergency.
4. Making Connections - Electrical Engineers work with circuits and electricity. From light switches to electrical generators, engineers keep the juices flowing. Here's your chance to wear an engineer's hat – find out how a doorbell works by making your own. Supplies needed: (from any electronic store)
 - 9-volt battery,
 - 24 or 28 gauge copper wire
 - a push button switch
 - 9 volt buzzer

Follow the diagram to attach the wire to the buzzer, switch and battery making an electrical circuit. When you push the button, you should hear your doorbell "ring."

Can you think of other things in your home that work this way? What about any games that you might have played? (One Answer: Operation Game by Milton Bradley)



Note: you may substitute this activity with another that completes a circuit. For example, request one of the Agilent Science Kits – “Electronic Matching Game.” With this kit, girls build their own electronic quiz board. Each kit serves 4 girls. Leader training is available as well. Contact Janet Berry at 302-456-7150 ext. 7159 or jberry@cbqsc.org. Kits must be ordered at least one month in advance and may be picked up at a council office or shipped for \$3 each.

5. Visit a building that uses solar energy and find out how it works.
6. Cooking With the Sun - You can use the sun’s energy to cook your food in the outdoors. By doing this, you are saving wood or fuel. In some places in the United States, there is very little dead wood left on the forest floor. Build a solar cooker and cook at least part of a meal in it or build a solar hot water heater that works and demonstrate its use to your troop or group.
7. Conserving energy not only helps your parents reduce the cost of utilities, but is also good for the environment. Do at least one of the following to help conserve energy in your home:
 - Find out what changes you could make that could help save water.
 - Learn how to weather strip your windows and doors.
 - Find out about energy efficient light bulbs and install them in your home.
8. Stop a Draft -Help seal up your house or meeting place. Keep cold air out and warm air inside by making draft stoppers. Draft stoppers help to close up the spaces and cracks under doors and along windowsills so energy is saved. You will need:
 - A few large pieces of cloth or old towel
 - Yarn or twine
 - Buttons, ribbon, lace, bells, etc..

Twist the cloth or towel into a tube like shape. Tie it with the yarn or twine. You can make your draft stopper look like an animal. Use buttons for the eyes or even for a nose. Place your draft stopper against a crack in the bottom of the door or against a windowsill. You have become an energy saver.

9. Put on a puppet show or skit for a group of younger children about recycling and energy conservation.
10. Controlling Consumption - Engineers, geologists, miners, scientists—citizens have always been willing to invent or find a way to do things easier or better. We invent more energy efficient ways to do things. We develop an item that is more efficient than a competitor's item. We develop a furnace that is more energy efficient than last year's model. What we don't seem to be able to develop is a way to get consumers to insulate, weatherstrip, and close doors and windows so that the energy saved by the more energy efficient furnace is not wasted by the consumer's carelessness.

So what if laws and regulations were passed that required consumers to purchase and use items that conserved natural resources and energy? Some such laws and regulations are in effect today (for example, the Clean Air Act, the Corporate Average Fuel Economy laws, appliance standards, and building codes). It is our elected officials that decide what wastes can be released into the air, how landfills can be used, and other environmental standards.

When consumers abide by the laws and regulations passed, our society benefits. As a result of conservation, consumers spend billions per year less than they would if they had not started to apply energy-saving measures in the 1970s. Some energy experts believe that if everyone used energy as efficiently as they already know how, we would use two-thirds to one-half less energy than we currently do!

Materials / Preparation

- Two cookies for each girl
- Clock or timing device
- One napkin for each girl
- Activity
- Give each girl a cookie and napkin.

Instructions:

- Have the girls stand. When you give a signal, they are to begin eating their cookie. When they have swallowed the last bit of cookie, they should sit down. Every 30 seconds count the girls who are still standing. (Once a girl sits, she should remain in her seat until all girls are finished.)
- Create a line graph for the data: girls standing versus time.
- Distribute a second cookie. This time girls can only take a bite when you say "take a bite" (every 30 seconds). The system is the same—girls sit when finished and you tally the standing girls every 30 seconds.
- Again construct a line graph.
- Compare the graphs: Graph One represents unlimited consumption while Graph Two represents conservation. Is Graph Two like Graph One? How are they different? How long did it take for all resources to be consumed?
- Discuss the term "conservation." In the second cookie-eating exercise, conservation was practiced. Does conservation result in preservation? Why not? What good does it do to conserve? What happens to the life expectancy of the energy resource under conservation?
- Discuss the following questions:
 - a. How was the rate of consumption controlled in the second cookie?

- b. Can we control how rapidly we use resources?
- c. Does this have any implications for the use of coal, natural gas, oil, electricity? If so, what?

11. Discuss why and how people conserve energy. Use the following as examples: 55 mph (90 km/h) speed limit, thermostats lowered to 68°F (20°C), daylight savings time, taxes (gasoline tax), etc. Make up laws for conserving energy. What is allowed? What isn't allowed? What will the impact be on your troop or family, the school, and the town?
12. Career Awareness Activity - Think of some careers locally, nationally, and globally that would influence laws and guidelines governing energy conservation or wise energy use. (For example, Mother Teresa had a global influence on compassion and charity.)
13. Choose 2 of the following energy sources: oil, nuclear, hydroelectric, gas, solar and coal. Determine the steps involved in transporting this type of fuel from it's production site to the consumer. How does your chosen energy source impact the environment? Display your findings.
14. Think About It - Suppose that there is a severe oil shortage and the government requires that you and your community cut back on the use of oil to conserve the available supply. Prepare a plan to help your family and the community respond to this emergency. Find out how oil is used in your daily life – for example heating your home and running your school bus. Then decide how people can reduce oil usage.
15. Visit a building supply store to learn about insulating materials. Find out the meaning of the term "R-values" and what the recommended R-values are for different parts of a building. If possible, watch insulation being installed.
16. Plan Ahead - Make plans for the possibility that your home might be without power for 2 days. How will you keep warm or cool, cook food and keep it fresh and do your homework?
17. Create a display that shows how plants and animals from millions of years ago became the oil or coal used today. Design a map that shows where most major oil or coal deposits are located.
18. Mini Mining Reclamation Activity - Girls will collect data surrounding a given area and make generalizations about the reclaimability of that land after a mini-mining operation.
 - Materials - String, small stakes, notebooks and pencils

In small groups of 2-4 girls each - inform girls that they have been selected as reclamation specialists and have been given the responsibility of collecting data on various plots of ground. These plots are under consideration for special mining activities. Their job is to observe the area under consideration, collect data, and report on the feasibility of using and reclaiming the plots.

Survey the selected area and identify an area that is about three feet square. Have them mark off the area with string and small stakes.

Observe the area very carefully and record the following information:

- What is the general appearance of the plot?
- What types of plants or vegetation are present?
- Are there any insects or signs of animal life present?
- What is the soil like in the plot area?
- Are there any rocks present?
- Does the plot, or any aspect of the plot, change as the seasons change?
- What environmental conditions are present (light intensity, evidence of water, evidence of human traffic, temperature, etc.)?
- What is the surrounding land used for?

It may also be useful to have girls observe their plot of ground over several days and record any changes or observations.

Discuss the following questions:

- If your plot were considered for a mini-mining exploration, and you had excavated an area 24 inches (61 centimeters) in diameter to a depth of six inches (15 centimeters) below the surface, how would your plot be affected?
- What tools would you need?
- Where would you put the excavated ground?
- How would the mini-mining affect insect, animal, or human interaction?
- Would mining produce long-term effects?
- If the plot were mini-mined, could the ground be reclaimed to near its approximate original appearance?
- What reclamation would need to be done?
- Is the disturbance worth the economic gain made through jobs, taxes, and the quality of life and creation of wealth?
- What factors present the greatest challenges?
- How are the issues discussed similar or different in relation to commercial mining projects?

19. Oil Spills - Oil is often transported and shipped thousands of miles before it reaches your home, school or gas station. An oil spill is always a risk. Find out why oil spills can be so difficult to clean up. To see what it's like to make and clean up an oil spill, pour some cooking oil in a bowl or pan of water. Try different ways of getting it out:

- Try to gather it all in one place using a string.
- Try to skim it off with a spoon.
- Try to soak it up with paper towels or cotton balls.
- What else can you use? What works best?

Next, use sand and water to build a mini "beach" in a foil pan. Put a twig, rock, feather, furry fabric and a leaf in the sand. Put vegetable oil in the water and make waves to wash up onto the "beach." What happens? Try removing the oil from the objects on the beach using the techniques listed above for an oil spill. How do these techniques work on the feather and the furry fabric? What does that mean for birds and animals caught in the oil spill? What other techniques might you try to get the feather and fur clean? What do you think will work and why or why not? (Note: Tri-State Bird Rescue offers an excellent program on saving birds caught in oil spills. Contact: 302-737-9543, 110 Possum Hollow Road, Newark, DE 19711, or www.tristatebird.org)

20. If fewer petroleum products (made from oil) were used, the chances of oil spills would be reduced. Below is a list of products that are made from petroleum (oil). Keep a log for one week of which petroleum products you use and why you are using them. At the end of the week, look at your chart. What can you personally do to cut down on petroleum usage?

Fabrics made of synthetic fibers
Most "wrinkle-free" clothes
Plastic bags, containers, pails
Food packaging
Vinyl house siding
Interior and exterior paints
Toys (plastic)
Video and audio tapes
CD's (music and computer)
Costume Jewelry
Detergents
Rugs, Carpets
Methane for heating
Propane for camp lighting, barbeque grills
Kerosene for camping lanterns
Gas for cars, airplanes and boats
Diesel fuel for trucks and tractors
Home heating oil

Finished lubricating oils
Wax
Varnishes, alcohols, solvents
Prescription drugs, plastic intravenous (IV) bags, and sterile syringes
Computers, cell phones, faxes, televisions, stereos, game boys, iPods, etc...
Asphalt
Baby Oil
Lip Gloss
Skin Lotion
Petroleum Jelly (Vaseline)
Charcoal Lighter Fluid
Paraffin Wax (used in making candles & fire starters & some candies)
Paint Thinner