



Energy

Merit Badge Worksheet

Jan. 1, 2006 Rev.
Worksheet
Created by
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Scouts Name _____

Date _____

Counselor's Name _____

Counselor's Phone # _____

Complete

1. Do the following:

a. Find an article on the use or conservation of energy. Discuss with your counselor what in the article was interesting to you, the questions it raises, and what ideas it addresses that you do not understand. _____

b. After you have completed requirements 2 through 8, revisit the article you found for requirement 1a. Explain to your counselor what you have learned in completing the requirements that helps you better understand the article.

Complete

2. Show you understand energy forms and conversions by doing the following:

a. Explain how THREE of the following devices use energy, and explain their energy conversions: toaster, greenhouse, lightbulb, bow drill, nuclear reactor, sweat lodge.

1. _____;

2. _____;

3. _____;

b. Construct a system that makes at least two energy conversions and explain this to your counselor. _____

Complete

3. Show you understand energy efficiency by explaining to your counselor a common example of a situation where energy moves through a system to produce a useful result. Do the following:

a. Identify the parts of the system that are affected by the energy movement.

b. Name the system's primary source of energy. _____

c. Identify the useful outcomes of the system. _____

d. Identify the energy losses of the system. _____

Complete

4. Conduct an energy audit of your home. (see attached sheet)

Keep a 14 day log that records what you and your family did to reduce energy use. Include the following in your report and, after the 14 day period,

ENERGY REDUCTION LOG

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14

Discuss what you have learned with your counselor. _____

- a. List the types of energy used in your home such as electricity, wood, oil, liquid petroleum, and natural gas, and tell how each is delivered and measured, and the current cost; OR record the transportation fuel used, miles driven, miles per gallon, and trips using your family car or another vehicle

Types of energy used: _____

How is it delivered? _____

How is it measured? _____

Current Cost: _____

or:

Transportation Fuel Used _____

Miles driven _____

Miles per gallon _____

List Trips Taken _____

- b. Describe ways you and your family can use energy resources more wisely. In preparing your discussion, consider the energy required for the things you do and use on a daily basis (cooking, showering, using lights, driving, watching TV, using the computer). _____

Explain how you can change your energy use through reuse and recycling.

Complete

5. In a notebook, identify and describe five examples of energy waste in your school or community. Suggest in each case possible ways to reduce this waste. Describe the idea of trade offs in energy use. In your response, do the following:

- a. Explain how the changes you suggest would lower costs, reduce pollution, or otherwise improve your community. _____

- b. Explain what changes to routines, habits, or convenience are necessary to reduce energy waste. _____

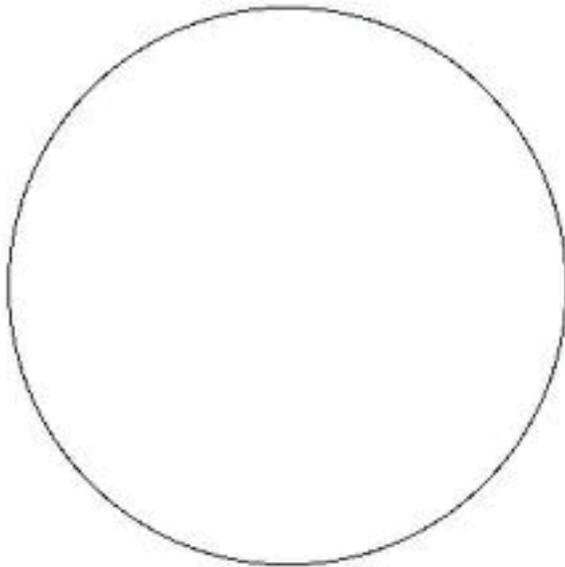
Tell why people might resist the changes you suggest. _____

Complete

6. Prepare pie charts showing the following information,(a-e) and explain to your counselor the important ideas each chart reveals.

Tell where you got your information. _____

Explain how cost affects the use of a nonrenewable energy resource and makes alternatives practical. _____



- a. The energy resources that supply the United States with most of its energy
- b. The share of energy resources used by the United States that comes from other countries
- c. The proportion of energy resources used by homes, businesses, industry, and transportation
- d. The fuels used to generate America's electricity
- e. The world's known and estimated primary energy resource reserves

Complete

7. Tell what is being done to make FIVE of the following energy systems produce more usable energy. In your explanation, describe the technology, cost, environmental impacts, and safety concerns.

* Biomass digesters or waste to energy plants

Technology _____

Cost _____

Environmental Impacts _____

Safety Concerns _____

* Cogeneration plants

Technology _____

Cost _____

Environmental Impacts _____

Safety Concerns _____

- * Fossil fuel power plants
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____
- * Fuel cells
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____
- * Geothermal power plants
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____
- * Nuclear power plants
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____
- * Solar power systems
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____
- * Tidal energy, wave energy, or ocean thermal energy conversion devices
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____
- * Wind turbines
 Technology _____
 Cost _____
 Environmental Impacts _____
 Safety Concerns _____

Complete

8. Find out what opportunities are available for a career in energy. _____

Choose one position that interests you and describe the education and training required. _____

Checklist

Attic

- Insulation - Is there enough insulation between ceiling joists?
- Vents - Sufficient and unobstructed?

Living Areas

- Air Leakage - Tape a foot of toilet paper to a pencil with paper hanging free. Hold near windows and doorframes, window air-conditioning units, and electrical covers. If paper moves, you may need weather-stripping, caulking, or storm windows.
- Wall Insulation - Are the wall too cool to the touch on a cold day or too warm on a hot day?
- Thermostat - Set at 68 degrees in winter (turn down 5 degrees more when sleeping), 78 in summer.
- Drapes - During winter, open drapes and shades to let sunlight in. Close at night. During the summer, close drapes.
- Unused Rooms - Close heating and cooling vents, doors in areas seldom used.
- Use fans instead of air conditioning when possible. Fans can also help circulate air when the air conditioning is on.

Fireplace

- Close the damper when fireplace is not in use.
- Glass doors keep heat from escaping up the chimney.

Kitchen

- Refrigerator/Oven Seal - To test, close a dollar bill in the door. If the bill moves with little resistance, the seal is bad.
- Appliances - Use washers and dryers in the morning and late evening hours when energy requirements are lower.
- Lights - Turn off lights when not used. Install lower wattage and fluorescent light bulbs whenever possible.
- Faucets do not drip.

Basement/Crawl Space

- Heating/Cooling System - Clean or replace filters monthly. Have unit serviced once a year.
- Water Heater - Set temperatures no higher than 160 degrees. Drain sediments 3-4 times a year.
- Ducts/Pipes - Insulate hot water pipes as well as heating and cooling ducts.
- Floors - If you have a crawl space under your house, install batt-type fiberglass insulation under floors.
- Venting - Washer & dryer units should be vented directly to the outside.

Outside

- Weather Stripping & Caulking - Caulk the cracks around windows, weather-strip around doors.
- Windows - Storm windows and double-paned glass can reduce energy usage up to 15%.
- Doors - Keep doors tightly closed on hot or cold days.
- Storm Doors - Help insulate doors