



ENERGY

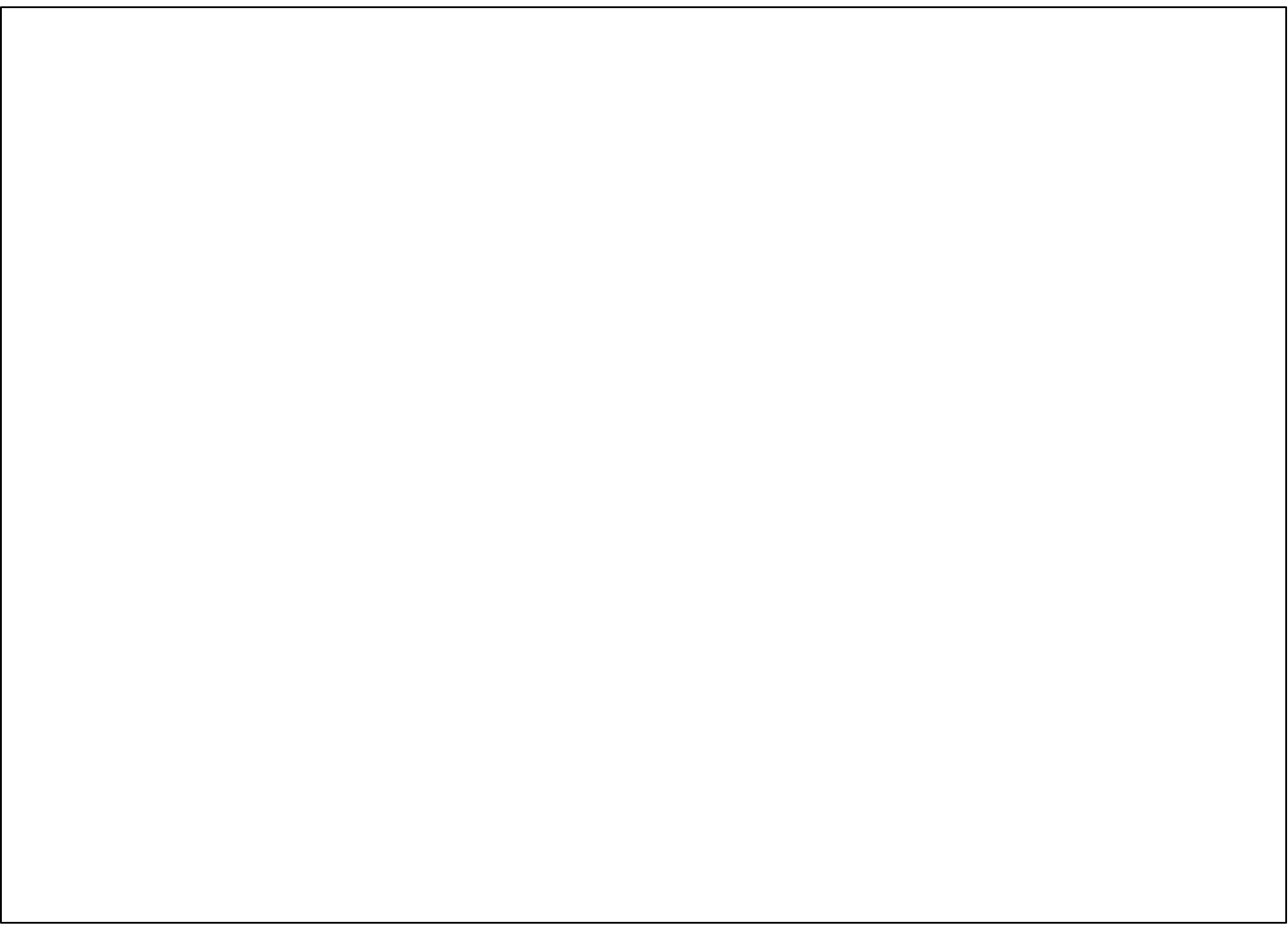
Merit Badge Requirements

- 1) Demonstrate the flow of heat energy. Use your demonstration to explain in your own words the ideas of heat, temperature, kinetic energy, calorie, and the laws of thermodynamics.
- 2) Give an example of each of the following forms of energy: heat, light, mechanical, electrical, chemical, atomic. Prepare a table showing devices for each form of energy that will convert it into another form of energy. Describe the idea of tradeoffs in energy use.
- 3) Make a color chart showing the world's known and estimated energy resources. Explain how long each is expected to last based on today's best estimates. Tell where you got your information.
- 4) Do the following:
 - A) Prepare charts showing:
 - What energy sources supply the United States with its energy
 - What portion of our energy is used by homes, businesses, industry, and transportation
 - What fuels are used to generate America's electricity
 - B) Tell what is being done to make any three of the following produce more energy. Include cost, pollution, and safety problems in your explanation.
 - Nuclear fission generators
 - Nuclear fusion generators
 - Cogeneration
 - The sun
 - The Wind
 - Geothermal
 - The oceans
 - C) Tell how our lives in the United States might be affected if energy supplies could not meet our present demands.
- 5) Show and explain to your counselor two articles from a current newspaper or magazine about the use or conservation of energy. Tell why these articles are important to the United States and why they are important to you.
- 6) Conduct an energy audit of your home. Prepare a written report in two parts:
 - A) Describe ways that your family can use energy more wisely.
 - B) Keep a record of what you have done to save energy for a 2-week period.
- 7) Find out and describe in a notebook 10 different examples of energy waste going on in your town. Suggest in each case possible ways to reduce this waste. Find out and write in your notebook five examples you have observed of pollution from energy use. Suggest in each case how this pollution might be reduced.
- 8) Give a talk titled "Energy: Why We Need It and How We Can Use It Better". Use all of the materials you have prepared in requirements 1 through 7. Choose as your audience your counselor, a den of Cub Scouts, or another group approved by your counselor.

Describe the idea of tradeoffs in energy use: _____

Requirement 3

In the space below make a color chart showing the world's known and estimated energy resources.



Explain how long each is expected to last bases on today's best estimates: _____

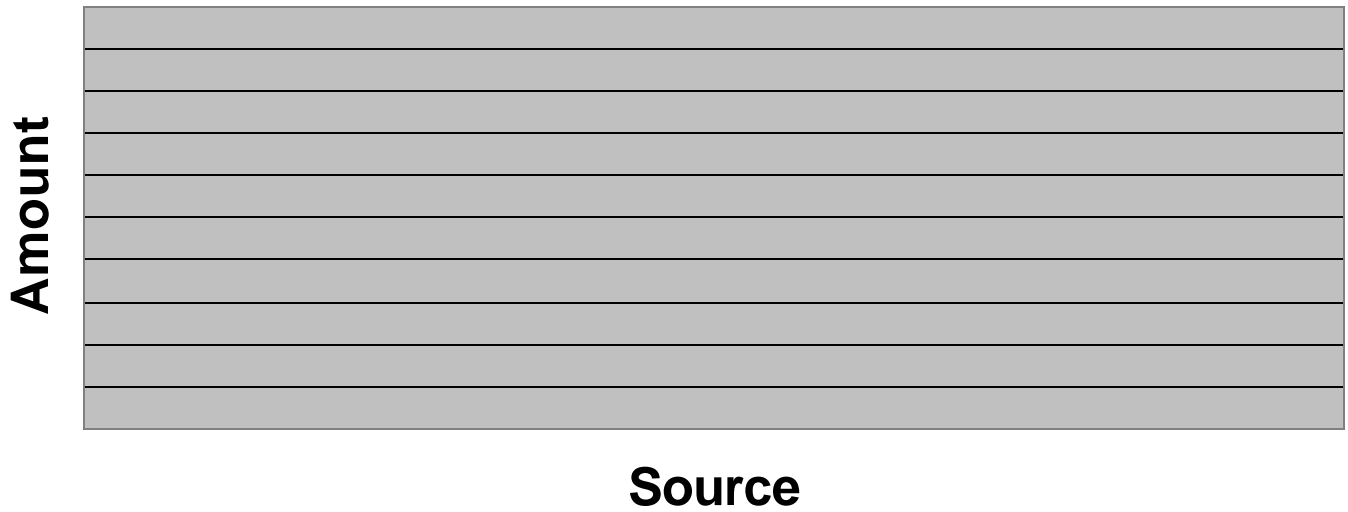
Where did you get your information? _____

Requirement 4

For each one of the charts below, provide the information that each chart asks for. You may use these charts or create charts of your own.

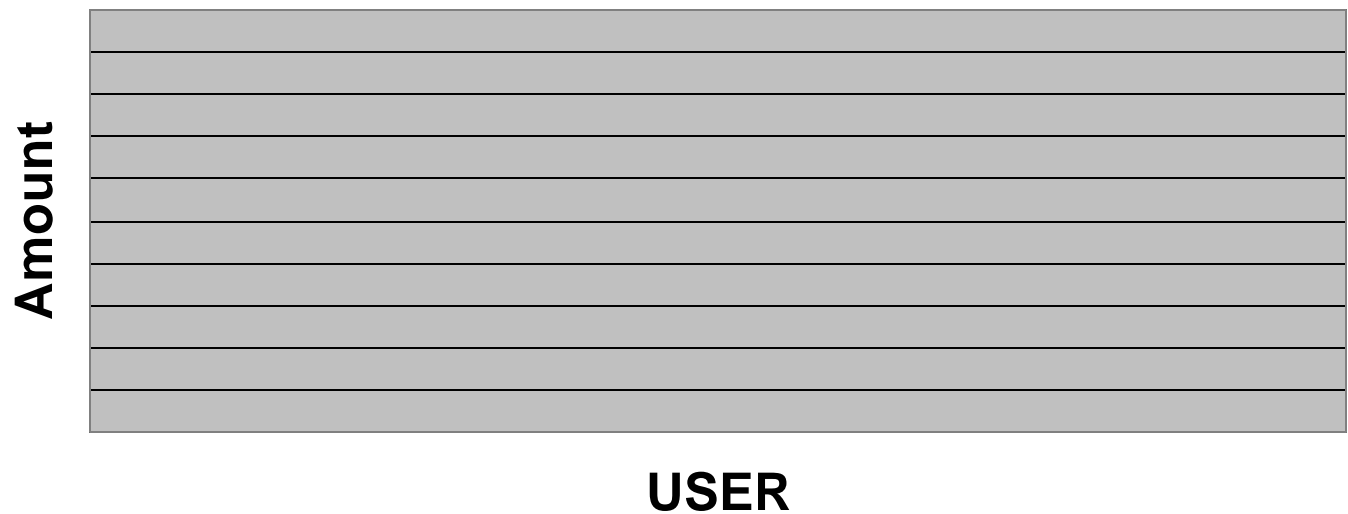
On this chart show what energy sources supply the United States with its energy:

United States Energy Sources



On this chart show what portion of our energy is used by homes, business, industry, and transportation:

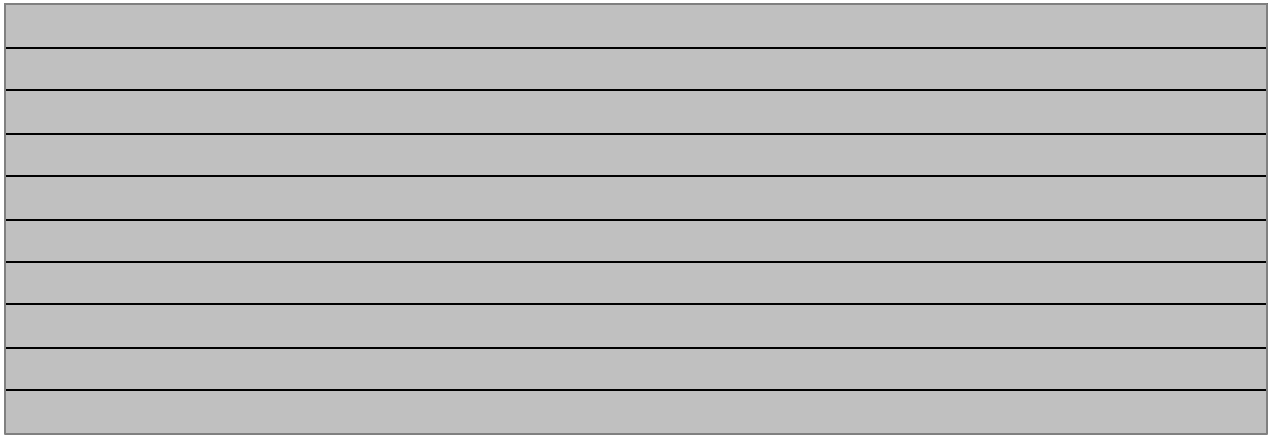
Energy Users



On this chart show what fuels are used to generate America's electricity:

Fuels

Amount



Source

Tell what is being done to make any three of the following produce more energy. Include cost, pollution, and safety problems in your explanation.

Nuclear Fission Generators: _____

Nuclear Fusion Generators: _____

Cogeneration: _____

The Sun: _____

The Wind: _____

Geothermal: _____

The Oceans: _____

Requirement 7

Find out and describe 10 different examples of energy waste going on in your town. Suggest in each case possible ways to reduce this waste.

Example 1: _____
Suggestion for reducing waste: _____

Example 2: _____
Suggestion for reducing waste: _____

Example 3: _____
Suggestion for reducing waste: _____

Example 4: _____
Suggestion for reducing waste: _____

Example 5: _____
Suggestion for reducing waste: _____

Example 6: _____
Suggestion for reducing waste: _____

Example 7: _____
Suggestion for reducing waste: _____

Example 8: _____
Suggestion for reducing waste: _____

Example 9: _____
Suggestion for reducing waste: _____

Example 10: _____
Suggestion for reducing waste: _____

Find out and describe five examples you have observed of pollution from energy use. Suggest in each case how this pollution might be reduced:

Example 1: _____
Suggestion for reducing waste: _____

Example 2: _____
Suggestion for reducing waste: _____

Example 3: _____
Suggestion for reducing waste: _____

Home Energy Audit

In The Attic:

___ Insulation - Use a ruler to measure the depth of insulation between ceiling joists. Make sure the level you measure meets or exceeds the recommended amount of insulation for your area.

___ Vents - Adequate venting reduces buildup of moisture in winter, of heat in summer. This minimizes temperature transfer into living areas and allows insulation to work better. About 1 sq. ft. of venting is recommended for every 150 sq. ft. of attic. Consider installing a thermostat-controlled attic fan to exhaust air.

In The Living Areas

___ Air Leakage - Cracks allow heat to escape in winter, enter in summer. To test, hold lit candle by window and door frames, window air-conditioning units, attic door. If flame flickers, you need weather-stripping, caulking and perhaps storm windows. Refer to the "Outside" section of this checklist.

___ Wall Insulation - To test, put a thermometer on outside wall of room, another at room center. Check after 4 hours. If wall reading is 5 degrees below room center reading, you need wall insulation. Consult an insulation contractor.

___ Fireplace - Close damper when fireplace is not in use. Otherwise, heating and cooling are lost up the chimney.

___ Thermostat - Set at 68 degrees in winter (turn down 5 degrees more when sleeping), 78 in summer. Turning thermostat on and off throughout the day uses more energy.

___ Drapes - During winter, open drapes and shades to let sunlight in. During the summer, close drapes and use opaque, light-colored ones to keep sun out.

___ Unused Rooms - Close heating and cooling vents, doors in areas seldom used.

In The Kitchen

___ Seals - To test, close a dollar bill in the door of the freezer, refrigerator, and oven. If the bill removes with little resistance, the appliance is leaking energy...replace the seal.

___ Appliances - Major appliances use major energy. Use washers and dryers during the morning and later evening hours, and on weekends, when energy requirements are not at their peak.

___ Lights - Install fluorescent light bulbs whenever possible...they use less energy.

In The Basement

___ Heating/Cooling System - Clean or replace furnace and air-conditioner filters once a month. Dirty filters make equipment work harder, use more energy. Have unit serviced once a year.

___ Water Heater - This is the #2 energy user in the home. Set temperatures between 140 & 160 degrees...drain sediments 3-4 times a year.

___ Ducts/Pipes - Insulate hot water pipes plus heating and cooling ducts, particularly if your basement is unheated.

___ Floors - Heat is lost through poorly insulated floors. If you have a crawl space under your house, install batt-type fiberglass insulation under floors...6" (R-19) is good.

___ Venting - Washer & dryer units should be vented directly to the outside to prevent heat and moisture buildup. In an air conditioned home, close off laundry and kitchen areas when they are in use...cool with a fan only.

On The Outside

___ Windows - Storm windows and double-paned glass can reduce energy usage up to 15%. Keep direct sunlight out during summer, but let in as much as possible in winter. This can be done with drapes, shutters, awnings, and shade trees that lose their leaves.

___ Weather Stripping & Caulking - As discussed under "Air Leakage", caulk the cracks around windows, weather-strip around doors. These improvements can lower your energy consumption by as much as 10%.