Energy

Merit Badge Workbook

Read the merit badge pamphlet.
This Workbook can help you organize your thoughts as you prepare to meet with your merit badge counselor

Merit Badge Counselors may not require the use of this or any similar workbooks.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
You should use the work space provided for each requirement to keep track of which requirements have been completed,
and to make notes for discussing the item with your counselor, not for providing full and complete answers.
If a requirement says that you must take an action using words such as "discuss", "show",
"tell", "explain", "demonstrate", "identify", etc, that is what you must do.
No one may add or subtract from the official requirements found on Scouting.org.

The requirements were last revised in 2025 • This workbook was updated in November 2025.

Scout's Name:_____ Unit_____Date Started _____

Counselor's Name: _____ Phone No.:_____Email: _____

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1. Do the following:

☐ a. With your parent or guardian's permission, use the internet to find a blog, podcast, website, or an article on the use or conservation of energy.

Discuss with your counselor what details in the article were interesting to you, the questions it raises, and what ideas it addresses that you do not understand.

What was interesting?

What questions does it raise?

What ideas does it address that you do not understand?

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

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,
- ☐ cell phone

☐ nuclear reactor,

☐ sauna.

☐ electric vehicles

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

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.

4. ☐ Conduct an energy audit of your home. *(See the Sample Home Energy Audit at the end of this workbook.)*

Keep a 14 day log that records what you and your family did to reduce energy use.

1	
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6	

Scout's Name: _____

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Include the following in your report and, after the 14 day period, 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.

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 what is meant by sustainable energy sources.

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

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.

1.		
2.		
3.		
4.		
5.		

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.

Suggested Change	Expected Results

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

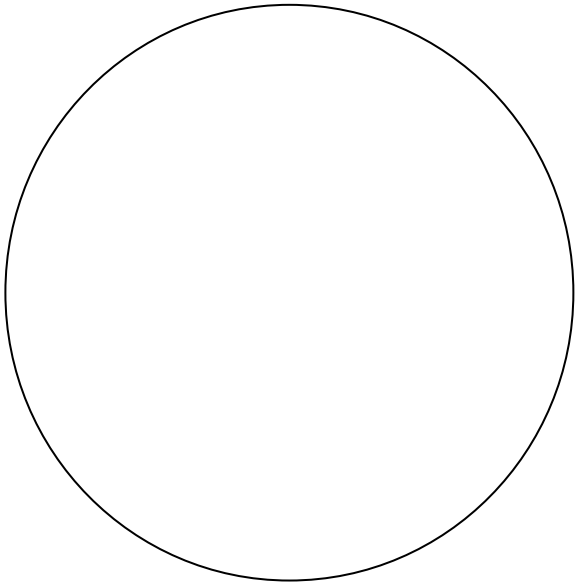
Tell why people might resist the changes you suggest.

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

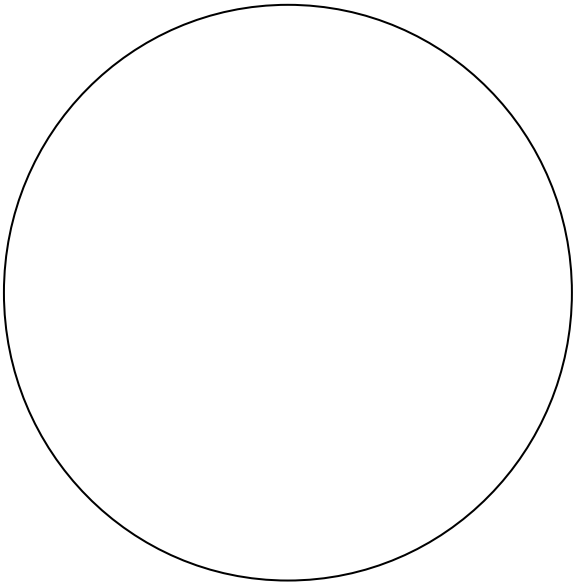
Tell where you got your information.

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

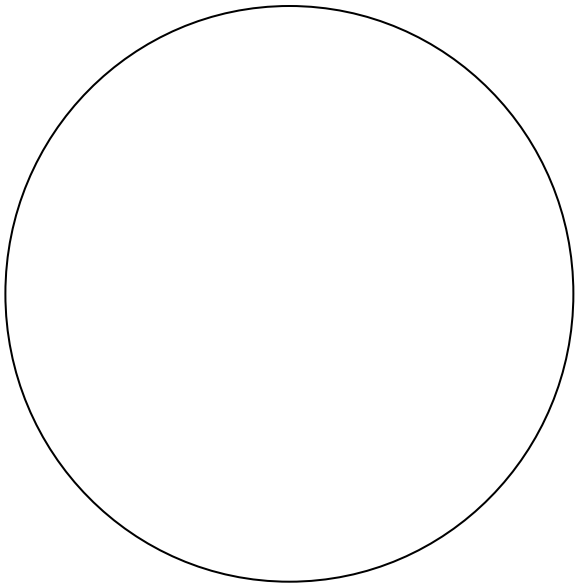
a. The energy resources that supply the United States with most of its energy



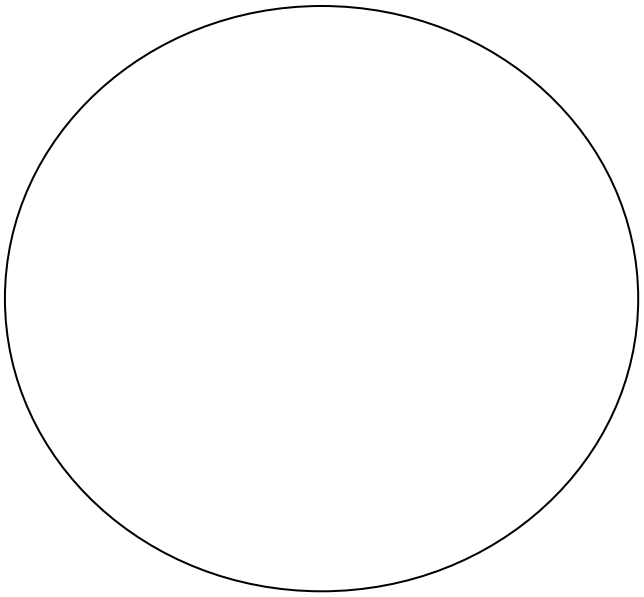
b. The share of energy resources used by the United States that comes from other countries



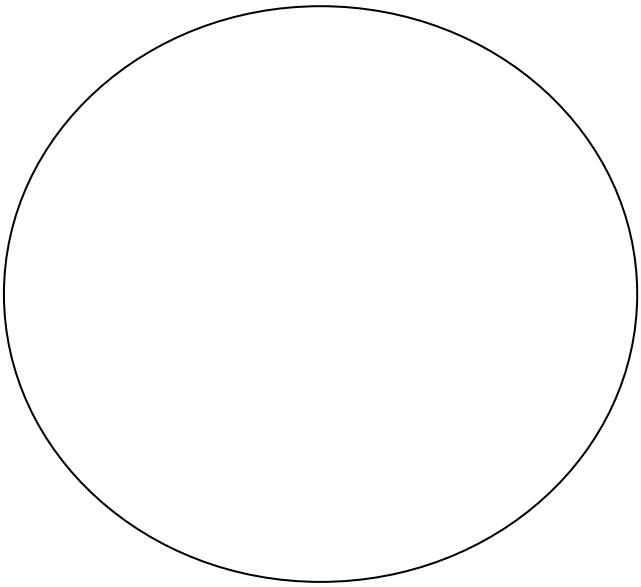
c. The proportion of energy resources used by homes, businesses, industry, and transportation



d. The fuels used to generate America's electricity



e. The world's known and estimated primary energy resource reserves



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
- ☐ Cogeneration plants
- ☐ Fossil fuel power plants
- ☐ Fuel cells
- ☐ Geothermal power plants
- ☐ Nuclear power plants
- ☐ Solar power systems
- ☐ Tidal energy, wave energy, or ocean thermal energy conversion devices
- ☐ Wind turbines

Scout's Name: _____

Energy System 1:

What is being done to produce more usable energy?

Technology	
Cost	
Environmental impacts	
Safety concerns	

Energy System 2:

What is being done to produce more usable energy?

Technology	
Cost	
Environmental impacts	
Safety concerns	

Scout's Name: _____

Energy System 3:

What is being done to produce more usable energy?

Technology	
Cost	
Environmental impacts	
Safety concerns	

Energy System 4:

What is being done to produce more usable energy?

Technology

Cost

Environmental impacts

Safety concerns

Energy System 5:

What is being done to produce more usable energy?

Technology	
Cost	
Environmental impacts	
Safety concerns	

8. Identify three career opportunities that would use skills and knowledge in energy.

1.
2.
3.

Pick one and research the training, education, certification requirements, experience, and expenses associated with entering the field. Research the prospects for employment, starting salary, advancement opportunities, and career goals associated with this career. Discuss what you learned with your counselor and whether you might be interested in this career

Career: _____

Training	
Education	
Certification Requirements	
Experience	
Expenses associated with entering field	
Prospects for employment	
Starting salary	
Advancement opportunities	
Career goals associated with this career	

☐ Discuss what you learned with your counselor and whether you might be interested in this career.

Notes:

When working on merit badges, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088). Important excerpts from that publication can be downloaded from http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf.
You can download a complete copy of the *Guide to Advancement* from http://www.scouting.org/filestore/pdf/33088.pdf.

Sample Home Energy Audit

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 120 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