

Energy

Merit Badge Workbook



Merit badges are earned by doing: reading the pamphlet, practicing the skills, and showing your counselor what you have learned.
This workbook gives you a place to organize your notes and track your progress along the way.
Merit badge counselors may not require the use of this or any similar workbook.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
Use the space under each requirement to note what you have done and what you want to talk about, not to write out full answers.
When a requirement says discuss, show, tell, explain, or demonstrate, that is what you must do.
No one may add to or subtract from the official requirements found on scouting.org (Guide to Advancement 7.0.4.8).
Scouting America last updated this badge's requirements page on December 15, 2025.
Requirements change from time to time. Double-check scouting.org before you start.

Scout's name: _____ Unit: _____ Date started: _____

Counselor's name: _____ Phone no.: _____ Email: _____

Links marked "Scouting America resources" are the ones Scouting America shares on its official badge page.
This workbook is unofficial and not endorsed by Scouting America.

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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.

Scouting America resources: The Essentials of Energy (video) · World's Most Asked Questions: What Is Energy? (video)

Title _____ Link or where I found it _____

My notes for the discussion

To discuss	My notes
Details that interested me	
Questions it raises	
Ideas I do not understand	

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

What I learned in requirements 2 through 8 that helps me understand the article better

Requirement 1 completed on _____ counselor initials _____

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

Scouting America resources: Different Forms of Energy (video) · Energy Transformations (video)

(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, or electric vehicles.

Scouting America resources: How Does a Toaster Work? (video) · How Do Greenhouses Work? Easy Explanation! (video) How Modern Light Bulbs Work (video) · Primitive Technology: Cord Drill and Pump Drill (video) How Wireless Charging REALLY Works! (The Hidden Physics) (video) · What Is Nuclear Energy? | National Geographic (video) ICE vs. Electric: The Future of Driving Compared (video)

Device 1

How it uses energy, and its energy conversions

Device 2

How it uses energy, and its energy conversions

Device 3

How it uses energy, and its energy conversions

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

Scouting America resources: Solar Motor-Free Energy Motor (video) · Solar Powered Toy Bell Ringer (video) How to Make a Simple Windmill for Free Energy - School Project | Functional (video) How to Make a Free Energy Using Water Wheel - Science Project Without Electricity (video)

What I built

Date

Energy conversions in my system

Conversion	Energy changes from	Energy changes to	Where it happens in my system
Conversion 1			
Conversion 2			
Conversion 3 (if any)			

Requirement 2 completed on

counselor initials

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:

Scouting America resources: Energy Transfers in Appliances (video)

My example system

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

Parts of the system affected by the energy movement

(b) Name the system's primary source of energy.

Primary source of energy

(c) Identify the useful outcomes of the system.

Useful outcomes

(d) Identify the energy losses of the system.

Energy losses

Requirement 3 completed on counselor initials

4. Conduct an energy audit of your home. 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, discuss what you have learned with your counselor.

Scouting America resources: Energy 101: Home Energy Assessment (video) · Do It Yourself Home Energy Audit Form (PDF)

Our 14-day energy log

Day	Date	What my family and I did to reduce energy use
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		

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(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.

Scouting America resources: Use of Energy Explained - Energy Use in Homes (website)

Choice 1: energy used in our home

Type of energy	How it is delivered	How it is measured	Current cost

OR choice 2: our vehicle record

Date	Trip	Miles driven	Fuel used	Miles per gallon

(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.

Scouting America resources: Save Energy (video) · Environmental Footprint Calculator (website) · Your Carbon Footprint (video) Renewable Energy 101 (video) · Reduce, Reuse, Recycle (video)

Using energy more wisely every day

Daily activity	Energy it takes, and how we could use it more wisely
Cooking	
Showering	
Using lights	
Driving	
Watching TV	
Using the computer	

What sustainable energy sources are

How reuse and recycling can change my energy use

What I learned from my 14-day audit

Requirement 4 completed on _____ counselor initials _____

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:

Scouting America resources: The Surprising Places We Waste Energy (video)

Example 1: where _____

What the waste is, and possible ways to reduce it

Example 2: where _____

What the waste is, and possible ways to reduce it

Example 3: where _____

What the waste is, and possible ways to reduce it

Example 4: where _____

What the waste is, and possible ways to reduce it

Example 5: where _____

What the waste is, and possible ways to reduce it

The idea of trade-offs in energy use

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

How my changes would lower costs, reduce pollution, or improve my 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.

Scouting America resources: Actions for a Healthy Planet (website)

Changes to routines, habits, or convenience that are needed

Why people might resist my changes

Requirement 5 completed on _____ counselor initials _____

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.

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

Scouting America resources: U.S. Energy Consumption by Source and Sector (website)
Everything You Need to Know About the Energy Flowcharts (video) · Monthly Energy Review (website)

Where I got my information _____

My pie chart (draw here or attach)

Important ideas this chart reveals

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

Scouting America resources: Why Does the US Import Oil When They Export So Much? (video)
US Energy Imports and Exports (website)

Where I got my information

My pie chart (draw here or attach)

Important ideas this chart reveals

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

Scouting America resources: Use of Energy Explained (website)
Energy Consumption & Efficiency Data | Energy Information Agency (website)

Where I got my information

My pie chart (draw here or attach)

Important ideas this chart reveals

(d) The fuels used to generate America's electricity

Scouting America resources: Total Energy: Primary Energy Consumption by Source (website)

Where I got my information

My pie chart (draw here or attach)

Important ideas this chart reveals

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

Scouting America resources: International Data (website)

Where I got my information

My pie chart (draw here or attach)

Important ideas this chart reveals

Requirement 6 completed on counselor initials

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.

Scouting America resources: How Cheap Renewable Energy Is Finally Flattening Emissions (video)

☐ **(a)** Biomass digesters or waste-to-energy plants

Scouting America resources: Flexible Clean Energy: Powering Tomorrow With Biomass (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(b)** Cogeneration plants

Scouting America resources: The Combined Cycle Gas Turbine - the World's Most Efficient Power Machine (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(c)** Fossil fuel power plants

Scouting America resources: From Coal to Clean Energy: A Utility-Scale Milestone in New Mexico (video)
How Forsite Development Transforms Retired Coal Sites Into Clean Solar Energy Hubs (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(d)** Fuel cells

Scouting America resources: Fuel Cell Technology - the Future of Clean Energy (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(e)** Geothermal power plants

Scouting America resources: The Secret Behind Iceland's Geothermal Energy (video)
Should We Build A Geothermal Power Plant In Yellowstone? (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(f)** Nuclear power plants

Scouting America resources: The Path to a New Era for Nuclear Energy (video) · How Close Are We to Nuclear Fusion? (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(g)** Solar power systems

Scouting America resources: Solar 3.0: This New Technology Could Change Everything (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(h)** Tidal energy, wave energy, or ocean thermal energy conversion devices

Scouting America resources: OTEC: The Huge Ocean Energy Source You've Never Heard of (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

☐ **(i)** Wind turbines

Scouting America resources: Wind Power Advances: Cutting-Edge Technologies Shaping the Future (video)

What is being done to get more usable energy, plus its technology, cost, environmental impacts, and safety concerns

Requirement 7 completed on _____ counselor initials _____

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

Scouting America resources: Careers in Energy and Natural Resources (video)
7 Nuclear Careers that Don't Require an Engineering Degree (PDF)

Three careers in energy

Career	How it uses skills and knowledge in energy

The career I picked

What I found out about it

Topic	What I found
Training	
Education	
Certification requirements	
Experience	
Expenses	
Prospects for employment	
Starting salary	
Advancement opportunities	
Career goals	

Whether I might be interested in this career, and why

Requirement 8 completed on counselor initials

Counselor sign-off

Your counselor signs your blue card or approves the badge in Scoutbook, and your unit records it. This line is for your own records.

Counselor's signature Date completed

Official Scouting America resources

Scouting America resources: Energy merit badge page (requirements and resources) · Energy merit badge pamphlet (free PDF)
All merit badges

Made by Cole at ScoutSmarts.com, an Eagle Scout who loves helping Scouts.
Spot an error or a requirement change? Tell me at scoutsmarts.com/contact.
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