Energy

Merit Badge Workbook

This workbook is not required but is designed to help you with this merit badge. No one can add or subtract from the Boy Scout Requirements #33215. Use page backs & add pages as needed. Please send comments to: craig@craiglincoln.com. Requirements revised: 2006, Workbook updated: January 2006.

Scout's Name: _____ Unit: _____

Counselor's Name: _____ **Counselor's Ph #:** _____

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 1 a. 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, _____

_____

nuclear reactor, _____

_____

sweat lodge. _____

_____

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. 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.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

12 _____

13 _____

14 _____

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 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. 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.

Example of energy waste _____

Possible ways to reduce this waste _____

How these changes should reduce costs _____

Reduce pollution _____

Improve your community _____

Needed changes _____

Why might people resist this change _____

Example of energy waste _____

Possible ways to reduce this waste _____

How these changes should reduce costs _____

Reduce pollution _____

Improve your community _____

Needed changes _____

Why might people resist this change _____

_____

Example of energy waste _____

Possible ways to reduce this waste _____

_____

How these changes should reduce costs _____

_____

Reduce pollution _____

_____

Improve your community _____

_____

Needed changes _____

_____

Why might people resist this change _____

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Example of energy waste _____

Possible ways to reduce this waste _____

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Example of energy waste _____

Possible ways to reduce this waste _____

_____

How these changes should reduce costs _____

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Reduce pollution _____

_____

Improve your community _____

_____

Needed changes _____

_____

Why might people resist this change _____

_____

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

Energy System: _____

What is being done to produce more usable energy? _____

_____

Technology_____

_____

Cost _____

_____

Environmental impacts_____

_____

Safety concerns _____

_____

Energy System: _____

What is being done to produce more usable energy? _____

_____

Technology_____

_____

Cost _____

_____

Environmental impacts_____

Safety concerns _____

Energy System: _____

What is being done to produce more usable energy? _____

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Energy System: _____

What is being done to produce more usable energy? _____

Technology _____

Cost _____

Environmental impacts _____

Safety concerns _____

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. _____

_____

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_____

_____