



# Electricity

## 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](mailto:craig@craiglincoln.com). Requirements revised: 2005, Workbook updated: January 2005.

Scout's Name: \_\_\_\_\_ Unit: \_\_\_\_\_

Counselor's Name: \_\_\_\_\_ Counselor's Ph #: \_\_\_\_\_

1. Demonstrate that you know how to respond to electrical emergencies by doing the following:

- (a) *Show* how to rescue a person touching a live wire in the home.
- (b) *Show* how to render first aid to a person who is unconscious from electrical shock.
- (c) *Show* how to treat an electrical burn.
- (d) Explain what to do in an electrical storm. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- (e) Explain what to do in the event of an electrical fire. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Complete an electrical home safety inspection of your home, using the checklist found in this pamphlet or one approved by your counselor. Discuss what you find with your counselor.

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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Make a simple electromagnet and use it to show magnetic attraction and repulsion.

4. Explain the difference between direct current \_\_\_\_\_  
\_\_\_\_\_  
and alternating current. \_\_\_\_\_  
\_\_\_\_\_

5. Make a simple drawing to show how a battery and an electric bell work.

6. Explain why a fuse blows or a circuit breaker trips. \_\_\_\_\_

\_\_\_\_\_

Tell how to find a blown fuse or tripped circuit breaker in your home. \_\_\_\_\_

\_\_\_\_\_

Show how to safely reset the circuit breaker.

7. Explain what overloading an electric circuit means. \_\_\_\_\_

\_\_\_\_\_

Tell what you have done to make sure your home circuits are not overloaded. \_\_\_\_\_

\_\_\_\_\_

8. On a floor plan of a room in your home, make a wiring diagram of the lights, switches, and outlets. Show which fuse or circuit breaker protects each one.

9. Do the following:

(a) Read an electric meter and, using your family's electric bill, determine the energy cost from the meter readings.

\_\_\_\_\_

(b) Discuss with your counselor five ways in which your family can conserve energy.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

10. Explain the following electrical terms:

volt, \_\_\_\_\_

\_\_\_\_\_

ampere, \_\_\_\_\_  
\_\_\_\_\_

watt, \_\_\_\_\_  
\_\_\_\_\_

ohm, \_\_\_\_\_  
\_\_\_\_\_

resistance, \_\_\_\_\_  
\_\_\_\_\_

potential difference, \_\_\_\_\_  
\_\_\_\_\_

rectifier, \_\_\_\_\_  
\_\_\_\_\_

rheostat, \_\_\_\_\_  
\_\_\_\_\_

conductor, \_\_\_\_\_  
\_\_\_\_\_

ground, \_\_\_\_\_  
\_\_\_\_\_

circuit, \_\_\_\_\_  
\_\_\_\_\_

and short circuit. \_\_\_\_\_  
\_\_\_\_\_

11. Do any TWO of the following:

- (a) Connect a buzzer, bell, or light with a battery. Have a key or switch in the line.
- (b) Make and run a simple electric motor (not from a kit).
- (c) Build a simple rheostat. Show that it works.
- (d) Build a single-pole, double-throw switch. Show that it works.
- (e) Hook a model electric train layout to a house circuit. Tell how it works. \_\_\_\_\_

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