



Electricity

Merit Badge Worksheet

Jan. 1, 2005
Rev. Created by
Craig Long 2011

Scouts Name _____

Date _____

Counselor's Name _____

Counselor's Phone # _____

Complete

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. _____

Complete

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

Complete

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

Complete

4. Explain the difference between direct current and alternating current. _____

Complete

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

Complete

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.

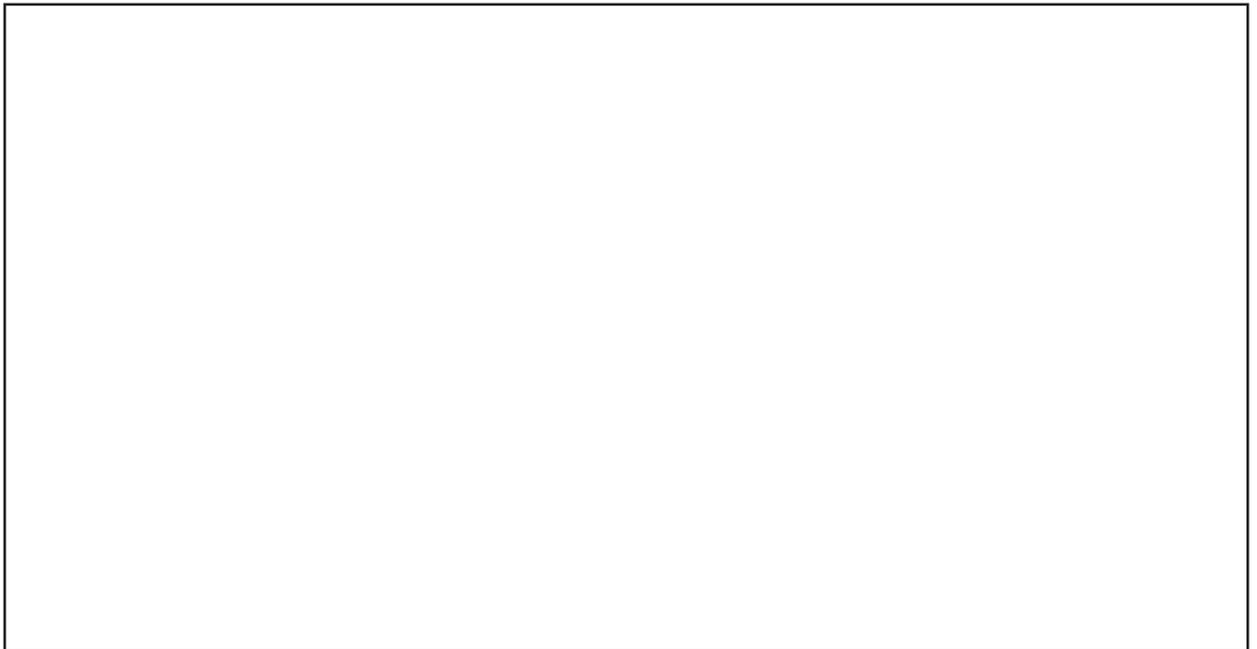
Complete

7. Explain what overloading an electric circuit means. _____

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

Complete

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.



Complete

9. Do the following:
- Read an electric meter and, using your family's electric bill, determine the energy cost from the meter readings. _____

 - Discuss with your counselor five ways in which your family can conserve energy.
 - _____
 - _____
 - _____
 - _____
 - _____

Complete

10. Explain the following electrical terms:

- volt _____
- ampere _____
- watt _____
- ohm _____
- resistance _____
- potential difference _____
- rectifier _____
- rheostat _____
- conductor _____
- ground _____
- circuit _____
- short circuit _____

Complete

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.

Tell about the two that you completed

- 1. _____

- 2. _____

Home Electrical Safety Checklist

Requirement 2

This is a simplified checklist based on the one in the Electricity Merit Badge pamphlet. It is not the checklist in the pamphlet.

- Outlets:** Check that outlets are not loose or wobble. Replace any broken outlets or broken or missing plates. Remember to shut off power to the house before replacing any outlets, and have an adult help you. Verify the outlet is dead with a volt meter.

- Cords and Plugs:**
 - Check for cracks, or other damage to the cord, throw away or replace if damaged
 - Check that the plug is not loose in an outlet. Adjust plug prongs or replace plug. If plugged in, check for hot spots in the wire, especially where the wire connects to the plug. If there is a hot spot, or if the rubber feels soft: unplug, cut off the bad part of the cord, and everything after it, and replace the plug, or replace the whole cord.
 - If the plug looks like it should have a third prong but doesn't, or if any of the prongs are missing or loose, replace the plug.
 - Computer equipment, and other electronic devices should be connected to a surge suppressor.

- Extension Cords:** Same checks as on other cords, but also: Make sure that extension cords are not overloaded. They should be plugged directly into a wall outlet, not into an outlet on a power strip.

- Ground Fault Circuit Interrupter (GFCI):** Make sure your house actually has one. Hit the "test" button. The "reset" button should pop-up and both outlets should be dead. The GFCI may be located inside a bathroom, or it may be outside outlet. Hitting the GFCI test button outside should kill power to the bathroom outlets as well (if a GFCI isn't in a bathroom). Hitting the "reset" button will reset the GFCI. Many hair driers have a GFCI build into the cord. These are for added safety, but do not take place of a household GFCI.

- Lightbulbs:** Make sure they are of the proper rating and that there are no empty sockets. Burnt out incandescent light bulb (the ones that just have a nifty little wire in them that glows) can be used to fill in any empty sockets. Replace any screw-in type fluorescent light bulb when they go out as they can burn up and smoke over time.

- Halogen Lamps:** Make sure halogen lamps are away from drapes or anything else

that that can burn easily. Halogen lamps operate at a very high temperature. Never touch a halogen bulb, or any other glass part of the lamp that is near the bulb, with your bare hands when replacing it. The oil on your hands will cause the bulb to explode when turned on.

- Circuit Breakers & Fuses:** If your house uses fuses, make sure that nobody has placed a penny or other metal in place of the fuse. Make sure all fuses are of the proper rating. Instead, call an electrician out, or someone else who has training on working with energized electrical circuits.

Make sure everyone knows where the main breaker is to turn off all power to the house in case of an electrical fire, or other emergency.

- Plug-In Appliances:** Check the cord on the appliance. Make sure no plug-in appliance is left near a water source when not in use, such as hair dryers and curlers left in a bathroom.

Appliances If any appliance blows a fuse, or trips a breaker often, or gives you a shock, have it repaired or replaced. Note: Some appliances may trip household breakers because there is too much load on that circuit, not because there is something wrong with the appliance.

Space Heaters: Keep space heaters three feet away from anything that can burn, like the clothes you are wearing. Do not use space heaters with extension cords not rated for 15 or more amps. Unplug heaters when leaving a room.

- Outdoor Safety:** Ensure all cords used outside, like for electric lawn mowers and other lawn tools, are rated for outdoor use and have the correct amp rating (15-20 amps is usually okay, 20 amp rating for larger motors like lawn mowers). Do not use power tools or lawn equipment when it is raining, or use an electric lawn-mower on wet grass. Check all cords for damage before and after use.