A HomeScouting Adventure

ELECTRICITY

SEPTEMBER HAC - MERIT BADGE FOR SCOUTS BSA

MERIT BADGE TRACKING

The tracking tool below is simply for your own tracking of completion of requirements.
Scouts are encouraged to find a local merit badge counselor to meet, discuss, and sign off on completion of the merit badge, however the HomeScouting Adventure Club will offer limited counseling sessions for Scouts needing a counselor.

Requirement	Completed?
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 on your connected worksheet.	
3. Make a simple electromagnet and use it to show magnetic attraction & 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. Make a floor plan wiring diagram of the lights, switches, and outlets for a room in your home. Show which fuse or circuit breaker protects each one.	
9. Read an electric meter and, using your family's electric bill, determine the energy cost from the meter readings and determine five ways in which your family can conserve energy.	
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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MERIT BADGE WORKSHEET

Through exploring The Trail inside the ClubHouse for the HomeScouting Adventure Club, complete this worksheet to demonstrate your knowledge of electricity. This worksheet will not be turned in and for your own use to demonstrate knowledge.

Describe how you would respond to the following electrical emergencies:

Rescue a person touching a live wire in the home

_____

_____

Render first aid to a person who is unconscious from electrical shock

_____

_____

Treat an electrical burn.

_____

_____

Explain what to do in an electrical storm.

_____

_____

_____

Explain what to do in the event of an electrical fire.

_____

_____

_____

Using the Home Electrical Inspection Checklist on the next page to complete an electrical home safety inspection of your home.

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Home Electrical Inspection Checklist

Outlets
- ❑ Check for outlets that have loose-fitting plugs, which can overheat and lead to fire.
- ❑ Replace any missing or broken wall plates.
- ❑ Make sure there are safety covers on all unused outlets that are accessible to children.

Line Cords
- ❑ Make sure cords are not frayed or cracked.
- ❑ Make sure they are placed out of traffic areas.
- ❑ Make sure that cords are not nailed or stapled to the wall, baseboard or to another object.
- ❑ Make sure that cords are not under carpets or rugs or any furniture rests on them.

Extension Cords
- ❑ Check that extension cords are not overloaded & only be used on a temporary basis, not as permanent wiring.
- ❑ Make sure extension cords have safety closures to help protect children from shock hazards and mouth burns.

Plugs
- ❑ Make sure your plugs fit securely into your outlets.
- ❑ Make sure no plugs have had the ground pin (the third prong) removed in order to make a 3-prong fit a 2-conductor outlet; this could lead to an electrical shock.
- ❑ Never force a plug into an outlet if it doesn't fit.
- ❑ Avoid overloading outlets with too many appliances.

Ground Fault Circuit Interrupters (GFCIs)
GFCIs can help prevent electrocution. GFCIs can be installed at the outlet, or as a replacement for the circuit breaker for an entire circuit at the fuse box.

- ❑ Kitchen
- ❑ Bathrooms
- ❑ Garage
- ❑ Laundry room
- ❑ Outdoors
- ❑ Test GFCIs according to the manufacturer's instructions monthly and after major electrical storms to make sure they are working properly.

Light Bulbs
- ❑ Check the wattage of all bulbs in light fixtures to make sure they are the correct wattage for the fixture size.
- ❑ Replace bulbs that have higher wattage than recommended; if you don't know the correct wattage, check with the manufacturer of the fixture.
- ❑ Make sure bulbs are screwed in securely; loose bulbs may overheat.

Circuit Breakers/Fuses
- ❑ Make sure circuit breakers and fuses are the correct size current rating for their circuit. If you do not know the correct size, have an electrician identify and label the size to be used. Always replace a fuse with the correctly specified size fuse.
- ❑ Make sure everyone in your home knows where the main breaker is located and how to shut of power to the entire house.

Plug In Appliances
- ❑ Make sure there are no plugged-in appliances where they might fall in contact with water. If a plugged-in appliance falls into water, NEVER reach in to pull it out—even if it's turned off. First turn off the power source at the panel board and then unplug the appliance.

Appliances
- ❑ If an appliance repeatedly blows a fuse, trips a circuit breaker or if it has given you a shock, unplug it and have it repaired or replaced.

Entertainment/Computer Equipment
- ❑ Check to see that the equipment is in good condition and working properly. Look for cracks or damage in wiring, plugs and connectors.
- ❑ Use a surge protector bearing the seal of a nationally recognized certification agency.

Outdoor Safety
- ❑ Electric-powered mowers and other electric tools should not be used in the rain, on wet grass or in wet conditions.
- ❑ Inspect power tools & electric lawn mowers before each use for frayed power cords, broken plugs & cracked or broken housings. If any part is damaged, stop using it immediately. Repair it or replace it.
- ❑ Always use an extension cord marked for outdoor use and rated for the power needs of your tools.
- ❑ Unplug portable power tools when not in use.
- ❑ When using ladders, watch out for overhead wires and power lines. Stay at least 10 feet from all overhead lines.

Lightning
- ❑ During an electrical storm, do not use appliances; do not take a bath or shower;
- ❑ Keep batteries on hand for flashlights and radios in case of a power outage.
- ❑ Use surge protectors on electronic devices, appliances, phones, fax machines and modems.

Space Heaters
- ❑ Keep space heaters at least 3 ft. away from any combustible materials such as bedding, clothing, etc.
- ❑ Don't use space heaters in rooms where children are unsupervised and remember to turn off and unplug when not in use.
- ❑ Do not use space heaters with extension cords; plug directly into an outlet on a relatively unburdened circuit.

Halogen Floor Lamps
- ❑ Halogen floor lamps operate at much higher temperatures than a standard incandescent light bulb. Never place a halogen floor lamp where it could come in contact with draperies, clothing or other combustible materials.
- ❑ Be sure to turn the lamp off whenever you leave the room for an extended period of time.
- ❑ Never use torchiere lamps in children's bedrooms or playrooms. Consider using cooler fluorescent floor lamps.

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Make a simple electromagnet and use it to show magnetic attraction and repulsion using instructions on homescouting.org. Use the space below to record any observations you made.

Explain the difference between direct current and alternating current.

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

Explain why a fuse blows or a circuit breaker trips.

How can you find a blown fuse or tripped circuit breaker in your home?

Then show a parent/guardian how to safely reset the circuit breaker.

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What does overloading an electric circuit mean?

_____

_____

_____

_____

What can you do to make sure your home circuits are not overloaded?

_____

_____

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

_____

_____

List five ways in which your family can conserve energy.

1. _____
2. _____
3. _____
4. _____
5. _____

Explain the following electrical terms:

Volt = _____

_____

Ampere = _____

_____

Watt = _____

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Explain the following electrical terms (continued):

Ohm = _____

_____

Resistance = _____

_____

Potential Difference = _____

_____

Rectifier = _____

_____

Rheostat = _____

_____

Conductor = _____

_____

Ground = _____

_____

Short Circuit = _____

Do any TWO of the following:

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

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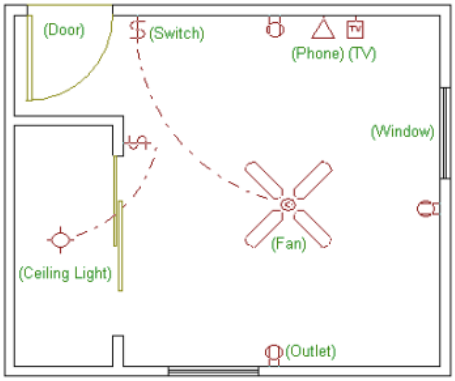
Using the space below, make a floor plan wiring diagram of the lights, switches, and outlets for a room in your home. Show which fuse or circuit breaker protects each one.



Sample plan