4-H Electricity Exhibit Suggestions

The Electric Energy Education Council (EEC) 4-H Youth Committee has prepared the following Exhibit Suggestions and Judging Criteria. It is encouraged that proper materials be used in the construction of all projects. Also please refer to the *General Judging Criteria for 4-H Electrical Projects* for more information regarding electricity project judging.

Include a written report with your project explaining the project and what you learned. If you are unable to make your project work, include in your report a brief discussion of why it does not work.

Electricity I, Magic of Electricity
(Battery-powered projects using battery components and wiring only)

Projects using paper clips, cardboard, thumbtacks, & brads are not eligible for state fair exhibits.

Exhibit a momentary switch, simple switch, or basic circuit **OR** an Electromagnet **OR** a Galvanometer OR an Electric motor. All projects must include a report explaining how the project was constructed and the principles demonstrated.

Electricity II, Investigating electricity
(Battery-powered projects using battery components and wiring)

Projects using paper clips, cardboard, thumbtacks, & brads are not eligible for state fair exhibits.

Exhibit a Circuit board demonstrating parallel and series switches, including a circuit diagram **OR** 3-way or 4-way switch circuit using DC/battery **OR** Basic electrical device (examples: Rocket launcher, burglar alarm, etc). All projects must include a report explaining how the project was constructed and the principles demonstrated.

Electricity III, Wired for Power

Exhibit a 120V lighting fixture or other appliance which uses a switch; OR two electrical household circuits using 120V materials to comply with National Electrical Code, one with a simple on/off switch to control bulb, and one using 3-way switches to control light from two locations; OR other project which demonstrates principles in the Wired for Power book.

The following information may be helpful as you plan your exhibit for this project. If you are planning to construct an Outdoor Utility Lamp, Outdoor-type Extension Cord, Trouble Light, Lamp or Lighting Fixture, Motor-Driven Appliance, or Home Wiring and Lighting Layout, these recommendations are necessary to know.

A. Outdoor Utility Lamp

General: A written report explaining your project and what you learned must accompany the exhibit. The lamp should be sturdy enough to withstand moderate abuse and allow for mobility. When the project is being constructed, general safety and good workmanship should be considered.

Physical Construction:

1. Height: 4' minimum
2. Column size: 4" X 4" wood or minimum !/2" steel
3. Base: 24" diameter of either wood or steel
4. Cord Bracket: a cord storage bracket must be incorporated into the lamp
5. Electrical box/boxes: all electrical boxes must be weatherproof or watertight.
6. Receptacle: if a receptacle is included, it must include GFCI protection.
7. Light/lights: Outdoor-type lamp
8. Conductor (wire)
   a. minimum 6' length
   b. Type SJOW, SOW, SJTW, STW, SJEO, SEO
   c. #14-2 wire with grounding conductor (if more than one light or receptacles are included, conductor should be sufficient size to carry connected wattage.) Exception: if GFCI receptacle is incorporated, must use a #12 conductor.
   d. Attachment plug: heavy-duty dead-front with grounding prong
9. Ground: all metal electrical boxes and metal parts must be grounded with grounding wire.
10. Connections: wire-to-wire connections must be soldered and taped OR have proper size wire-nut. Polarization (proper color coding) of all wiring must be adhered to.
11. Conductor shall be attached at base with an insulated device (nylon cable tie, electrical tape, etc.)

B. Outdoor-Type Extension Cord

General: A written report explaining your project and what learned must accompany the project. When the project is being constructed, general safety and good workmanship should be considered.

Physical Construction:

1. Length: minimum length 6'

2. Cord: #12-2 wire with ground, type SJOW, SOW, SJTW, STW, SJEO, SEO
3. Attachment plug: heavy-duty dead-front with grounding prong
4. Connector: cord grip and grounding receptacle with dead-front
5. Connections: polarization of all wiring must be adhered to

C. Trouble Light

General: A written report explaining your project and what learned must accompany the project. When the project is being constructed, general safety and good workmanship should be considered.

Physical Construction:

1. Non-metallic handle with switch
2. Shielded lamp guard
3. Minimum of #14-2 wire should be used, type SJOW, SOW, SJTW, STW, SJEO, SEO if to be used only for a light and no receptacle.

D. Lamp or Lighting Fixture

General: A written report explaining your project and what learned must accompany the project. When the project is being constructed, general safety and good workmanship should be considered.

Physical Construction:

1. Dead-front attachment plug
2. Wiring shall be protected for all sharp edges by any effective means, e.g., grommets, silicone seal, etc.
3. Soldering of wire ends is recommended.
4. Minimum of #18-2 lamp cord (minimum 6’ length)
5. Appropriate fixture and design for intended use.

E. Motor-Driven Appliance

General: A written report explaining your project and what learned must accompany the project. When the project is being constructed, general safety and good workmanship should be considered.

Physical Construction:

1. Motor should be adequate size to fulfill expected workload
2. All metal equipment shall be grounded
3. Wiring and attachment plug should be of adequate size for load of the motor with overload protection.
4. Dead-front attachment plug with grounding prong
5. Pulleys, belts, and chains used are to be guarded
6. Cord used should be type SJOW, SOW, SJTW, STW, SJEO, SEO

F. Home Wiring and Lighting Layout

General: A written report explaining your project and what learned must accompany the project.

1. Prepare a “floor plan” of a home
2. Describe lighting and receptacle layout in the home with “overlays”
    a. General lighting
    b. Task lighting
    c. Decorative lighting
    d. Receptacles for general use
    e. Receptacles for specific purposes (circuits could also be shown)
    f. Indicate where GFCI protected receptacles should be used
3. Show the wattage for lighting per room and total
4. Use National Electrical Code Symbols
5. Indicate if the lighting is incandescent or fluorescent and if lighting is adequate or needs improvement. If improvement is needed in lighting or receptacle layout, tell what should be done.

F. Clover Challenge: Electricity

This class is limited to 15-18 year olds who are enrolled in Clover Challenge for this project area. Exhibit a display illustrating the Clover Challenge area explored. This could include anything NOT covered in the project books, including but not limited to career exploration, safety issues, floor plan of electrical wiring for a new or renovated building, power plant design, etc. The completed Illinois 4-H Clover Challenge Agreement must be presented with the exhibit.

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