SCIENCE, ENGINEERING & TECHNOLOGY
STEM (ENGINEERING)

Unlimited entries per class number may be made per exhibitor.

Premium Code: STATIC ITEMS

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of exhibit may be identified if the entry tag is separated from the exhibit.
2. Several classes require a display board which should be a height of 24" and not to exceed 1/4" in thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24" boards are cut from one end of a 4' X 8' sheet of plywood. Nothing should be mounted within 3/4" of the top or bottom of the board. (Example: Woodworking, & Electricity). Posters can be any size up to 28" by 22" when ready for display. Example: tri fold poster boards are not 28" by 22" when fully open for display.
3. Fabricated boards such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
4 Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
5. Demonstration boards should include an overall title for the display, plus other necessary labeling.
6. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did. Method used and observations. Results: What you learned. All reports should be computer generated and enclosed in a clear/plastic cover. The reports should be attached securely to the display.

ELECTRICITY

In this division, 4-H'ers have the opportunity to create informational exhibits about the different aspects of electricity. Through involvement in this division 4-H'ers will be better educated about electricity and be able to present their knowledge to others.

Learn: Electrical insulation; Learn about the effects of magnetism; Build and electromagnet an electric motor; Decode circuit diagrams; Build circuits and test voltages; Build a rocket launcher and a burglar alarm; Measure electrical usage; Replace electrical switches; Evaluate light bulbs and test for electrical power; Explore LED's and SCR's, transistors, and the construction of a ACR intruder alarm; Learn the basics of solid-state electronics; Build a blinking "flasher and an amplifier"; Explore LED's and SCR's.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Several classes require a display board which should be a height of 24 inches and not to exceed ¼" thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24" are cut from one end of a 4' x 8' sheet of plywood. Nothing should be mounted within ¾" of the top or bottom of the board. (Example: Woodworking & Electricity.)
3. Fabricated boards such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
4. Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
5. Demonstration boards should include an overall title for the display, plus other necessary labeling.
6. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations). Results: what you learned. All reports should be computer generated and enclosed in a clear plastic cover.
7. The reports should be attached securely to the display.

Magic of Electricity-Unit 1
Dept H Division 870
Classes

9* Bright Lights- Scoresheet SF226- Create your own flashlight using items found around your house. Flashlights should be made from items that could be recycled or reused. No kits please. Magic of Electricity Unit 1(BU-06848*):* Make a switch. Use the following items: D cell battery, battery holder, insulated wire, 2- or 2.5-volt light bulb, bulb holder, paper clip, cardboard, and two brass paper fasteners to create a circuit that you can open and close.

11* Conducting Things- Scoresheet SF226- Make a circuit with a switch and a light bulb that can be used to test different household items for their ability to act as an insulator or conductor. You must find five items that are conductors and five items that are insulators. Create a table that illustrates your results.

12* Is There a Fork in the Road? - Scoresheet SF226- Use the following items to construct one parallel and one series circuit. Items: D cell battery, battery holder, insulated wire, bulb holder and a 2- or 2.5-volt light bulb.

Investigating Electricity-Unit 2
Dept H Division 870

Classes

21* Case Of Switching Circuit Essay- Scoresheet SF226- Use the following items: two D cell batteries, two battery holders, light bulb, bulb holder, a 3" x 6" piece of cardboard, six brass paper fasteners and approx. 2' of 24 gauge insulated wire to build a three way switch. Write a short essay or create a poster that illustrates how three-way switches function.

22* Rocket Launcher Poster- Scoresheet SF226- Construct a rocket launcher out of the following materials: a plastic pencil box that is at least 4" x 8", single pole switch, single throw switch, normally-open push button switch, 40' of 18 or 22 gauge stranded wire, 4 alligator clips, 2- by 6- board 6" long, 1/8" diameter metal rod, rosin core solder, soldering iron or gun, wire stripper, small crescent wrench, pliers, small phillips and straight blade screwdrivers, drill, 1/8" and 1/4" drill bits, rocket engine igniters, additional drill bits matched to holes for two switches. You must successfully build a rocket launcher and light two rocket igniters with your launcher. You DO NOT have to actually fire a rocket off of the launcher. Create a poster using photographs to show the "step by step process" you used to build your launcher.

23* Stop the Crime Poster- Scoresheet SF226- Build an ALARM using the following materials: On-off push button switch, mercury switch, buzzer-vibrating or piezoelectric, 9-volt battery, 9-volt battery holder, 4" x 4" by 1/8" Plexiglas board to mount circuit on; rosin core solder, soldering gun/iron, 2' of 22 gauge wire, wire strippers, hot glue sticks, hot glue gun and a plastic box with a lid to mount your alarm circuit on. Create a poster using photographs to show the "step by step process" you used to build your alarm.

Wired For Power-Unit 3
Dept H Division 870
Classes

1 Electrical Tool/Supply Kit- Scoresheet SF224- Create an electrical supply kit to be used for basic electrical repair around the house. Include a brief description of each item and its use. Containers should be appropriate to hold items.

2 Lighting Comparison- Scoresheet SF225- Display studying the efficiency of various lighting (incandescent, fluorescent, halogen, Light Emitting Diodes, etc.). The exhibit could be a poster display, or an actual item.

3 Electrical Display/Item- Scoresheet SF226- Show an application of one of the concepts learned in the Wired for Power project. Examples include re-wiring or building a lamp, re-wiring or making a heavy-duty extension cord or developing an electrical diagram of a house. The exhibit could be a poster display, or an actual item.

4 **Poster-** Scoresheet SF227- Should exemplify one of the lessons learned in the Wired for Power Project. Posters can be any size up to 28” x 22”.

Electronics-Unit 4
Dept H Division 870
Classes

5 **Electrical/Electronic Part Identification-** Scoresheet SF228- Display different parts used for electrical/electronic work. The exhibit should show the part (either picture or actual item) and give a brief description, including a symbol of each part and its function. Display should include a minimum of 10 different parts.

6 **Electronic Display-** Scoresheet SF229- Show an application of one of the concepts learned in the Electronics project. Examples include components of an electronic device (refer to page 35 of the Electronics’ manual).

7 **Electronic Project-** Scoresheet SF230- Exhibit an electronic item designed by the 4-Her or from a manufactured kit that shows the electronic expertise of the 4-H’er. Examples include: a radio, a computer, or a voltmeter.

8 **Poster-** Scoresheet SF231- Should exemplify one of the lessons learned in the Entering Electronics Project. Posters can be any size up to 28” x 22”.