

**2020**

## **SCIENCE, ENGINEERING AND TECHNOLOGY**

All exhibits must be labeled. Label each item with the exhibitor name, project division, exhibit class number and years in the project before entering at county fair. 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. Each individual is limited to one exhibit per class. All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.

Several classes require a display board which should be a height of 24 inches 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 inch 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.) For the safety of the models, models must be brought to the fair on a steady surface. Board such as plywood, composition board, or particle-type lumber must be used for demonstration displays and LEGO models.

Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.

Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit. Demonstration boards should include an overall title for the display, plus other necessary labeling.

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.

4-H'ers can exhibit in only one level, and once they have progressed to a higher level they cannot exhibit or enroll in a lower project level. This does not apply to Aerospace Model Rockets Levels 3 and 4 and Woodworking Levels 3 and 4.

\*H930001. Careers Interview – Interview someone who is working in any field associated with science, engineer and technology and research that career (i.e. computer programmer, architect, engineer, pilot, etc.). Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12-point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

## **ELECTRICITY**

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

\*Denotes State Fair Entry

**Purple, \$2; Blue, \$1.50; Red, \$1; White, \$0.50**

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H870020 Electricity Safety Poster (14 inches by 22 inches, either vertical or horizontal. May be in any medium — watercolor, ink, crayon, etc. — as long as they are not three-dimensional). Must deal with a specific topic. Examples: “Overhead Power Line Safety,” “Electrical Safety in the Home,” “On the Farm Safety.”

H870021 Electric Energy Conservation Poster (14 inches by 22 inches, either vertical or horizontal). Must show useful methods of efficient use of electrical energy and conservation.

**Purple, \$3; Blue, \$2; Red, \$1.50; White, \$1**

#### **Unit I**

H870030 Demonstration Board — This exhibit is to be prepared on a board that is ¼ inch thick by 24 inches high by 32 inches wide. A height of 23 7/8 inches is acceptable to allow for the saw kerf if two 24-inch boards are cut from one end of a 4-foot by 8-foot sheet of plywood. Nothing should be mounted within ¾ inches of the top or bottom of the board. Fabricated board such as plywood, composition board, or particle-type lumber may be used. The board should be sanded and finished to improve their appearance. The demonstration board should include an overall title for the display, plus other necessary labeling. Include two graphics and four items made or studied in the Unit I project. The graphic may show what electricity is, how a battery works, 10 electricity safety rules, the results of the home lighting survey, etc. The four items may include a simple fuse, simple switch, circuit board, cut away flashlight, electro-plated objects, conductors-nonconductors, etc.

H870031 Quiz Board or Steady Hand Tester — Game will be judged for usefulness, craftsmanship and wiring skill. Include battery or power supply to operate exhibit. Questions on the quiz board could deal with any topic.

#### **Unit II**

H870040 Telegraph Station — Exhibit must include one telegraph key and one telegraph sounder. The telegraph must be attached to a sturdy base and wired to a battery to demonstrate its operation. Label the display and the major components.

H870041 Toy Electric Motor — Working model of an electric motor. The motor is to be of the 4-H'er's design and should have the major parts labeled. A short, written description of how the motor works is to be included in a clear protective cover. No pre-manufactured electric motor will be accepted.

#### **Unit III – Wired for Power**

**Purple, \$4; Blue, \$3.50; Red, \$3; White, \$2.50**

\*H870001 Electrical Tool/Supply Kit: 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. Container should be appropriate to hold items.

\*H870002 Lighting Comparison: Display studying the efficiency of various lighting (incandescent, fluorescent, halogen, light emitting diodes, etc.). Exhibit could be a poster display or an actual item.

\*H870003 Electrical Display/Item: 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. Exhibit could be a poster display, or an actual item.

H870050 Electric Fencing System — This display may show different components such as grounding insulator, wire, wire splices, lightning protection, how an energizer works, complete systems, etc. Use needed labeling, short written description or explanations, drawing, etc., to explain what you are showing. Prepare the exhibit on a board that is ¼ inch thick, 24 inches high and 32 inches wide. A 22-inch-wide board will be accepted if extra space is not required.

H870051 Wiring Panel — This display may consist of any one of the following systems: 1. Single pole switch; 2. Three-way switch; 3. Complete wiring system. Display the components in a manner that illustrates actual construction wiring as closely as possible. Prepare the exhibit on a board that is ¼ inch thick, 24 inches high and 32 inches wide. A 22-inch-wide board will be accepted if extra space is not required. Include a plug so the system can be tested.

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\*H870004 Poster should exemplify one of the lessons learned in the Wired for Power Project. Posters can be any size up to 28 inches by 22 inches.

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#### **Unit IV**

\*H870005 Electrical/Electronic Part Identification: Display different parts used for electrical/electronics work. Exhibit should show the part (either picture or actual item) and give a brief description, including symbol of each part and its function. Display should include a minimum of 10 different parts.

\*H870006 Electronic Display: Show an application of one of the concepts learned in the Electronics project. Examples include: components of a electronic device (refer to page 35 of the Electronic manual).

\*H870007 Electronic Project: Exhibit an electronic item designed by the 4-H'er or from a manufactured kit that shows the electronic expertise of the 4-H'er. Examples include: a radio, a computer, or a volt meter.

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\*H870008 Poster should exemplify one of the lessons learned in the Entering Electronics Project. Posters can be any size up to 28 inches by 22 inches.

## **GEOSPATIAL**

SET Geospatial is a diverse category that includes a variety of exhibits 4-H'ers can get involved in. Through participation in this category, 4-H'ers will gain more knowledge about Nebraska's rich history and diverse geography.

Youth enrolled in Geospatial may exhibit in any class within this division

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\*H880001 Poster - Create a poster (not to exceed 14" x 22") communicating a GPS theme such as How GPS or GIS works, Careers that use GPS or GIS, How to use GPS, What is GIS, GPS or GIS in Agriculture, Precision Agriculture, or a geospatial topic of interest.

\*H880002 4-H Favorite Places or Historical Site Poster – The 4-H exhibitor identifies a favorite place or historical site (including grave sites) in Nebraska. Exhibit should include latitude and longitude, digital picture, and local area map. Poster size should not exceed 14" X 22".

\*H880003 GPS Notebook - Keep a log of at least 5 places visited using a GPS enabled device. For each site, record the latitude, longitude and elevation. At least one site should be from a community other than where you live. Also include a description of the site, a paragraph explaining what was interesting about the site or finding it. Photos of each site and/or cache are optional but encouraged.

\*H880004 Geocache - Assemble a themed geocache. Each geocache should be a water-tight container. It should include a log book and pencil for finders to log their visits and may include small trinket, geocoins, etc. for the finders to trade. Documentation should include a title, teaser description and the geographic coordinates of intended placement. **Register the site at [geocaching.com](http://geocaching.com), include a print-out of its registry.** The entry may include a photograph of the cache in its intended hiding place.

\*H880005 Agriculture Precision Mapping – 4-Hers will assemble a notebook that will include a minimum of 2 digital copies of various data layers that can be used in precision agriculture to identify spatial patterns and/or correlations (printed copies of websites where applications can be purchased is acceptable). A report of how the analysis of the various data will be used to make a management decision.

\*H880006 4-H History Map Preserve 4-H History: Nominate a Point of Interest for the 4-H History Map Project include copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to <http://arcg.is/1bvGogV>. For more information about 4-H history go to <http://4hhistorypreservation.com/HistoryMap/>. For a step by step video on nominating a point, please go to this link: <http://tinyurl.com/nominate4h>. Write a brief description of historical significance of 4-H place or person. (a minimum of one paragraph).

\*H880007 GIS Thematic Map – Using any GIS software, create a thematic map. Thematic maps can utilize any subject of interest to the 4-H'er. Example map would be Amelia Earhart's or Sir Francis Drake's Voyage population density maps, water usage "x 11" maps or 4-H project in Nebraska. Create a GIS map using data from books, and/or internet. Use reliable data, (U.S. Center or U.S. Census Bureau etc.) Map any size from 8 ½" x 11" up to 36" x 24", which should include Title, Base Map, Neat Line, North Arrow, and Legend. Identify the source of your information on the back of map.

**Purple, \$2; Blue, \$1.50; Red, \$1; White, \$.50**

H880015     You Be The Teacher — Share with others what you learned in this project.

H880016     Poster (14 inches by 22 inches) relating to what you learned from the Geospatial project.