

- d. What materials were selected for your project?
 - e. If your final design has any moving parts, define how you determined appropriate allowance in your design.
 - f. Identify any changes that you would make to improve your design.
- H860008.* **MAKER SPACE/DIGITAL FABRICATION** - This project is a computer generated project created using a laser cutter, vinyl cutter, heat press or CNC router. Vector or 3D based software such as Corel Draw or Fusion 360 would be an example of an appropriate software used to create your finished project. Project should include a notebook with the following:
- a. What motivated you to create this project
 - b. Software and equipment used
 - c. Directions on how to create the project
 - d. Prototype of plans
 - e. Cost of creating project
 - f. Iterations or modifications made to original plans
 - g. Changes you would make if you remade the project

Team Entry Option: To qualify for entry at the Nebraska State Fair team materials entered in H860007 – Maker Space/ Digital Fabrication must clearly be the work of a team instead of an individual, and must have at least 50% of all team members enrolled in 4-H. Additionally, all enrolled 4-H members on the team should complete and attach an entry tag to the materials. A supplemental page documenting the individual contributions to the project should be included. The entry will be judged as a team, with all team members receiving the same ribbon placing.

DEPARTMENT ROBOTICS

PREMIUMS: Purple-\$4.50; Blue-\$4.00; Red-\$3.50; White-\$2.50

DIVISION 861 - ROBOTICS

- Youth enrolled in Virtual Robotics, Junk Drawer Robotics (Levels 1, 2, or 3) Robotics Platforms or GEAR TECH 21 may exhibit in any class within this division.
- Team Entries: To qualify for entry at the Nebraska State Fair, team materials entered in robotics classes that are clearly the work of a team instead of an individual must have at least 50% of all team members enrolled in 4-H. Additionally, all enrolled 4-H members on the team should complete and attach an entry tag to the materials. A supplemental page documenting the individual contributions to the project should be included. The entry will be judged as a team, with all team members receiving the same ribbon placing.
- Creating a video of your robot in action would be helpful for the judges but is not mandatory. Present as a CD Rom with your robot entry.

H861001.* **ROBOTICS POSTER** – Create a poster (14” x 22”) communicating a robotics theme such as “Robot or Not”, “Pseudocode”, “Real World Robots”, “Careers in Robots” or “Autonomous Robotics”, “Precision Agri culture”, or a robotic topic of interest to the 4-H'er. SF236

H861002.* **ROBOTICS NOTEBOOK** - Explore a robotics topic in-depth and present your findings in a notebook. Documentation should include any designs, research, notes, pseudocode, data tables or other evidence of the 4-H'ers learning experience. The notebook should contain at least three pages. Topics could include a programming challenge, a programming skill, calibration, sensor exploration, or any of the topics suggested in Class 1. SF237

H861004.* **ROBOTICS/CAREERS INTERVIEW** - Interview someone who is working in the field of robotics and research the career in robotics. 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. SF239

H861005.* **ROBOTICS SENSOR NOTEBOOK** – Write pseudo code with a loop which includes at least one sensor activity. Include the code written and explain the code function. SF241

H861007.* **KIT LABELED ROBOT (cannot be programmed) and NOTEBOOK** SF243 – This class is intended for explorations of robotic components such as arms or vehicles OR educational kits marketed as robots that do not have the ability to be programmed to “sense, plan and act.” The exhibit should include a notebook with the robot the youth has constructed. Included in the notebook should be (1) a description of what the robot does, (2) pictures of programs the robot can perform, (3) why they chose to build this particular form, and (4) how they problem solved any issues they might have had during building and programming. A picture story of assembly is recommended. If robot is more than 15” inches wide and 20” inches tall they may not be displayed in locked cases.

H861008.* **3D Printed Robotics Parts** - This class is intended for youth to create parts through 3D printing, that help create their robot or aid the robot in completing a coded function. Project should include notebook describing the process used to create the project, describe the success of your designed piece (did it work), intended use of the product and the modifications made to the item. SF244

- H861009. **3D/NON-MOBILE ROBOT** - Construct out of items found around the home. Provide a short description of your robot, including steps you took to construct the robot and items used.
- H861010. **ROBOT/STEM ART** - The purpose of this class is to allow artistic exhibits that contain a science and technology theme. This class can use any form of medium. Examples might include paintings, drawings, photographs, or songs or poems written by the exhibitor. Entries must be appropriate for fair display and no larger than 24" x 24". For example: paintings or photographs should be displayed in notebook format or mounted on a sturdy display panel. All entries must include a title and brief explanation of the purpose or message (what is the exhibit meant to show).
- H861011. **LEGO INITIAL** - Construct the first letter of your first or last name out of Legos. Entries must not reach over 12" in height and 18" in width. Can be two or three dimensional. If two dimensional, make sure the letter is securely fastened to a poster or wood board. If 3D, please place initial on a sturdy surface and make sure it is able to stand on its own. Include a brief explanation of the exhibit.
- H861012. **OTHER/CATCH ALL** - Other robotics exhibit that does not fit into any other class.
- H861013. **FIRST LEGO LEAGUE ~ INTO ORBIT** - Any exhibit that showcases member participation in the 2017-2019 Animal Allies Season. Exhibit examples: poster board, scrapbook, brochure, etc.

ROBOTICS SHOWCASE

- H861003.* **ROBOTICS VIDEO** - This class should be displayed in a notebook. The notebook should include a video clip on a CD/DVD that demonstrates the robot performing the programmed function. Include your pseudo code and screenshots of the actual code with a written description of the icon/command functions. All videos for state fair should be emailed to Amy Timmerman atimmerman2@unl.edu before August 15. Files must be saved in a PC compatible format with county name and last name of participant before emailing.

DEPARTMENT ELECTRICITY

PREMIUMS: Purple-\$4.50; Blue-\$4.00; Red-\$3.50; White-\$2.50

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. For more resources and materials in this category refer to the resource section at the bottom of the page.

- 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.
- 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-inch thickness. A height of 24 7/8 inches is acceptable to allow for the saw kerf (width) 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 3/4 inch of the top or bottom of the board. (Example: Woodworking & Electricity.)
 - a. Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
 - b. Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
 - c. Demonstration boards should include an overall title for the display, plus other necessary labeling.
 - d. 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.

DIVISION 871 – ELECTRICITY 1

MAGIC OF ELECTRICITY UNIT 1

- H871001. **BRIGHT LIGHTS** – Create your own flashlight using items found around your house. Flashlights should be made out of items that could be recycled or reused. No kits please.
- H871002. **CONTROL THE FLOW** – 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.
- H871003. **CONDUCTING THINGS** – 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.
- H871004. **IS THERE A FORK IN THE ROAD** – 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.