

## **DIVISION 861 – ROBOTICS**

### **See General Information Science, Engineering and Technology**

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. Creating a video of your robot in action would be helpful but is not mandatory. Present as a CD Rom with your robot entry.

**H861-001\* 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 Agriculture”, or a robotic topic of interest to the 4-H'er.

**H861-002\* 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 explanation, or any of the topics suggested in Class 1.

**H861-003\* 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 mailed to Amy Timmerman [atimmerman2@unl.edu](mailto: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.

**H861-004\* 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.

**H861-005\* Robotic Sensor Notebook** - Write pseudo code which includes at least one sensor activity. Include the code written and explain the code function.

**H861-006\* Build a Robot** (may use kit) - Include a robot and notebook including the pseudo codes for at least one program you have written for the robot, the robot's purpose, and any challenges or changes you would make in the robot design or programming. If robot is more than 15” inches wide and 20” inches tall they may not be displayed in locked cases. (State Fair) We recommend you submit the project under class H861003 – Robotics Video. Junk Drawer Robotics do not qualify. For State Fair, submit a video of robot in action to Amy Timmerman by 8/15. Files must be saved in a PC compatible format with county name and last name of participant before mailing.

**H861-007\* Kit Labeled Robot** – (Cannot be programmed) 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 project the youth has constructed, a description of what it does and an explanation of how it is similar to and different from a robot. . If robot is more than 15” inches wide and 20” inches tall they may not be displayed in locked cases. (State Fair) We recommend you submit the project under class H861003 – Robotics Video.

## **DIVISION 870 – ELECTRICITY**

### **See General Information Science, Engineering and Technology**

**H870-901 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.

**H870-902 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.

**H870-903 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.

**H870-904 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.

## **INVESTIGATING ELECTRICITY - UNIT 2**

**H870-905 Case of the Switching Circuit**: Use the following items: two D cell batteries, two battery holders, light bulb, bulb holder, a 3 inch by 6 inch piece of cardboard, six brass paper fasteners and approximately two feet 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.

**H870-906 Rocket Launcher**: Construct a rocket launcher out of the following materials: a plastic pencil box that is at least 4 inches by 8 inches, single pole switch, single throw switch, normally-open push button switch, 40 feet of 18 or 22 gauge stranded wire, 4 alligator clips, 2 by 6 board 6 inches long, 1/8 inch 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 inch and ¼ inch 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.

**H870-907 Stop the Crime: 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 inch by 4 inch by 1/8 inch Plexiglas board to mount circuit on; rosin core solder, soldering gun/iron, two feet 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**

**H870-001\* 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.

**H870-002\* 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.

**H870-003\* 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 poster display, or an actual item.

**H870-004\* Poster** - Poster 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**

**H870-005\* Electrical/Electronic Part Identification** - Display different parts used for electrical/electronic 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.

**H870-006\* Electronic Display** - 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 Electronic manual).

**H870-007\* 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.

**H870-008\* Poster** - Poster should exemplify one of the lessons learned in the Entering Electronics Project. Poster can be any size up to 28" x 22".