

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.

ROBOTICS

Involvements in STEM Robotics give participants a first-hand experience in modern technology.

This division involves many different aspects of Robotics. Participants will learn more about how robots are designed and developed as well as the mechanical and electronic elements of robots. Discover the design and functions of robotic arms; Build a robotic arm that moves; explore robot movement, power transfer, and locomotion; Design and build machines the roll, slide, draw or move underwater; Make the connection between the mechanical and electronic elements of robots; Explore sensors, write programs, build circuits, and design sensors, loops and conditional statements.

Youth enrolled in Virtual Robotics, Junk Drawer Robotics (Level 1, 2, or 3, or Robotics Platforms may exhibit in any class within this division.

Team Entries: To qualify for entry materials entered in robotics classes must clearly be 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. Videos should be uploaded to a video streaming application and exhibitors should provide a hard copy QR code for viewing. Entries must be submitted to your local extension office one week prior to static judging day but exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permission for public viewing.

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 the owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. 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.
3. 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.

Dept H Division 861

Classes

- 1 **Robotics Poster-** Scoresheet SF236- Create a poster (28" X 22") communicating a robotics theme such as "Robot or Not", "Pseudocode", "Real World Robots", "Careers in Robots", "Autonomous Robotics", "Precision Agriculture", or a robotic topic of interest to the 4-H'er.
- 2 **Robotics Notebook-** Scoresheet SF237- 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, programming skill, calibration, sensor exploration, or any topic suggested in Class 1.
- 4 **Robotics Career Interview-** Scoresheet SF239- 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

such as a short video uploaded to a cloud sharing service. Include a QR code with your project to allow for judging access. Entries must be submitted to your local extension office one week prior to static judging day but exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permission for public viewing. 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.

- 5 Robotics Sensor Notebook-** Scoresheet SF241- Write pseudo code which includes at least one sensor activity. Include the code written and explain the code function. Codes can be submitted as a multimedia format uploaded to a cloud sharing service. Include a QR code with your project to allow for judging access. Entries must be submitted to your local extension office one week prior to static judging day but exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permission for public viewing.
- 6* Build a robot- (may use kit)-** Scoresheet SF243- Include a robot and notebook including the pseudocodes 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 15" wide and 20" tall they may not be displayed at state fair. It is recommended the exhibit be submitted under class H861003 Robotics Video. Junk Drawer Robotics do not qualify.
- 7 Kit Labeled Robot (cannot be VFDD programmed) and Notebook-** Scoresheet 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 the robot is more than 15" inches wide and 20" inches tall they may not be displayed in locked cases at the State Fair.
- 8 3D Printed Robotics Parts-** Scoresheet SF244- This class is intended for you to create parts, through 3D printing, to help create their robot or aid the robot in completing a coded function. Project should include a notebook describing the process used to create the project, describing the success of your designed piece (did it work), intended use of the product and the modifications made to the item.

9* Lego League Project – This class is intended to provide youth participating in Lego League during the past project year a place to be judged and to be displayed to the public.