The Kansas 4-H Robotics program is designed to allow 4-H members to explore robotics from simple machines to complex systems, all completing various tasks that exhibitors define for them.

Rules
1. Read General Rules. Violation of any of the following rules may result in disqualification. All decisions will be made by a county agent and their decision is final.
2. Each exhibitor is required to complete the "4-H Robotics Exhibit Information Form" which is available through your K-State Extension office or at https://robotics.engtech4ks.com/ .
3. This form must be attached to the outside of a 10" X 13" manila envelope. All revisions of all forms previously released for the Engineering and Technology division either undated or dated prior to current year are void for use and new forms must be obtained and used that are dated by the State 4-H office for the current year. Use of old forms should result in the loss of one ribbon placing for exhibits.
4. Each exhibit must include a robot, information packets are not a sufficient exhibit.
5. Robots must have automated (electric, pneumatic, hydraulic, etc.) articulated structures (arms, wheels, grippers, pneumatic, hydraulic, etc.). Game consoles that display on a screen are not considered robots and should either be entered in the computer sciences division or electronics and renewable energy division. Robots requiring no assembly, just programming, such as Ozobots, are considered computer sciences projects as the skill is focused on programming not on the construction of the robot.
6. Robot dimensions should not exceed 2 feet high, by 2 feet wide, by 2 feet deep. If displayed in a case (not required for the state fair, but strongly encouraged for county fairs) the outside case dimensions should not be excessive. The display case should have the exhibitor's information attached to both the base and cover, as the top part (lid) of the case may be separated from the display.
7. Materials including but not limited to USB drives, obstacles, spare batteries, and mats for testing the robot may be placed in a separate container, which is not included in the robots' dimensions. That container may not be larger than 576 cubic inches as measured along the outside of the container (Examples: 4" x 4" x 36" or 4" x 8" x 18" or 6" x 6" x 16"). The container, if used, and/or any large objects (such as mats or obstacles) should be labeled with the exhibitor's name(s), county, as they will be stored separately from the exhibit.
8. All electric components of the robot must be adequately covered or concealed with a protective enclosure, specifically circuit boards. Paper is NOT considered an adequate enclosure or covering for electrical components.
9. Robots may be powered by an electrical, battery, water, air, elastic energy devices (rubber bands, balloons, etc.) or solar source only. Junk drawer robots may be powered by a non-traditional power source. Robots powered by fossil fuels/flammable liquids will

be disqualified. <u>Robots that include weaponry of any kind will be disqualified.</u> Weaponry is defined as any instrument, possession, or creation, physical and/or electrical that is intended to inflict damage and/or harm to individuals, animal life, and/or property.

10. ***Remote controlled robots*** are allowed under certain conditions provided that the robot is *not drivable*. Robots programmed on phones/tablets need to have a specific program created, using motion controls to move the robot are not acceptable, for example "press forward on the screen to make the robot go forward." ~~Robotic arms (hydraulic or electric) are allowed~~. A remote is allowed, provided more than a single action happens when a single button is pressed on the remote. <u>For</u> example "a motor spins for 3 seconds, at which point an actuator is triggered, then the motor spins for 3 more seconds." Remote controlled cars, boats, planes and/or action figures, etc. are not allowed.
    A. <u>Robotic arms and hand extensions (hydraulic, mechanical, or electrical) are allowed.</u>

11. Each robot must be in working condition. The judges will operate each robot to evaluate its workmanship and its ability to complete its intended task. In the event the robot uses a phone, tablet, or similar device for both programming AND control of the robot a video will be used to evaluate the working condition of the robot. ~~It~~ <u>The video</u> should follow the instructions provided for operation so that the judge can follow along with the provided instructions. For county fairs, where consultation judging is used the video requirement should be waived in favor of actual operation of the robot.

12. ~~Each exhibitor is required to complete the "4-H Robotics Exhibit Information Form" which is available through your local K-State Research and Extension office or at 2024-Robotics-Exhibit_Final.pdf~~

13. The exhibit must include written instructions for operation (~~the instructions should be written as if they were to tell a grandparent or elderly person how to operate the robot~~ <u>Instructions should be written in clear, simple, step-by-step language so that someone with no prior experience could successfully operate the robot.</u>), construction plans (do not need to be printed)<u>, a video, and one to five pages</u> of project photographs <u>are required for all robotic exhibits</u>. For robots that can be programmed, robot programming information must be included. This information should be placed inside the 10" x 13" manila envelope mentioned above. Robot programming information can be, but not limited to, source code, block diagrams, screen captures of the coding window, and other images that show the programming logic used.

14. The exhibitor may enter their robotics project in either robotics or electric and renewable energy project if the exhibitor chooses, but not both.

15. No exhibitor will be allowed to set up their robot in person at the state fair.

16. If that the robot uses a device like a phone, iPad, or tablet for programming AND operation, DO NOT include the device (phone, tablet, etc.). The device's safety cannot be ensured. Instead, record a video demonstrating the instructions included for your robot, as described above. It should show, setting up the robot, starting the robot, the robot executing its task, and powering off the robot, just like how the instructions are written.

17. Creativity, workmanship, and functionality will be strong criteria in judging the "Robot designed by Exhibitor" classes. All robots should have a purpose or intended function, examples include, but are not limited to following a line, sweeping the floor, solving a Rubix Cube, sorting colors, or climbing stairs.

18. Exhibitor's name(s), county, must be tagged or labeled on the robot such as on the

bottom of the robot, exhibit cards are not an acceptable form of labeling.

Scoresheets, Forms, and Contest Study Materials:
Robotics Scoresheet
Robotics Exhibit Form
Educational Display, Notebook or Poster Scoresheet

CLASSES

Division A- NOVICE- Ages 7 & 8. (Div A is not eligible for state fair)

5505: NOVICE – Robot made from a commercial (purchased) kit

5506: NOVICE - Robot designed and constructed by exhibitor**.** Robot must not be a mere modification of an existing robot kit or plan.

5507: NOVICE - Programmable robot made from a commercial (purchased) kit

5519: NOVICE – Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote-controlled device

5543: NOVICE - Junk Drawer Robotics – based curriculum robot

Division B – INTERMEDIATE – Ages 9 – 13

5509: INTERMEDIATE - Robot made from a commercial (purchased) kit (No programming, just assembly)

5510: INTERMEDIATE - Robot designed and constructed by exhibitor. The robot must not be a mere modification of an existing robot kit or plan.

5511: INTERMEDIATE - Programmable robot made from a commercial (purchased) kit

5544: INTERMEDIATE - Junk Drawer Robotics

5546 :INTERMEDIATE – Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote controlled device.

Division C - Senior – Ages 14-18

5513: SENIOR - Robot made from a commercial (purchased) kit (No programming, Just assembly)

5514: SENIOR - Robot designed and constructed by exhibitor. The robot must not be a mere modification of an existing robot kit or plan.

5515: SENIOR - Programmable robot made from a commercial (purchased) kit

5545: SENIOR - Junk Drawer Robotics

5547: SENIOR – Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote-controlled device

Division D – Team Robotics Project

5517: Robots designed and constructed by two or more - The robot must not be a mere modification of an existing robot kit or plan. The robot may be a programmable type that is made from a commercial (purchased) kit. This division is designed to encourage teamwork and cooperation among fellow 4-H Robotic members. As with many high-tech projects today, no one person designs and builds a robot alone. It takes the brainstorming, planning, problem solving, and cooperation of an entire team to complete a given robotics project.

Educational Exhibits Rules

1. For notebooks, display boards, and posters, no additional exhibit information is required; no manila envelope is needed for these exhibits.
2. Exhibits are to have a **clear link to the Engineering and Technology area** of robotics.
3. Exhibits in posters, notebooks and display boards must contain substantial supporting educational materials.
4. Educational display boards, posters and notebooks should be creative and showcase details about the knowledge learned in the project during the current 4-H year. Value is placed on youth who can demonstrate how their skills have increased while completing the project. Each exhibit will be judged on uniqueness, creativity, neatness, accuracy of material, knowledge gained, and content. An exhibit judging score sheet available at http://robotics.engtech4ks.com/.
5. Follow copyright laws, citing all sources of information in a standard notation Sources of information must be cited on the front of your exhibit, including all posters and educational display boards. Example citation: "Make a Star Finder" https://spaceplace.nasa.gov/starfinder/en/
6. Educational displays are not to exceed a standard commercial 4' high X 3' wide X 2' deep. No card table exhibits will be allowed. Care should be taken to use durable materials that will withstand fair conditions.
7. Posters are limited to commercial 3' X 4' tri-fold display boards.
8. "Construction Kits" that are part of educational displays must be contained in cases (tackle boxes, sealable containers, etc.) that may not be larger than 2' x 2' x 2' and must have a latch which securely keeps all components contained in the "Construction Kits". Other components are to adhere to appropriate dimensions as stated elsewhere.
9. Educational Project notebooks must be organized in a 3-ring binder or similar book.
10. Any three-dimensional poster or display board exhibits may not be thicker than 2 inches.
11. Exhibitor's name, county, age, and year(s) in project must be tagged or labeled on the back of the exhibit. Exhibit cards are not sufficient as they may be removed or repositioned for display. Failure to label an exhibit may result in one ribbon placing deduction.
12. Exhibits should possess the following qualities (in no particular order):
    a. A central theme

b. What you want others to learn
c. Be designed and constructed in a manner befitting the exhibit
d. Be something you are interested in
e. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's exhibit, at the judge's discretion, may receive a reduced ribbon placement or disqualification.

Robotics Division A - Novice – Ages 7-8 (Not State Fair Eligible)
5751   Robotics Educational Display
5752   Robotics Educational Notebook
5753   Robotics Educational Poster

Robotics Division B – Intermediate – Ages 9-13
5756   Robotics Educational Display
5757   Robotics Educational Notebook
5758   Robotics Educational Poster

Robotics Division C – Senior – Ages 14 and up
5761   Robotics Educational Display
5762   Robotics Educational Notebook
5763   Robotics Educational Poster

Robotics Division D – Team Robotics Project
5766   Team Robotics Educational Display
5767   Team Robotics Educational Notebook
5768   Team Robotics Educational Poster

Resources: Project Area – [Robotics](#)