2024 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.

STEM COMPUTERS

This category gives 4-H'ers a chance to display their knowledge of computers. Through participation in this category 4-H'ers will develop presentations that show judges their knowledge in the different aspects of computer science. Involvement in STEM Computers gives participants a first-hand experience in modern technology.

*Denotes State Fair Entry

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

The name and county of each exhibitor should appear on the back of each board or article and on the front cover of the notebooks so the exhibit may be identified if the entry tag is separated from the exhibit. Each exhibitor is limited to one exhibit per class. Demonstration boards should include an overall title for the display, plus other necessary labeling. All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display. 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 in observation, results: what you learned.) The reports should be attached securely to the display.

Team Entries: To qualify for entry at the Nebraska State Fair or the County Fair team materials entered in H860009 – 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.

COMPUTER 1

H860015   Beginning Flyer/Brochure Computer Exhibit — 4-H'ers demonstrate their beginning skills in producing a flyer or brochure on a topic relating to 4-H. This project is for those in their first and/or second year of the computer project only. Using existing software is acceptable.

H860016   Computer Exhibit — 4-H'ers demonstrate their skills in producing a Word document on a topic relating to 4-H. This project is for those in their beginning year of the computer project only. Using existing software is acceptable.

COMPUTER 2

*H860001   Computer Application Poster — 4-H exhibitor should use computer application to create a graphic notebook utilizing computer technology. 4-H'er may create any of the following: greeting card (5 different cards such as a birthday, wedding, anniversary, sympathy, get well or other); a business card (3 cards for 3 different individuals and businesses); menu (minimum of 2 pages including short description of foods and pricing); book layout (I-book); promotion flyer (3 flyers promoting 3 different events); newsletter (minimum 2 pages); or other: examples such as precision farming or family business logo etc. This exhibit consists of a notebook (8.5 x 11 inches) which should include a (1) a detailed report describing: (a) the task to be computer, (b) the computer application software required to complete the task, (c) specific features of the computer application software necessary for completing the task (2) print out of your project. Project may be in color or black and white.

*H860002   Produce a Computer Slideshow Presentation — Using presentation software a 4-H Exhibitor designs a multimedia computer presentation on one topic related to youth. A notebook with a printout of all the slides should be submitted. Slideshow should include a minimum of 10 slides and not more than 25. Incorporate appropriate slide layouts, graphics, animations, and audio (music or voice and transition sounds do not count). Each slide should include notes for a presentation. All slideshows must be uploaded. State fair qualified entries should be submitted to https://go.unl.edu/2024nesfset by August 10th, 2024. Or entries can be uploaded to a cloud sharing service and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions for public viewing.

COMPUTER 3

*H860003   Produce an Audio/Video Computer Presentation — Using presentation software a 4-H exhibitor designs a multimedia computer presentation on one topic related to youth, including audio and/or video elements. A notebook with a printout of all the slides should be submitted. The presentation should be at least 2 minutes in length and no more than 5 minutes in length, appropriate graphics, sound and either a video clip, animation, or voice over and/or original video clip. Entries can be uploaded to a cloud streaming service and video streaming application and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions for public viewing.

*H860004   How to STEM (Science, Technology, Engineering, and Math) Presentation — Youth design a fully automated 2 to 5 minute 4-H "how to" video. Submissions should incorporate a picture or video of the 4-Her, as well as their name (first name only), age (as of January 1 of the current year), years in 4-H, and their personal interests or hobbies. Videos should be uploaded to a video streaming application and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions.

*H860005   Virtual Platform Presentation - Youth design a fully automated educational presentation using (any multimedia platform such as Tik Tok, YouTube, Canva, Canvas, etc. Submissions may include a notebook, poster, etc., explaining the process, /experience, and/or /presentation. All submissions must include a link to the virtual presentation. Entries can also be uploaded to a cloud sharing service. Exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions for public viewing.

*H860006   Create a Web Site/Blog or App — Design a simple website, blog, or app for providing information about a topic related to youth. Include an explanation of why the entry was created. (Any current website, /blog, or app development platform is accepted such as Google Sites, iBuildApp, Wix, etc.) If the website, blog, or app isn't live, include all files on a flash drive in a plastic case. Entries can be uploaded to a cloud sharing service. and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions for public viewing.

*H860007   3D printing uses plastic or other materials to build a three-dimensional (3D) object from a digital design (including 3D Pen Creation). Youth may use original designs or someone else's they have redesigned in a unique way. Exhibits will be judged based on the motivation and/or problem identified. For example, 3D objects

printed as part of the design process for robot or other engineering project. Must include design notebook that addresses the following questions:

1. What was the motivation for your design or the problem you were solving with your design? ie. Is your item a functional or decorative piece?
2. Please include a picture of original design, citation of designer/website OR if design is completely original (you created it using CAD software), then state that it's original. If item was not completely original, indicate what you did to the original design to modify it to better meet the design problem stated in #1 above. Its design was modified multiple times, please indicate what change was made with each modification, and what prompted the need for the change. I.e. I printed it and the design was too fragile, so I resliced the print to make thicker external walls, or to have a denser infill.
3. Define your process for designing/printing. What software and/or hardware was used (indicate type of 3D printer or if item was created with 3D pen)?
4. What materials were selected for your project?
5. If your final design has any moving parts, define how you determined appropriate allowance in your design.
6. Identify any changes that you would make to improve your design.

*H860008 - Maker Space/Digital Fabrication - This project is a computer generated projected 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:

1. What motivated you to create this project
2. Software and equipment used
3. Directions on how to create the project
4. Prototype of plans
5. Cost of creating project
6. Iterations or modifications made to original plans
7. 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.

H860010   Write a Software Program — This project allows a 4-H'er to demonstrate his or her skills in writing a computer program using a common programming language. The program must demonstrate the use of data files and subroutines. It should demonstrate a high degree of organization and quality suitable for distribution to the general public. This exhibit consists of a notebook (8½ inches by 11 inches) which should include these parts: 1. A cover page; 2. A report including: (a) what the software can do, (b) why you wrote the software, (c) what features are included in the software, (d) how you will use the program in the future; 3. A flow chart in block diagram form; and 4. An example of input and output.
Purple, $2; Blue, $1.50; Red, $1; White, $0.50
H860011   Poster — the poster should exemplify one of the lessons learned in the Computer Mysteries project. Posters can be any size up to 28 inches by 22 inches.

STEM ROBOTICS
This category involves the many different aspects of STEM Robotics. Participants will learn more about how robots are designed and developed as well as the mechanical and electronic elements of robots. Involvements in SET Robotics gives participants a first-hand experience in modern technology.
*Denotes State Fair Entry
Purple, $3; Blue, $2; Red, $1.50; White, $1

The name and county of each exhibitor should appear on the back of each board or article and on the front cover of the notebooks so the exhibit may be identified if the entry tag is separated from the exhibit. Each exhibitor is limited to one exhibit per class.

Reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display. 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 in observation, results: what you learned.)

Posters can be any size up to 28" inches by 22" inches when ready for display. Example: tri-fold poster boards are not 28" inches by 22" inches when fully open for display.

 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. Videos can be uploaded to a video streaming application and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions for public viewing.

Team Entries: To qualify for entry, team materials entered in robotics classes 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.

*H861001   Robotics Poster - Create a poster (28 inches x 22 inches) 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.

*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, programming skills, calibration, sensor exploration, or any of the topics suggested in Class 1.

*H861004   Robotics/Career 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 such as a short video uploaded to a cloud sharing service. Include a QR code with your project to allow for judging access. Videos can be uploaded to a video streaming application and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions 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" inch margins. Multimedia reports should be between 3 to 5 minutes in length.

*H861005   Robotics Sensor Notebook — Write pseudo code which includes at least three 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 judging access. Mulitmedia presentations should be 3 to 5 minutes in length. Videos can be uploaded to a video streaming application and exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or links on several devices to check for appropriate permissions for public viewing.

*H861007   Kit Labeled Robot (cannot be free 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 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.