2020
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.

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 SET 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 plant 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 – 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. All county fair projects with a printout should be saved in a PC compatible format to be submitted for county fair. Slideshow should include a minimum of 10 slides and no more than 25. Incorporate appropriate slide layouts, graphics and animations and audio (music or voice and transition sounds do not count). Each slide should include notes for a presenter. A notebook with a printout of all the slides should be submitted

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. The presentation should be at least 2 minutes in length and no more than 5 minutes in length, and should include appropriate graphics, sound and either a video clip, animation or voice over and/or original video clip. The presentation must be able to be played and viewed on a PC using Windows Media Player, Real Player, iTunes or QuickTime Player.

*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 designed for web viewing. Any of the following formats will be accepted: .mpeg, .rm, .wmv, .mp4, .ov, .ppt, or .avi.

*H860005 Create a Web Site/Blog or App — Design a simple Web site/blog or app for providing information about a topic related to youth using software programs such as an HTML editor like Microsoft's FrontPage or Macromedia's Dreamweaver, and image editor like IrfanView or GIMP or online using a WIKI such as Google Sites. If the Web site, Blog or App isn't live include all files comprising the Web site, Blog or App on a CD-ROM in a plastic case along with the explanation of why the site was created. If developed using a WIKI or other online tool include a link to the website in the explanation of why the site was created.

*H860006 3D PRINTING Unique Items: 3D printing uses plastic or other materials to build a three-dimensional (3D) object for a digital design. Youth may use original designs or someone else's they have re-designed 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 or cookie cutter. Must include design notebook with motivation or problem statement the prototype was 3D printing will include a notebook with the following:

a. Define motivation/problem solved
b. Software used
c. Document purpose of material and print settings
d. Material choice (PLA, PVA, ABS, etc.)
e. In-fill density
f. Moving parts

*H860007 3D Pen Creation – 3D pens rapidly melt and cool plastic filament allowing the 4-H'er to draw in 3D. Youth may use original designs or use a template to create their 3D item. Exhibits will be judged based on the complexity of the design and shape. 3D pen creation will include a notebook with the following:

a. Copy of the template is used and description of any changes the youth created.
b. If no template used – an explanation of how the creation was built.

    c. Must include paragraph of what the youth learned while creating their project (i.e. way to improve their next creation)

    d. Paragraph on how 3D pens impact science, engineering and technology.

  *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 noteboo 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

  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.

ROBOTICS

    This category involves the 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. Involvements in SET Robotics gives participants a first-hand experience in modern technology.

    Youth enrolled in Virtual Robotics, Junk Drawer Robotics or Robotics Platform may exhibit in any class within this division.

    *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. Several classes require a display board which should be a height of 24 inches and not to exceed ¼ inches in thickness. A height of 24 7/8 inches is acceptable to allow for the saw kerf 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 ¾ inch of the top or bottom of the board. 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. 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 plant to do and what you did, method used in observation, results: what you learned.) The reports should be attached securely to the display.

    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.

    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 (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.

*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.

*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.

*H861004   Robotics/Career Interview — Interview someone who is working in the field of robotics and research that 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-inch margins. Multimedia reports should be between 3 and 5 minutes in length.

*H861005   Robotics Sensor Notebook — Write pseudo code which includes at least one sensor activity. Include the code written and explain the code function.

*H861006   Build a Robot (may use kit) — Include a robot and notebook including the pseudocodes for at least one program you have written for the robot, the robots purpose, and any challenges or changes you would make in the robot design or programming.

*H861007   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.

*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.