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DEPARTMENT H - SET
SCIENCE, ENGINEERING & TECHNOLOGY

DRESS CODE -
Please follow the dress code for your county as noted in the "General Rules and Regulations" section of this fair book.

IMPORTANT – There is **NOT** a **County Only Section** in the Fair book. There will either be a **CF** or **SF** in front of every **Class Number**.
- **CF**: means that exhibit is **ONLY** eligible to be exhibited at the **C**ounty **F**air.
- **SF**: means that exhibit if **CHOSEN** at County Fair is eligible to advance to **S**tate **F**air.

ENTRIES PER EXHIBITOR -
County Entries - No limit to number of exhibit per class unless otherwise noted in class description.
State Fair - State Fair has limits to entries per exhibitor and could be different in each division (please refer to the Nebraska State Fair Book).

All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.

GENERAL INFORMATION FOR ALL ENGINEERING EXHIBITS: 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.

Several classes require a display board which has a height of 24" and not to exceed ¼" 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, and Electricity). 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 board 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.

DEPARTMENT H - PREMIER SCIENCE

Objective: Recognize 4-H youth static exhibits incorporating or demonstrating concepts from the areas of 4-H Science (science, technology, engineering, or applied math) at the County Fair and at the Nebraska State Fair. Exhibits in all curriculum areas will be considered for the award.

Curriculum Areas Targeted: Animal Science, Communications/Expressive Arts, Consumer & Family Sciences, Environmental Education and Earth Science, Healthy Lifestyles, Leadership & Citizenship, Plant Sciences, Science Engineering & Technology (SET).

Exhibit Entry: Youth will identify exhibits to be considered for the Premier 4-H Science Award. The Premier 4-H Science Award Application must be submitted along with a photograph of the exhibit on entry day of County Fair. The photograph will not be used for judging, only to locate it at the fair should we need additional information. The exhibitor will enter exhibit into its original class and the Premier 4-H Science Award class (H101001). Only one exhibit per youth will be eligible for the Nebraska State Fair Premier 4-H Science Award.

Check-In: During static exhibit check-in, Premier 4-H Science Award applications along with a photograph of the exhibit will be dropped off at the Science, Engineering, and Technology Department area. The original exhibit will be dropped off to its department area.

Judging: A score sheet will be used to judge each exhibit. Exhibits which do not have a completed application or photograph can be disqualified at the discretion of the judge.

Recognition: All projects entered in this class will be recognized with a certificate attached to the original exhibit. Exhibits will be displayed within their original class. At the Nebraska State Fair up to 5 top 4-H Science

exhibits will be chosen from all curriculum areas and will receive a $100 cash award sponsored by the Nebraska 4-H Foundation.

DIVISION 101 - PREMIER SCIENCE CLASS

SF-H101001 - Premier Science Exhibit

DEPARTMENT H - ROPE

Requirements: Each rope exhibit must be mounted on a board that is ¼" thick by 24" high by 32" wide. All items placed on demo-boards must be made according to instructions found in the 4-H Rope Manual, EC 7-01-79. Mount the knots in the same position as shown in the 4-H Rope Manual. Either manila or synthetic rope may be used. When halters are exhibited, the tie rope, plus a required second piece of rope must show any three of the following items: 1) end whipping, 2) eye splice, 3) crown splice, 4) rosebud knot, 5) Matthew Walker knot, or 6) diamond knot.

DIVISION 500 - ROPE CLASSES

CF-H500900 - Rope Display - At least 10 and not more than 12 knots, hitches, and splices (include two splices) made of 3/8" rope. Include appropriate board title and item labels. The end of all ropes must be whipped. Judging consideration will be given to difficulty of items shown on the board.

CF-H500901 - Single Loop Halter, Double Loop Halter and/or Halter Designed by 4-H'er - Single or double loop halter (sheep and goats use 3/8" rope; cattle and horses use 5/8" or 3/4" rope) or Halter that has been designed by the 4-H'er using any size rope and for animal of their choice. Document where you got your idea for your halter, animal halter is for and the types of knots used in making your halter. See above requirements for halter exhibits.

CF-H500902 - Rope - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - SMALL ENGINES/RESTORED VEHICLE

DIVISION - 510 - SMALL ENGINE/ RESTORED VEHICLE CLASSES

CF-H510900 - Small Engine Display/Item - Show an application from one of the concepts learned in any of the 3 Small Engine Units. State which unit you are exhibiting from. Examples: CRANK IT UP - UNIT 1: identify the parts of a small engine, safety rules for starting a small engine, small engine repair tool identification; WARM IT UP - UNIT 2: comparison of engine oil types, transmissions, or safety related to engines; TUNE IT UP - UNIT 3: diagnostic tools, fuel systems, ignition systems. If a complete engine is exhibited it will not be started. However, display needs to report process of building/rebuilding engine and how/where engine will be utilized (i.e. lawn mower, weed eater, snow blower, etc.). Exhibit could be a poster display, or an actual item.

CF-H510901 - Restored Vehicle - Detailed Report - In lieu of bringing a tractor, etc. to the fair, the 4-H'er can submit a detailed report explaining the process used to restore or overhaul. Also include a digital recorded copy of the item and the process used.

DEPARTMENT H - MODELS, BUILDING ITEMS, & COLLECTIONS

DIVISION 520 - MODELS, BUILDING ITEMS, & COLLECTIONS CLASSES

MODELS - Any model of the 4-H'ers choice

CF-H520900 - Snap Together Models

CF-H520901 - Glued Models

BUILDING ITEM - Any building item exhibit/display made from one of the following: Lego, KNEX, Coinstruction, Lincoln Logs, Tinkertoys, Gearbotics, etc. of the exhibitors choice. Entry needs to be displayed in a showcase, box with cover, big Ziploc bag, etc. to contain the parts.

NUMBER OF EXHIBITS PER EXHIBITOR - Holt County-2; Boyd County-no limits.

CF-H520902 - Original Design

CF-H520903 - Made From A Pattern, Bring Pattern to Fair

CF-H520904 - Made from pattern but altered about 25%, bring pattern to Fair

CF-H520905 - Building Item - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

COLLECTIONS - An exhibit to consist of your collection of baseball cards, stamps, dolls, toys, etc. Included with the display will be a covered report that tells why you collect this item(s); where you found/bought/were given/etc. your items in the display; and what is new this year to your collection. Display your items in a way that does not destroy the value of the collection (for example, don't glue or pin baseball cards onto a backing). Display in a way to keep all pieces of your collection together. If your complete collection is very large it is suggested that you exhibit only a portion of your collection with the rest of the collection displayed as pictures in a photo album.

CF-H520906 - Collection Display

CF-H520907 - Fix a Toy - This class will involve the refinishing skills for a wood or metal toy as well as a doll. The exhibit must be accompanied by a supporting information card (suggested size: 4" x 6"). The card should describe and/or show by a photograph condition of toy before refinishing, steps taken to refinish and if any part of refinishing was done by someone other than exhibitor. If you wish to donate this toy to the Nebraska Department of Social Services at O'Neill please note this on your information card. The toys will be given to needy families in Holt and Boyd Counties at Christmas.

DEPARTMENT H - RECYCLED ITEM

DIVISION 540 - RECYCLED ITEM CLASSES

Recycled Item - This exhibit can be as simple or elaborate as you like. Exhibit must be able to be carried in your hands. No project enrollment or record books are necessary. You will need to identify how/why the item is a "recycled item".
CF-H540900 - Metal
CF-H540901 - Wood
CF-H540902 - Plastic
CF-H540903 - Glass
CF-H540904 - Recycled Item - Other

DEPARTMENT H - AEROSPACE

Rocket must be supported <u>substantial</u>ly to protect the rocket from breakage. Rockets are to be mounted on a base that has dimensions equal or less than 12" x 12" and the base should be 3/4" thick. No metal bases. If the rocket fins extend beyond the edges of the required base (12" x 12"), then construct a base that is large enough to protect the fins. The base size is dictated by the size of the rocket fins. The rockets must be mounted vertically. Please do not attach side boards or backdrops to the displays. In addition a used engine or length of dowel pin should be glued and/or screwed into the board and extended up into the rockets engine mount to give added stability. Rockets must be equipped as prepared for launching, with wadding and parachute. Rockets entered with live engines, wrong base size or sideboards will be <u>disqualified</u>. A report, protected in clear plastic cover, must be included describing: 1) rocket specification, 2) a flight record for each launching (weather, distance, flight height) 3) number of launchings 4) flight pictures, 5)statistics, 6) objectives learned and 7) conclusions. The flight record should describe engine used, what rocket did in flight, and recovery success. Points will not be deducted for launching, flight, or recovery failures described. This includes any damage that may show on the rocket. Complete factory assembled rockets (i.e. plastic fins) will not be accepted at State Fair. Judging is based upon display appearance, rocket appearance, workmanship, design or capabilities for flight, number of times launched, and report. Three launches are required to earn the 9 launch points given on the score sheet. For scoring for the State Fair, only actual launches count, misfires will not count towards one of the required three launches.

For self-designed rockets only, please include a digital recorded copy of one flight. In the documentation please include a description of stability testing before the rocket was flown.

4-H Rocket project levels are not intended to correspond to National Association of Rocketry model rocket difficulty ratings or levels.

DIVISION 850 - AEROSPACE CLASSES
You must be in your third year of the project
in order to exhibit at the State Fair.

PRE-FLIGHT - UNIT 1

CF-H850900 - Space Buggy - Design and make a spacecraft from household items or items that could be re-used instead of being thrown away. Materials list: scissors, glue, assorted clean household materials such as; paper towel tubes, tissue boxes, plastic bottles, etc. Draw a picture design of your buggy on a sheet of paper. On another separate sheet of paper briefly explain the job/jobs your space buggy can do.

CF-H850901 - Space Station - Draw a design of what you think an International Space Station of the future might look like. Using household items build a model of that station. On a sheet of paper briefly describe how scientist would use your Space Station.

CF-H850902 - Rocket: Any Skill Level 1 Rocket with wooden fins.

LIFT OFF - UNIT 2

SF-H850001 - Rocket - Any Skill Level 2 Rocket with wooden fins painted by hand or air brush. Scoresheet SF92.

SF-H850002 - Display - Display exemplifying one of the principles learned in the Lift Off project. Examples include: display of rocket parts and purpose, interview of someone in the aerospace field, or kite terminology. Display can be any size up to 28" by 22". Scoresheet SF93.

SF-H850003 - Rocket - Any Skill Level 2 Rocket with wooden fins painted using commercial application. Example: commercial spray paint. Scoresheet SF92.

REACHING NEW HEIGHTS - UNIT 3

SF-H850004 - Rocket - Any Skill Level 3 Rocket with wooden fins painted by hand or air brush. Scoresheet SF92.

SF-H850005 - Display - Display exemplifying one of the principles learned in the Reaching New Heights Project. Examples include: airplane instrumentation, kite flying, or radio-controlled planes. Display can be any size up to 28" by 22". Scoresheet SF93.

SF-H850006 - Rocket - Any Skill Level 3 Rocket with wooden fins painted using commercial application. Example: commercial spray paint. Scoresheet SF92.

PILOT IN COMMAND - UNIT 4

SF-H850007 - Rocket - Any Skill Level 4 Rocket with wooden fins or any self-designed rocket. Scoresheet SF92.

SF-H850008 - Display - Display exemplifying one of the principles learned in the Pilot in Command Project. Examples include: flying lessons, or careers in aerospace. Display can be any size up to 28" by 22". Scoresheet SF93.

CAREERS

SF-H850020 - Careers Interview - Interview someone who is working in the field of aerospace and research that career. 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. Scoresheet SF239.

AEROSPACE - ANY UNIT

CF-H850903 - Rocket - Any Skill Level Rocket with plastic fins.

CF-H850904 - Rocket - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - COMPUTERS

DIVISION 860 - COMPUTER CLASSES

BOOTING UP - UNIT 1

CF-H860910 - Poster - Create a poster on a lesson learned in Booting Up Unit 1. Examples might include: hardware, software programs, how to take care of a computer and operating systems. See General Information under Posters for size and other requirements.

COMPUTER MYSTERIES - UNIT 2

SF-H860001 - Computer Application - 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 should 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); promotional 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 (8.5x11 inches) which should include a (1) a detailed report describing: (a) the task to be completed, (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. Scoresheet SF278.

SF-H860002 - Produce a Computer Slideshow Presentation - Using presentation software. All slide shows for state fair should be emailed to Amy Timmerman atimmerman2@unl.edu before August 15. Files must be saved in a PC compatible format. All county fair projects with a printout should be saved on a CD Rom 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. All slideshows must be up loaded. Scoresheet SF277.

COMPUTER MYSTERIES - UNIT 3

SF-H860004 - 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, 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. Scoresheet SF276.

SF-H860005 - 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-H'er, 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. Scoresheet SF276.

SF-H860006 - 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 either 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 should be submitted 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. Scoresheet SF275.

SF-H860007 - 3D PRINTING - **Unique Items:** 3D printing uses plastic or other materials to build a 3 dimensional object from 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 complexity of the design and shape. 3D Unique Object: 3D objects printed for their own sake. May be an art design, tool or other object. 3D printing will include a notebook with the following:
  a. Software used to create 3D design.
  b. Design or, if using a re-design, the original design and the youth's design with changes.
  c. Orientation on how the object was printed.

SF-H860008 - Printing Prototypes - 3D printing uses plastic or other materials to build a 3 dimensional object from 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 complexity of the design and shape. 3D objects printed as part of the design process for robot or other engineering project or cookie cutter, be creative. Must include statement of what design question the prototype was supposed to answer and what was learned from the prototype
3D printing will include a notebook with the following:
   a. Software used to create 3D design.
   b. Design or, if using a re-design, the original design and the youth's design with changes.
   c. Orientation on how the object was printed.

COMPUTERS - ANY UNIT

CF-H860900 - Digital Photo - Enhanced and/or Manipulated Photo - **Enhanced** entry will consist of either digital photo or scanned photo with both before and after photos showing enhancement OR **Manipulated Photo**. A series of at least 3 photos that you have manipulated of either digital photo or scanned photo. Ask for permission if you are using a photo of a person or a photo that you did not take. Include under a plastic cover information stating what you did to enhance/manipulate the picture. Avoid the use of copyright materials.

CF-H860901 - E-Mail; E-Mail with Attachment; and/or E-Mail with Digital Photo Attachment - Exhibit should include the steps taken to send the e-mail and how you can benefit by using e-mail. Photo may be printed on computer paper - does not need to be printed on photo quality paper.

CF-H860902 - Internet Exploration - Compare 3 different internet sites to see if the information is correct; is it researched, cited, etc. Highlight the different information on the sites; explain how this will change the way you look at sites and the information.

CF-H860903 - Build Your Own Computer (one component only) - Exhibit will be a notebook (8.5x11 inches) that includes a (1) cover page, (2) detailed report (2-3 pages) describing a specific computer component, (a) describe the component's purpose (b) how it is used, (c) the location (d) why components were chosen (e) cost of component from more than one source, and (3) pictures and supporting materials.

CF-H860904 - 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 (8.5x11) 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.

CF-H860905 - App Smashing - Create a description (poster or report) of the app's used and how they were combined to feature the final product through print or digital media. If using digital media, bring the device and poster/report to demonstrate to the judge.

CF-H860906 - What's Up with Smart Phones - Create a report or poster that addresses one or more of the following questions: 1) What features do you use on your phone and why? 2) What are commonly used apps?

CF-H860907 - Social Media - Create a report or poster that addresses one or more of the following questions: 1) What are the risks/dangers associated with using social media? 2) What are the advantages of using social media? 3) Why do you choose certain social media over others?

CF-H860908 - Take the Technology to Fair - Create a QR code, Aurasma Aura or similar interactive technology to be displayed at the county fair highlighting a 4-H project area. For example: an overview of the horse project, entomology project etc. Please provide the code or Aurasma image and your title in a 5x7 inch photo frame (without the glass but with a hinged easel backing for display).

CF-H860909 - Computers - Other - Examples include: Original Story with Original or Clipart Illustrations - printed in book format; 6 Original Designed Greeting Cards (for Different Occasions/Holidays with a variety of folds and designs in a protective cover); Original Drawing (either black and white or color); Poster (either black and white or color); Promotional Flyer (either black and white or color; whole page or folded); Vacation Plans; Power Point (or similar program) Presentation; Internet Web Site Creation; Teaching Aids; Computer Designed T-Shirt.

Create on paper no larger than 8½ x 11 inches in size. Remember to give credit when needed. Include a report explaining how you made your exhibit; program used, etc.

DEPARTMENT H - ELECTRICITY

GENERAL INFORMATION - POSTERS: 4-H electricity related posters are to be entered in the engineering area for exhibiting and judging. Refer to Posters for general requirements.

DIVISION 870 - ELECTRICITY CLASSES

MAGIC OF ELECTRICITY - UNIT 1

CF-H870900 - Bright Lights - Create your own flash light using items found around your house. Flash lights should be made out of items that could be recycled or reused. No kits please.

CF-H870901 - 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.

CF-H870902 - 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.

CF-H870903 - 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.

CF-H870904 - Electricity Unit 1 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

INVESTIGATING ELECTRICITY - UNIT 2

CF-H870905 - 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 approx. 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.

CF-H870906 - 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 6inches 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.

CF-H870907 - 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.

CF-H870908 - Electricity Unit 2 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

WIRED FOR POWER – UNIT 3

You must be in your third year of the project
in order to exhibit at State Fair.

SF-H870001 - 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. Scoresheet SF224.

SF-H870002 - 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. Scoresheet SF225.

SF-H870003 - 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 a poster display, or an actual item. Scoresheet SF226.

SF-H870004 - Poster - Poster should exemplify one of the lessons learned in the Wired for Power Project. Posters can be any size up to 28" by 22". Scoresheet SF227.

CF-H870909 - Electricity Unit 3 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

ELECTRONICS - UNIT 4

SF-H870005 - 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. Scoresheet SF228.

SF–H870006 - Electronic Display - Show an application of one of the concepts learned in the Electronics project. Examples include: components of an electronic device (refer to p. 35 of the Electronic manual). Scoresheet SF229.

SF–H870007 - 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. Scoresheet SF230.

SF–H870008 - Poster - Poster should exemplify one of the lessons learned in the Entering Electronics Project. Posters can be any size up to 28" by 22". Scoresheet SF231.

CF–H870910 - Electricity Unit 4 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

CAREERS

SF–H870010 - Careers Interview - Interview someone who is working in the field of electricity and research that career. 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. Scoresheet SF239.

DEPARTMENT H - ROBOTICS

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.

Team Entries: To qualify for entry at the Nebraska State Fair team materials entered in robotics classes that 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. 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

DIVISION 861 - ROBOTICS CLASSES

SF-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. Scoresheet SF236.

SF-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. Scoresheet SF237.

SF-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. All videos for state fair should be emailed to Amy Timmerman 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. Scoresheet SF238.

SF-H861004 - 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. Scoresheet SF239.

SF-H861005 - Robotics Sensor Notebook - Write pseudo code which includes at least one sensor activity. Include the code written and explain the code function. Scoresheet SF241.

SF-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. If robot is more than 15" inches wide and 20" inches tall they may not be displayed in locked cases at State Fair. We recommend that you submit the project under SF-H861003 - Robotics Video. Scoresheet SF243.

SF-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. If robot is more than 15" inches wide and 20" inches tall they may not be displayed in locked cases at State Fair. We recommend that you submit the project under SF-H861003 – Robotics Video. Scoresheet SF243.

CF-H861900 - Robotics - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - GEOSPATIAL

Youth enrolled in Geospatial or GEAR TECH 21 may exhibit in any class within this division.

DIVISION 880 - GPS CLASSES

SF-H880001 - Poster - Create a poster (not to exceed 14" x 22") communicating a GPS theme such as How GPS or GIS works, Careers that use GPS or GIS, How to use GPS, What is GIS, GPS or GIS in Agriculture, Precision Agriculture, or a geospatial topic of interest. Scoresheet SF299.

SF-H880002 - 4-H Favorite Places or Historical Site Poster - The 4-H exhibitor identifies a favorite place or historical site (including grave sites) in Nebraska. Exhibit should include latitude and longitude, digital picture, and local area map. Poster size should not exceed 14" X 22". Scoresheet SF272.

SF-H880003 - GPS Notebook - Keep a log of at least 5 places visited using a GPS enabled device. At least one site should be from a community other than where you live. For each site, record the latitude, longitude and elevation. Also include a description of the site, a paragraph explaining what was interesting about the site or finding it. Photos of each site and/or cache are optional but encouraged. Scoresheet SF300.

SF-H880004 - Geocache - Assemble a themed geocache. Each geocache should be a water-tight container. It should include a log book and pencil for finders to log their visits and may include small trinket, geocoins, etc. for the finders to trade. Documentation should include a title, teaser description and the geographic coordinates of intended placement. **Register the site at geocaching.com, include a print-out of its registry.** The entry may include a photograph of the cache in its intended hiding place. Scoresheet SF301.

SF-H880005 - Agriculture Precision Mapping - 4-Hers will assemble a notebook that will include a minimum of 2 digital copies of various data layers that can be used in precision agriculture to identify spatial patterns and/or correlations (printed copies of websites were applications can be purchased is acceptable) A report of how the analysis of the various data will be used to make a management decision. Scoresheet SF302.

SF-H880007 - 4-H History Map - Preserve 4-H History: Nominate a Point of Interest for the 4-H History Map Project include copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to http://arcg.is/1bvGogV. For more information about 4-H history go to http://4hhistorypreservation.com/History_Map/.For a step by step video on nominating a point, please go to this link: http://tinyurl.com/nominate4h Write a brief description of historical significance of 4-H place or person (a minimum of one paragraph).

CAREERS

SF-H880010 - Careers Interview - Interview someone who is working in a Geospatial field and include research that career. 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. Scoresheet SF239.

CF-H880900 - Geospatial - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - POWER OF WIND

DIVISION 900 - POWER OF WIND CLASSES

SF-H900001 - Engineering Notebook - Your engineering notebook may include sketches of designs, notes of engineering questions you have, or answers to questions posed within the project manual, pictures as you complete exercises within this project, or big ideas you have while participating in this project. The notebook submitted in this class should be a working engineering notebook, **not a scrapbook.** Please include your name, county, and age on the front cover. Scoresheet SF305.

SF-H900002 - Wind Poster - Poster should exemplify one of the lessons learned in the Power of Wind project. Posters can be any size up to 14" by 22". Scoresheet SF307.

SF-H900003 - Mini Turbine Blade Energy Display - Develop a pinwheel display that demonstrates the working power of wind. Follow guidelines on page 18 and 19 of your manual. Display should include a notebook description of the effectiveness of at least three different designs or materials. Please do not include pennies with your display. Scoresheet SF306.

SF-H900004 - Wind Art or Literature Written Piece - Item should illustrate or represent wind turbines, wind power, or something from the power of wind curriculum, for example a pinwheel or item may be original story or poem written by the exhibitor about wind. Scoresheet SF304.

SF-H900005 - Wind as Energy Display - Item should be the original design of the 4-H'er. Include the item, or a picture if item is in excess of 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of wind. Scoresheet SF308.

SF-H900006 - Alternative Energy - Poster should exemplify an alternative energy source besides wind. Posters can be any size up to 14" by 22". Scoresheet SF239.

CF-H900900 - Power of Wind - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - WOODWORKING
4-H'ers must be in Unit 3 or Unit 4 for the
exhibit to be considered for State Fair.

The ability to build objects as designed by another person is an important life skill. Professional woodworkers often are hired to build objects to exacting specifications as laid out in a written plan.

Requirements: All articles exhibited **must include a plan (with drawings or sketch or blueprint)** stating dimensions and other critical instructions a builder would need to know how to build the project. Plans may include narrative instructions in addition to the dimension drawings and include any alternations to the original plan. Part of the score depends on how well the project matches the plans. If the plans are modified, the changes from the original need to be noted on the plans. All plans used for making the article must be securely attached and protected by a clear plastic cover. Exhibit is disqualified if plans are not included.

Composite Materials will be accepted on woodworking projects. Examples would include using composite decking for a picnic table, deck table or chair.

DIVISION 911 - WOODWORKING CLASSES

MEASURING UP - UNIT 1

CF-H911900 - Woodworking Article - Item made using skills learned in the Measuring Up Project Guide. Examples include: recipe holder, stilts or other skill level appropriate item. Items should be entered with construction plans.

CF-H911901 - Woodworking Unit 1 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

MAKING THE CUT - UNIT 2

CF-H911902 - Woodworking Article - Item made using skills learned in the Making The Cut project guide. Examples include: birdhouse, foot stool, napkin or letter holder. Items should be entered with construction plans.

CF-H911903 - Woodworking Unit 2 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

NAILING IT TOGETHER - UNIT 3

SF-H911001 - Woodworking Article - Item made using skills learned in the Nailing It Together manual. Examples include: bookcase, coffee table or end table. Scoresheet SF91.

SF-H911002 - Woodworking Display - Display exemplifying one of the principles learned in the Nailing It Together Project. Examples include: measuring angles, wood lamination and joint types. Scoresheet SF91.

SF-H911003 - Recycled Woodworking Display - Article made from recycled, reclaimed or composite wood. Article must be sanded and sealed and utilize one or more woodworking techniques **from page 2 of the Unit 3 manual**. Exhibit must include the woodworking plan and a minimum one page report of how the engineering design process was used to develop the woodworking plan. Scoresheet SF91.

Engineering Design Process
1. State the problem (Why did you need this item?)
2. Generate possible solutions (How have others solved the problem? What other alternatives or designs were considered?)
3. Select a solution (How does your solution compare on the basis of cost, availability, and functionality?)
4. Build the item (What was your woodworking plan, and what processes did you use to build your item?)
5. Evaluate (How does your item solve the original need?)
6. Present results (How would you do this better next time?)

CF-H911904 - Woodworking Unit 3 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

FINISHING UP - UNIT 4

SF-H911004 - Woodworking Article - Item made using skills learned in the Finishing It Up Project. Examples include: dovetailing, making a pen using lathe, overlays, using a router, etc. Scoresheet SF91.

SF-H911005 - Woodworking Display - Display exemplifying one of the principles learned in the Finishing It Up Project. Examples include: career opportunities, types of finishes, or dovetailing. Scoresheet SF91.

SF-H911006 - Recycled Woodworking Display - Article made from recycled, reclaimed or composite wood. Article must be sanded and sealed and utilize one or more woodworking techniques from **page 2 of the Unit 4 manual**. Exhibit must include the woodworking plan and a minimum one page report of how the design and engineering process was used to develop the woodworking plan. Scoresheet SF91.

Engineering Design Process
1. State the problem (Why did you need this item?)
2. Generate possible solutions (How have others solved the problem? What other alternatives or designs were considered?)
3. Select a solution (How does your solution compare on the basis of cost, availability, and functionality?)
4. Build the item (What was your woodworking plan, and what processes did you use to build your item?)
5. Evaluate (How does your item solve the original need?)
6. Present results (How would you do this better next time?)

CF-H911905 - Woodworking Unit 4 - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

CAREERS

SF-H911010 - Careers Interview - Interview someone who is working in the field of woodworking and research that career. 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. Scoresheet SF239.

DEPARTMENT H - WELDING
All metal welding process accepted.

ARCS AND SPARKS - All welds exhibited in class 1 or 2 must be mounted on a 12" wide x 15" long display board of thickness not to exceed 3/8". Attach each weld on a wire loop hinge or equivalent, so the judge can look at the bottom side of the weld when necessary. Each weld should be labeled with information stated 1) type of welding process (stick, MIG, TIG, Oty-Acetylene, etc.) 2) kind of weld, 3) welder setting, 4) electrode/wire/rod size, and 5) electrode/wire /rod ID numbers. Attach a wire to display board so it can be hung like a picture frame. If no plans are included with welding article or welding furniture, item will be disqualified.

4-H Welding Project Tips and Suggestions
CLASS 1
1. All welds should be made with the same electrode/wire/rod size and number.
2. Welds should be made only on one side of metal so penetration can be judged.
3. Welds should be cleaned with chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil.
4. It is suggested that all welds be on the same size and thickness of metal. These pieces, referred to as coupons, should be 1.5 to 2 inches wide and 3.5 to 4 inches long. A good way to get this size is to buy new cold rolled strap iron and cut to length. The extra width is needed to provide enough metal to absorb the heat from the welding process and prevent the coupons from becoming too hot before the bead is completed. Narrower coupons will become very hot, making an average welder setting too cold at the bead start, just about right in the middle, and too hot at the end. The correct way to weld narrow strips is to make short beads and allow time to cool, however this project requires a full length bead.

- **Stick welding -**
  Suggested coupon thickness - ¼" if using ⅛" rod
  Suggested rod - AC and DC straight or reverse polarity- first E-7014, second E-6013
- **MIG welding -**
  Suggested coupon thickness--¼" if using .035 wire and ⅛" if using .023 wire
- **Oxy-Acetylene -**
  Suggested coupon thickness- ⅛"
  Suggested rod - ⅛" mild steel rod

CLASS 2

1. It is suggested that all welds be on same size and thickness of metal.
2. These pieces are referred to as coupons. The welds can be on one coupon that is about 4" x 4" or on individual coupons that are about 2" x 4" inch and ¼" thick. Suggested rods for this class of position welds for AC and DC straight or reverse polarity is, first E-6013, second E-7014and E-6010 for DC reverse polarity only.

    2. Welds should be cleaned with a chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil.

CLASS 3 and 4

1. All welds should be cleaned and protected from rust with paint or light oil. Plans are to be complete enough that if they were given to a welding shop, the item could be made without further instructions. Bill of materials should include a cost for all items used including steel, electrodes, paint, wheels, etc.

DIVISION 920 - WELDING CLASSES

SF-H920001 - Welding Joints - A display of one butt, one lap and one fillet weld. Scoresheet SF281.

SF-H920002 - Position Welds - A display showing three beads welded in the vertical down, horizontal and overhead positions. Scoresheet SF281.

SF-H920003 - Welding Article - Any shop article or piece of furniture where welding is used in the construction. 60% of item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. All plans, plan alternations, and a bill for materials must be attached to the article. Protect plans with a cover. Scoresheet SF281.

SF-H92004 Welding Furniture - any furniture with 75% welding is used in the construction. 60% of item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. All plans, plan alternations, dimensions and a bill for materials must be attached to the article. Protect plans with a cover. May be displayed outside. Scoresheet SF281

CAREERS

SF-H920005 - Careers Interview -Interview someone who is working in the field of welding and research that career. 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. Scoresheet SF239.

CF-H920900 - Welding - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - ENTOMOLOGY

GENERAL INFORMATION: Specimen should be mounted properly and labeled with the location and date of collection, name of collector and order name. Follow mounting and labeling instructions in the old edition of the Nebraska 4-H Entomology Manual online as a PDF file. Purchased insects and other insects not collected by the exhibitor can be included, but must have accurate labels and will not be counted in meeting minimum requirements for the exhibit. Boxes are preferred to be not more than 12" high by 18" wide so they fit in display racks.

DIVISION 800 - ENTOMOLOGY CLASSES

Specimens in display collections should be mounted properly and labeled with location, date of collection, name of collector, and order name. Follow mounting and labeling instructions in the Nebraska 4-H Entomology Manual. Boxes are preferred to be 12" high X 18" wide, and landscape orientation, so they fit in display racks. Purchase of commercially-made boxes is allowed. All specimens must be from the collector.

All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair. Exhibitors may, and should, correct and update collections for competition at the State Fair.

CF-H800900 - Killing Jar - relaxing jar and net (1st year only)

SF-H800001 - Entomology Display - 1st Year Project. Collection to consist of 25 of more different kinds (species) of insects representing at least 6 orders. Limit of one box.

SF–H800002 - Entomology Display - 2nd Year Project. Collection to consist of a minimum of 50 kinds (species) of insects representing at least 8 orders. Replace damaged or poorly mounted specimens. About 25 species should be present from July 1 of the previous year. Limit 2 boxes.

SF–H800003 - Entomology Display - 3rd Year or More Project. Collection to consist of a minimum of 75 kinds (species) of insects representing at least 10 orders. Replace damaged or poorly mounted specimens. About 25 species should be present from after July 1 of the previous year. Limit of 3 boxes.

SF–H800004 - Special Interest Display - Educational display developed according to individual interests and abilities. Examples include a collection from a specific insect group (e.g. butterflies, grasshoppers, dragonflies, scarab beetles, etc.) or by subject (e.g. insect pests of corn, aquatic insects, insect mimicry, etc.), a research project, special report, poster display, insect scrapbook, artwork, etc. Poster displays should be no larger than 22" x 28". Three-dimensional artwork, models, dioramas and other crafts are restricted to a base area no larger than 22" x 28" Nor should height be over 24". Research projects should include a report about methods and results, as well as a brief discussion about what was learned. Artwork should include brief information about the work. Each display should be self-explanatory so that the audience can understand it without help.

SF–H800005 - Insect Habitats - Habitats consist of any hand-crafted objects, made of natural or artificial material which are placed outdoors, and which promote or conserve insects in the environment. Insects may include bee pollinators, butterflies, beneficial insects, etc. A one-page report must accompany the exhibit.

SF–H800006 - Macrophotography - Subjects should be insects, spiders or other arthropods, or any nests, webs or constructions they make. All exhibit prints should be 8½" x 11" and mounted on rigid, black 11" X 14" poster or black matt board. Either orientation is acceptable. No frames are allowed. A short caption explaining the subject, printed on white paper, should be glued below the print on the poster or matt board.

CF–H800901 - Entomology - Other - Exhibit needs to relate to project area. You can add any additional information that you want the judge to know about your exhibit.

DEPARTMENT H - VETERINARY SCIENCE

The purpose of a Veterinary Science exhibit is to inform the public about a common health problem of animals or a veterinary science principle. Do not confuse veterinary science exhibit topics with animal husbandry or production topics.

A Veterinary Science exhibit may consist of a poster, notebook or a display. The exhibit may represent material from exhibitors enrolled in Animal Disease or Animal Health.

If photographs are to be part of the exhibit, remember that they will be viewed by the public. Make sure that the photographs are in good taste and will not be offensive to anyone. Graphic photographs of excessive bleeding, trauma or painful procedures are not appropriate. For exhibits related to veterinary surgical procedures, aseptic techniques need to be shown, for example, use of drapes, use of sterile procedures, wearing of gloves, and other appropriate veterinary medical practices.

First-Aid Kits: Because of public safety concerns and risk of theft of first-aid kit contents (veterinary drugs/equipment) with perceived potential for drug abuse, NO ANIMAL FIRST AID KITS WILL BE PERMITTED. Animal first aid kits submitted will be immediately disqualified and not shown.

Veterinary Science Posters - This exhibit presents the viewer with a design that is simple and direct, unlike a display that usually presents more information. A poster should not exceed 22" x 28" and may be either vertical or horizontal.

Veterinary Science Displays: A display may include but is not limited to: a 3-dimensional exhibit, a scale model, the actual product (for example: skeleton; teeth; samples of leather, fur, or dried skin damaged by disease or parasites) or a notebook. A display is not a poster. A display may be mounted on poster board not to exceed 22" x 28" or on 1/4" plywood or equivalent that does not exceed 24" high or 32" wide or in a three ring binder or another bound notebook format.

Appropriate Veterinary Science Topics:
- Maintaining Health
- Specific Disease Information
- Photographic Display of Normal and Abnormal Characteristics of Animals
- Animal Health or Safety
- Public Health or Safety
- Proper Animal Management to Ensure Food Safety & Quality
- Efficient and Safe Livestock Working Facilities
- **OR** a topic of the exhibitors choosing related to veterinary medicine or veterinary science.

**Remember, since these are science displays, all references and information needs to be properly cited. Proper sources include but are not limited to: Professional journals and publications, professional AVMA accredited websites, interviews with Veterinarians and excerpts from Veterinary Educational Literature.

All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.

Premier 4-H Science Award is available in this area. Please see General Rules for more details.

DIVISION 840 - VETERINARY SCIENCE CLASSES

SF-H840001 - 4-H Veterinary Science Large Animal Poster, Notebook or Display

SF-H840002 - 4-H Veterinary Science Small Animal/Pet Poster, Notebook or Display

CF-H840901 - Veterinary Science - Other - State where (page number) in the project manual that you got your idea for this project.