SCIENCE, ENGINEERING & TECHNOLOGY

Premium Code: STATIC ITEMS

ENTOMOLOGY

Unlimited entries per class number may be made per exhibitor.

Entomology exhibits give 4-H'ers the opportunity to demonstrate their knowledge about insects and insect displays. This category has multiple projects at allows 4-H'ers to progress over numerous years.

Learn the difference between an insect and a bug; Identify insect parts and know why each is important; Find and examine bugs and insects in the field; /Design your own insect or create a home for an insect Make an insect collection; Learn where to look for insects; Learn how to identify and classify insects; complete an insect collection table; Plan an insect collection trip; Raise meal worms; Explore insect legs and collect insects with an extractor; test ant food preferences; Conduct honey bee learning experiments; Record insect observations; Identify insect mouth types.
URL: https://4hcurriculum.unl.edu/index.php/main/program_project/61
Rules:
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 are to be pinned and labeled by the exhibitor. No purchased specimens allowed. No projects over 50 pounds allowed.

Dept H Division 800

Classes

1 **Entomology Display-First-Year Projec**t- Scoresheet SF186- Collection to consist of 25 or more different kinds (species) of insects representing at least 6 orders. Limit of one box.

2 **Entomology Display-Second-Year Project-** Scoresheet SF186- Collection to consist of a minimum of 50 kinds (species) of insects representing at least 8 orders. Replace damaged or poorly mounted specimens. At least 25 species must be present from after July 1 of the previous year. Limit of 2 boxes.

3 **Entomology Display-Third-Year or More Project-** Scoresheet SF186- Collection to consist of a minimum of 75 kinds (species) of insects representing at least 10 orders. Replace damaged or poorly mounted specimens. At least 25 species must be present from after July 1 of previous year. Limit of 3 boxes.

4 **Special Interest or Advanced Insect Display-** Scoresheet SF187- Educational display developed according to personal interests and/or advanced identification capability. This also is an opportunity to highlight favorite insects in a creative arrangement. Insects should

conform to pinning and mounting standards as in Classes 1-3 and be protected in an insect box. Each specialty display should include the names of the insects, interesting information about them, and why the display was made. Advanced identification collections should have insects grouped with labels that correspond with identification level (e.g., family, genus, species). A specialty collection may consist of insects by taxonomic group (e.g., butterflies, grasshoppers, dragonflies, scarab beetles) or by host, subject, or habitat (e.g., insect pests of corn, aquatic insects, insect mimicry, insect galls, insects from goldenrod, insect pollinators, etc.).

5 **Insect Habitats-** Scoresheet SF188- Habitats consist of any hand-crafted objects, made of natural or artificial materials, placed outdoors, which promote or conserve insects in the environment. Insects may include bee pollinators, butterflies, beneficial insects, etc. A one-page report describing activities must accompany the exhibit. Report should include placement, target insect, why materials were chosen, functional design, and indicators of success. See the following resources for reports:

a. Nebraska Extension NebGuide: Creating a Solitary Bee Hotel (G2256)

b. University of Minnesota: Wild Bees and Building Wild Bee Houses.

c. National Wildlife Federation: How to Provide Water in Monarch Gardens.

6 **Macrophotography-** Scoresheet SF189- Subjects should be insects, spiders or other arthropods, or any nests, webs, or constructions they make. All exhibit prints should be 8" x 10", 8½" x 11" and mounted on rigid, black 11" X 14" poster or matt board. Either orientation is acceptable. No frames or mat board framing is allowed. A caption of a few sentences should explain the subject and be printed on white paper and glued below the print on the poster board.

7 **Insect Poster/Display Exhibits-** Scoresheet SF190- Exhibits can be posters or three-dimensional displays, and artistic creativity is encouraged. Posters should be no larger than 22" x 28". They should be instructional and can be attractive and have pictures, drawings, charts, or graphs. Posters and displays may show any aspect of insect life, habitat, or related conservation or management. Examples include life history and other facts about an insect; insect anatomy; how to manage insects in a farm, home, lawn, or garden setting; experiences rearing one kind of insect; survey of an important insect; insect behavior (ex. nesting, finding food, mobility, defenses, etc.); habitats (e.g. forests, grasslands, wetlands, rivers, or lakes) and what insects are found there, etc. Three-dimensional displays, such as dioramas, sculptures, models, or decorative boxes should have a page of explanatory information accompanying them and fit within a 22" x 28" area.

8 **Reports or Journals-** Scoresheet SF191- Reports and journals should be in a 3-ring binder. A report may be informational, that is, an original article about a favorite insect, a history of insect outbreaks, diseases caused by insects, insects as food, etc. Or it may be a research report about an investigation or experiment done in a scientific manner. It then should have a basic introduction of the insect studied, methods used, observations, and results of the project. Tables, graphs, and images are helpful to include. A journal is an observational study over a period of time with personal impressions. It may cover watching changes in kinds of butterflies over the summer, rearing a specific insect from an egg to adult, managing a beehive, observations of insects in a specific habitat, accounts of insect behavior in a forest or flower garden, etc.

VETERINARY SCIENCE

Scoresheet SF119

The purpose of a Veterinary Science exhibit is to inform the public about a common health problem of animals, a veterinary science principle or public health/zoonotic diseases.

Veterinary Science- Understand animal's basic needs. Keep health records. Learn about future veterinary science technology; Take an animal's temperature and pulse; Recognize healthy skin and membranes; Clean and disinfect animal quarters; Study bacteria, viruses, and parasites; Learn about diseases relationship to nutrition, stress, heredity, and poison; Learn basic disease prevention techniques; Study environmental influences on animal health; Learn about maintaining animal health; Explore veterinary medicine as a career.

Rules:

1. A Veterinary Science exhibit may consist of a poster, notebook, or a display. The exhibit may represent material from any of the Veterinary Science projects including level exhibits from Unit I.
2. If photographs are to be a 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.
3. **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, animal first aid kits containing any drugs or medications will be immediately disqualified and not displayed. First Aid kits wishing to include medication information should instead utilize

written descriptions, photographs, drawings, computer generated printouts, or empty packaging of pharmaceuticals.

4. **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.
5. **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 exhibitor's choosing related to veterinary medicine or veterinary science.

Remember, since these are science displays, all references and information need 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**.** *Plagiarism will result in disqualification. Please study your topic and present the information to your audience in your own words.*

Dept H Division 840
Classes
1 Large Animal Poster, Notebook or Display
2 Small Animal/Pet Poster, Notebook or Display

STEM (ENGINEERING)

Unlimited entries per class number may be made per exhibitor.
Premium Code: STATIC ITEMS

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of exhibit may be identified if the entry tag is

separated from the exhibit.

2. Several classes require a display board which should be a height of 24” and not to exceed 1/4" in thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24” boards are cut from one end of a 4' X 8' sheet of plywood. Nothing should be mounted within 3/4" of the top or bottom of the board. (Example: Woodworking, & Electricity). Posters can be any size up to 28” by 22” when ready for display. Example: tri fold poster boards are not 28” by 22” when fully open for display.
3. Fabricated boards such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
4 Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
5. Demonstration boards should include an overall title for the display, plus other necessary labeling.
6. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did. Method used and observations. Results: What you learned. All reports should be computer generated and enclosed in a clear/plastic cover. The reports should be attached securely to the display.

ROCKETS/DRONES

This division gives 4-H’ers a chance to display the rockets and drones they have created. Through participation in this division 4-H’ers will show judges what they learned about and how they adapted their exhibit throughout the project. Involvement in Rockets gives participants a first-hand experience in modern technology.

Learn about how to: Fly kites and launch rockets; Explore space; Experience disorientation; Learn to fly an airplane; Make a shuttle on a string; Control flight directions; Create an altitude tracker; Evaluate navigation systems; Explore pilot certification requirements.

Rules:

Youth entered in Level 1 are not eligible to advance to State Fair.

1. The name and county of each exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.

2. Rockets must be supported substantially to protect the rocket from breakage. Rockets are to be mounted on a base that has dimensions equal to 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.

3. The rockets must be mounted vertically. Please do not attach sideboards or backdrops to the displays. In addition, a used engine or length of dowel pin is to be glued and/or screwed into the board and extended up into the rockets engine mount to give added stability.

4. Rockets must be equipped as prepared for launching, with wadding and parachutes or other recovery systems. Rockets entered with live engines, wrong base size or sideboards will be disqualified.

5. A report, protected in a clear plastic cover, must include: 1) rocket specification (include original or photo of manufacture packaging stating rocket skill level), 2) a flight record for each launching (weather, distance, flight height), 3) number of launchings, 4) flight pictures, 5) Safety (How did you choose your launch site? Document safe launch, preparations, and precautions), 6) objectives learned, and 7) conclusions.

6. The flight record should describe the engine used, what the rocket did in flight and recovery success. Points will not be deducted for describing launching, flight, or recovery failures. This includes any damage that may be shown on the rocket. Complete factory assembled rockets will not be accepted at the State Fair.

7. 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 maximum launch points given on the score sheets. 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.
- The skill level of a project is not determined by the number of years in project. Skill level is determined by the level listed on the manufacturing packaging.
- 4-H Rocket project levels are not intended to correspond to National Association of Rocketry model rocket difficulty ratings or levels.

8. High power rockets (HPR) are similar to model rocketry with differences that include the propulsion power and weight increase of the model. They use motors in ranges over "G" power and/or weigh more than laws and regulations allow for unrestricted model rockets. These rockets are NOT appropriate for 4-H projects and will be disqualified.

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

Aerospace/Rockets
Dept H Division 850

Classes

1 **Rocket-** Scoresheet SF92- Any Skill Level Rocket **with wooden fins and cardboard body tubes** painted by hand or air brush.

2 **Aerospace Display-** Scoresheet SF93- Poster or display board that displays or exemplifies one of the principles learned in the Lift Off project. Examples include display of rocket parts and purpose, explaining the parts of a NASA rocket or shuttle, interview of someone in the aerospace field, or kite terminology. Include notebook containing terminology (definition), and what was learned. Display can be any size up to 28" x 22."

3 **Rocket Painted Commercially-** Scoresheet SF92- Any Skill Level Rocket **with wooden fins and cardboard body tubes** painted using commercial application. Example commercial spray paint.

Drones- Youth enrolled in STEM Rockets may exhibit in any class within this division.

Dept H Division 850

Classes

5 **Drone Poster-** Scoresheet SF93- Exhibit must be designed to educate yourself and others on one or more of the following topics: drone technologies, uses of drones, the different types of drones, types of training needed to operate drones, and the laws and regulations users must follow. Poster can be any size up to 28" by 22".

6 **Drone Video-** Scoresheet SF93- Exhibit must demonstrate how the drone interacts with the outside world. Examples include field scouting, surveying damage from natural disasters, drones used in commercial applications and settings, drones used for structural engineering. Video should not exceed 5 minutes. For state fair: Qualified videos should be submitted prior to other state fair entries. Check the State fairbook for details.

COMPUTERS

This division 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 of the different aspects of computer science. Involvement in STEM Computers gives participants a first-hand experience in modern technology. Learn about hardware and software; Discuss Internet safety; Create and save data; Use Internet search engines; Take apart a computer; Participate in a chat room; Create a newspaper or magazine; Build your own computer system; Design a website; Develop a multimedia presentation; Use spreadsheets: https://4hcurriculum.unl.edu/indes/php/main/program_project/123

Rules:

1. The name and county of each exhibitor should appear separately on

the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.

2. Demonstration boards should include an overall title for the display, plus other necessary labeling.
3. 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. 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.
5. No firearms, items with a blade, and other related items allowed.
6. No use of copywritten images.
7. The State Fair Premier 4-H Science Award is available in this area.
8. Team Entries: 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.

Booting Up-Unit 1
Dept H Division 860
Classes

20* Poster- Scoresheet CF022- Create a poster on a lesson learned in Unit 1. Examples might include hardware, software programs, how to take care of a computer and operating systems.

24*Computer Designed Announcement/Greeting Card- Scoresheet CF023- Card should be created using a commercially available graphics program. Tell which software program was used. Prefabricated cards from commercially available card programs will NOT be accepted. No theme required. Put cards in some type of protective cover.

27* 4-H Promotional Flier- Scoresheet CF024- Exhibit should be created on an 8 1/2" x 11" page using a commercially available graphics software package. Flier can be color or black and white. Fliers can be a whole page or a folded flier. Display on appropriate size paper or poster board, not to exceed 24" x 24".

28* **Cybercard-** Scoresheet CF025- (For ages 8-12)- Exhibit will consist of two cyberspace greeting cards sent to the office e-mail address. The exhibit will be a printout of each card and a one-page text telling the steps taken to complete and send the cybercards and how you may be able to use cybercards. **Due in Extension office by 4:00 p.m. on entry deadline date**. Office email address: nuckolls-county@unl.edu or thayer-county@unl.edu

29* **Utilizing the Internet-** Scoresheets CF026- Exhibit will be a notebook of web sites used to plan a real or fictitious vacation. Notebook will consist of at least four different web sites illustrating the following: 1) airfare and/or directions to drive to destination, 2) hotels/motels in the area, 3) things to do (i.e., baseball game, Disney World, amusement park) and 4) a maximum of one- page text telling the steps taken to plan the vacation. List web sites for each site and tell how you may be able to use the web to plan or research other things in the future.

Computer Mysteries-Unit 2
Dept H Division 860
Classes

1 **Computer Application Notebook** - Scoresheet SF277- 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.

2 **Produce a Computer Slideshow Presentation**- Scoresheet SF276- 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 and submitted to Nuckolls-county@unl.edu one week prior to fair's static entry date. Exhibitors MUST provide a hard copy QR code for viewing. Exhibitors should test their codes or link on several devices

to check for appropriate permissions for public viewing.

Computer Mysteries-Unit 3
Dept H Division 860
Classes

3 **Produce an Audio/Video Computer Presentation-** Scoresheet SF276- 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 graphic, sound and either a video clip, animation, or voice over and/or original video clip. Entry should be submitted to Nuckolls-county@unl.edu one week prior to fair's static entry date. Exhibitor must provide a hard copy QR code for viewing. Codes should be tested on several devices to check for appropriate permissions for public viewing.

4 **How To STEM (Science, Technology, Engineering, and Math) Presentation-** Scoresheet SF276- 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 or may be uploaded to a video streaming application and exhibitors MUST provide a hard copy QR code for public viewing. Exhibitor should test their codes or links on several devices to check for appropriate permissions for public viewing.

5 **Virtual Platform Presentation-** Scoresheet SF276- 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. Entry should be submitted to Nuckolls-county@unl.edu one week prior to fair's static entry date. Exhibitors MUST provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions for public viewing.

6 **Create a Website/Blog or App-** Scoresheet SF275- 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. Entry should be submitted to Nuckolls-county@unl.edu one week prior to fair's static entry date. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions for public viewing.

7 3D Printing- Scoresheet SF1050- 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 projects. 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? i.e. 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 an appropriate allowance in your design.
6. Identify any changes that you would make to improve your design.

8 Maker Space/Digital Fabrication- Scoresheet SF1051-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:

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.

State Fair 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.

ELECTRICITY

In this division, 4-H'ers have the opportunity to create informational exhibits about the different aspects of electricity. Through involvement in this division 4-H'ers will be better educated about electricity and be able to present their knowledge to others.

Learn: Electrical insulation; Learn about the effects of magnetism; Build and electromagnet an electric motor; Decode circuit diagrams; Build circuits and test voltages; Build a rocket launcher and a burglar alarm; Measure electrical usage; Replace electrical switches; Evaluate light bulbs and test for electrical power; Explore LED's and SCR's, transistors, and the construction of a ACR intruder alarm; Learn the basics of solid-state electronics; Build a blinking "flasher and an amplifier"; Explore LED's and SCR's.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Several classes require a display board which should be a height of 24 inches and not to exceed ¼" thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24" are cut from one end of a 4' x 8' sheet of plywood. Nothing should be mounted within ¾" of the top or bottom of the board. (Example: Woodworking & Electricity.)
3. Fabricated boards such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
4. Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
5. Demonstration boards should include an overall title for the display, plus other necessary labeling.
6. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations). Results: what you learned. All reports should be computer generated and enclosed in a clear plastic cover.
7. The reports should be attached securely to the display.

Magic of Electricity-Unit 1

Dept H Division 870
Classes

9* Bright Lights- Scoresheet SF226- Create your own flashlight using items found around your house. Flashlights should be made from items that could be recycled or reused. No kits please. Magic of Electricity Unit 1(BU-06848*):* 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.

11* Conducting Things- Scoresheet SF226- 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.

12* Is There a Fork in the Road? - Scoresheet SF226- 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.

Investigating Electricity-Unit 2
Dept H Division 870
Classes

21* Case Of Switching Circuit Essay- Scoresheet SF226- Use the following items: two D cell batteries, two battery holders, light bulb, bulb holder, a 3" x 6" piece of cardboard, six brass paper fasteners and approx. 2' 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.

22* Rocket Launcher Poster- Scoresheet SF226- Construct a rocket launcher out of the following materials: a plastic pencil box that is at least 4" x 8", single pole switch, single throw switch, normally-open push button switch, 40' of 18 or 22 gauge stranded wire, 4 alligator clips, 2- by 6- board 6" long, 1/8" 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" and 1/4" 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.

23* Stop the Crime Poster- Scoresheet SF226- 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" x 4" by 1/8" Plexiglas board to mount circuit on; rosin core solder,

soldering gun/iron, 2' 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.

Wired For Power-Unit 3
Dept H Division 870
Classes

1 **Electrical Tool/Supply Kit-** Scoresheet SF224- 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. Containers should be appropriate to hold items.
2 **Lighting Comparison-** Scoresheet SF225- Display studying the efficiency of various lighting (incandescent, fluorescent, halogen, Light Emitting Diodes, etc.). The exhibit could be a poster display, or an actual item.
3 **Electrical Display/Item-** Scoresheet SF226- 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. The exhibit could be a poster display, or an actual item.
4 **Poster-** Scoresheet SF227- Should exemplify one of the lessons learned in the Wired for Power Project. Posters can be any size up to 28" x 22".

Electronics-Unit 4
Dept H Division 870
Classes

5 **Electrical/Electronic Part Identification-** Scoresheet SF228- Display different parts used for electrical/electronic work. The exhibit should show the part (either picture or actual item) and give a brief description, including a symbol of each part and its function. Display should include a minimum of 10 different parts.
6 **Electronic Display-** Scoresheet SF229- Show an application of one of the concepts learned in the Electronics project. Examples include components of an electronic device (refer to page 35 of the Electronics' manual).
7 **Electronic Project-** Scoresheet SF230- Exhibit an electronic item designed by the 4-Her or from a manufactured kit that shows the electronic expertise of the 4-H'er. Examples include: a radio, a computer, or a voltmeter.
8 **Poster-** Scoresheet SF231- Should exemplify one of the lessons learned in the Entering Electronics Project. Posters can be any size up to 28" x 22".

ROBOTICS

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

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

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

Team Entries: To qualify for entry materials entered in robotics classes must clearly be the work of a team instead of an individual; must have at least 50% of all team members enrolled in 4-H. Additionally, all enrolled 4-H members on the team should complete and attach an entry tag to the materials. A supplemental page documenting the individual contributions to the project should be included. The entry will be judged as a team, with all team members receiving the same ribbon placing.

Creating a video of your robot in action would be helpful for the judges but is not mandatory. Videos should be uploaded to a video streaming application and exhibitors should provide a hard copy QR code for viewing. Entries must be submitted to your local extension office one week prior to static judging day but exhibitors MUST provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permission for public viewing.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks so the owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned. All reports should be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
3. Posters can be any size up to 28” by 22” when ready for display. Example: tri fold poster boards are not 28” by 22” when fully open for display.

Dept H Division 861
Classes

1 **Robotics Poster-** Scoresheet SF236**-** Create a poster (28" X 22") communicating a robotics theme such as "Robot or Not", "Pseudocode", "Real World Robots", "Careers in Robots", "Autonomous Robotics", "Precision Agriculture", or a robotic topic of interest to the 4-H'er.

2 **Robotics Notebook-** Scoresheet SF237- Explore a robotics topic in-depth and present your findings in a notebook. Documentation should include any designs, research, notes, pseudocode, data tables, or other evidence of the 4-H'ers learning experience. The notebook should contain at least three pages. Topics could include a programming challenge, programming skill, calibration, sensor exploration, or any topic suggested in Class 1.

4 **Robotics Career Interview-** Scoresheet SF239- Interview someone who is working in the field of robotics, and research the career in robotics. Interviews can either be written or in a multimedia format such as a short video uploaded to a cloud sharing service. Include a QR code with your project to allow for judging access. Entries must be submitted to your local extension office one week prior to static judging day but exhibitors MUST provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permission for public viewing. Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12-point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

5 **Robotics Sensor Notebook-** Scoresheet SF241- Write pseudo code which includes at least one sensor activity. Include the code written and explain the code function. Codes can be submitted as a multimedia format uploaded to a cloud sharing service. Include a QR code with your project to allow for judging access. Entries must be submitted to your local extension office one week prior to static judging day but exhibitors MUST provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permission for public viewing.

6* **Build a robot- (may use kit)-** Scoresheet SF243- Include a robot and notebook including the pseudocodes for at least one program you have written for the robot, the robot's purpose, and any challenges or changes you would make in the robot design or programming. If robot is 15" wide and 20" tall they may not be displayed at state fair. It is recommended the exhibit be submitted under class H861003 Robotics Video. Junk Drawer Robotics do not qualify.

7 **Kit Labeled Robot (cannot be VFDD programmed) and Notebook**- Scoresheet SF243- This class is intended for explorations of robotic components such as arms or vehicles OR educational kits marketed as robots that do not have the ability to be programmed to "sense, plan and act." The exhibit should include a notebook with the robot the youth has constructed. Included in the notebook should be (1) A description of what the robot does, (2) pictures of programs the robot

can perform, (3) why they chose to build this particular form, and (4) how they problem solved any issues they might have had during building and programming. A picture story of assembly is recommended. If the robot is more than 15" inches wide and 20" inches tall they may not be displayed in locked cases at the State Fair.

8 **3D Printed Robotics Parts-** Scoresheet SF244- This class is intended for you to create parts, through 3D printing, to help create their robot or aid the robot in completing a coded function. Project should include a notebook describing the process used to create the project, describing the success of your designed piece (did it work), intended use of the product and the modifications made to the item.

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

GEOSPATIAL

Geospatial is a diverse category that includes a variety of exhibits 4-Hers can get involved in. Through participation in this division 4-Hers will gain more knowledge about Nebraska's rich history and diverse geography. Take close note of the rules to ensure your exhibit qualifies.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations). Results: What you learned. All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.
3. NO FIREARMS, ITEMS WITH A BLADE (broadheads, knives, saws, etc.) or related items of any other kind, may be exhibited.
4. No copywritten images allowed.

Dept H Division 880
Classes

1 **Poster-** Scoresheet SF299- 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.

2 **4-H Favorite Places or Historical Site Poster-** Scoresheet SF299- The 4-H exhibitor identifies a favorite place or historical site (including grave sites) in Nebraska. The exhibit should include latitude and longitude, digital picture, and local area map. Poster size should not exceed 14" x 22".

3 **GPS Notebook-** Scoresheet SF300- 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 of finding it. Photos of each site and/or cache are optional but encouraged.

4 **Geocache-** Scoresheet SF301- Assemble a themed geocache (physical geocache is REQUIRED with exhibit). Each geocache should be a water-tight container. It should include a logbook and pencil for finders to log their visits and may include a small trinket, geo-coins, etc. for the finders to trade. Documentation should include a title, teaser description and the geographic coordinates of intended placement. **Register the site at geocashing.com include a print-out of its registry**. The entry may include a photograph of the cache in its intended hiding place.

5 **Agriculture Precision Mapping-** Scoresheet SF302- 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 correlation (printed copies of websites were application can be purchased is acceptable). A report of how the analysis of the various data will be used to make a management decision.

6 **4-H History Map/ Preserve 4-H History-** Scoresheet SF303- 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 go to http://arcg.is/1bvGogV For more information about 4-H history go to http://www.4-hhistorypreservation.com/History_Map For 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.)

7 **GIS Thematic Map-** Scoresheet SF302- Using any GIS software, create a thematic. Thematic maps can utilize any subject of interest to the 4-Her. Example maps would be Amelia Earhart's or Sir Francis Drake's voyage, population density maps, water usage maps or 4-H project in Nebraska. Create GIS Map using data from books and or internet. Use reliable data, (U.S. Center or U.S. Census Bureau, etc.) Map any size from 8 ½" x 11" up to 36" x 24", should include Title, Base Map, Neat Line, North Arrow, and Legend. Identify the source of your information on the back of the map.

8 **Virtual Geocache-** Scoresheet SF300- Keep a log of at least 5 places visited using a virtual geocache platform. 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 highly encouraged.

STEM ENERGY

This division provides 4-H'ers a way to present their idea about renewable energy resources. Through participation in this division, 4-H'ers will learn more about physics, friction, energy, and elasticity. In addition, participants will make a display to go along with their findings.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated
2. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned. All reports should be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
3. Posters can be any size up to 28" by 22" when ready for display. Example: tri fold poster boards are not 28" by 22" when fully open for display.

Dept H Division 900
Classes

1 **Create and Compare Energy Resources Poster-** Scoresheet SF307- Poster should explore 2 alternative/renewable energy resources. Compare and contrast the 2 resources including two of the following information: amount of energy created, costs of production, usability of the energy, pros/cons of environmental impacts, etc. Poster can be any size up to 28" x 22".

2 **Experiment Notebook-** Scoresheet SF305- Notebook will explore the scientific method involving alternative/renewable energy sources. Information required. 1) Hypothesis, 2) Research, 3) Experiment, 4) Measure, 5) Report or Redefined Hypothesis.

3 **Solar as Energy Display/Poster-** Scoresheet SF308- Item should be the original design of the 4-Her. 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 the sun. Examples

include solar ovens, solar panels, etc.

4 **Water as Energy Display/Poster-** Scoresheet SF308- Item should be the original design of the 4-Her. Include the item, or a picture if item is more than 6' tall or 2' x 2'. Include a notebook of why the item was designed and how it harnesses the power of water.

5 **Wind as Energy Display/Poster-** Scoresheet SF308- Item should be the original design of the 4-Her. Include the item, or a picture if item is more than 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of wind.

6 **Other Nebraska Alternative Energy-** Scoresheet SF306- Notebook should explore Nebraska alternative energy source besides wind, water, and solar power. Include information on type of power chosen, infrastructure for distribution, what resources are needed to create this alternative resource, cost of production, and potential used of bio-products. Examples include geothermal, biomass, ethanol, biodiesel, methane reactors, etc.

WOODWORKING

Unit 1 & 2 Scoresheet SF91, SF239

In this division 4-H'ers have the opportunity to create exhibits about varying levels of woodworking. In addition, participants can also create informational exhibits about their woodworking projects. Through involvement in this division 4-H'ers will be better educated about the topic and better their woodworking skills.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. **Requirements:** All articles exhibited must include a plan (with drawings or sketch or blueprints) stating dimensions and other critical instructions a builder would need to know how to build the project and 4-H'ers name & county. Plans may include narrative instructions in addition to the dimension drawings and include any alterations 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.
3. 4-H'ers must be in Unit 3 or Unit 4 for the exhibit to be considered for the State Fair. All projects must have an appropriate finish.
4. If the project (i.e. picnic tables, wishing wells, swings, chairs, bridges, doghouses, etc.) is designed to be used outside, it will be displayed outside.
5. **All outside projects MUST have entry tag and supporting information placed in a protective bag to prevent damage**

from weather events such as rain and be ATTACHED to projects with string, zip ties, etc.

Unit 1 is designed to develop skills such as measuring, squaring, and cutting a board, driving nails, and using clamps and screws; build a picture frame, a letter holder, a box, or an airplane.

Unit 2 is designed to learn how to measure, cut, sand, drill, and use advanced hand and power tools; apply paint and use bolts and staples. Build a sawhorse, birdhouse, toolbox, or a stool.

Unit 3 is to practice measuring angles, cutting dado and rabbet joints, using a circular saw, a table saw, and a radial arm saw; and how to sand and stain wood.

Dept H Division 911

Classes- Units 1 & 2

11* Article as Shown in Woodworking 1 Manual- Item made using skills learned in the Measuring Up manual- 4-H 6875. Examples include recipe holder, stilts, or other skill level appropriate item. Items should be entered with construction plans. Or comparable items using hand tools.

12* Article as Shown in Woodworking 2 Manual- Item made using skills learned in the Making the Cut manual- 4-H 6876. Examples include birdhouse, foot stool, napkin, or letter holder. Items should be entered with construction plans. Or comparable items using power hand electric jig saw, power drill, and/or oscillating sander.

Dept H Division 911

Classes- Unit 3

1 Woodworking Article- Scoresheet SF91- Item should be made using either joints, hinges, dowels, or a dado joining made using skills learned in the Nailing it Together manual. The item is required to be appropriately finished. Examples include bookcase, coffee table or end table.

3 Recycled Woodworking Display- Scoresheet SF95- Article made from recycled, reclaimed, or composite wood. Article must be appropriately finished and/or sealed and utilize one or more woodworking techniques from page 2 of the Unit 3 manual. The 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.

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 based on cost, availability, and functionality?)

4) Build the item (What was your woodworking plan, and what processes did you use to build your item?)
5) Reason for article finish (What type of finish, how did you finish or why you choose this finish?)
6) Evaluate (How does your item solve the original need?)
7) Present results (How would you do this better next time?)

4 Composite Wood Project- Scoresheet SF284- 60% of the project must be wood and 40% made from other materials such as metal, rubber, resin, etc. All plans and plan alterations must be attached to the article. Protect plans with a cover. If a project is designed to be outside, it is required to have an appropriate outdoor finish because project may be displayed outside.

5 Outdoor Wood Project made with Treated Wood- Scoresheet SF97- Treated wood projects DO NOT have to have a finished coating. All plans and plan alterations must be attached to the article. Protect plans with a cover if project is designed to be outside. Examples include picnic tables, planters, outdoor furniture, etc.

6 Wood Project Created on a Turning Lathe- Scoresheet SF??- Article is the object created from spinning wood on a turning lathe. Article must be appropriately finished and/or sealed. Exhibit must include plans detailing design and process of completion, any changes made to the design, details of finishing techniques, and other relevant information about the article. Must include a description of tools used.

Dept H Division 911

Classes- Unit 4

7 Woodworking Article- (SF91)- Item made using skills learned in the Finishing It Up Project. Examples include dovetailing, making a pen using lathe, overlays, using a router, etc. The item is required to be appropriately finished.

8 Recycled Woodworking Display- Scoresheet SF91- Article made from recycled, reclaimed, or composite wood. Article must be appropriately finished and/or sealed and utilize one or more woodworking techniques from page 2 of the Unit 4 manual. The 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.

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 based on cost, availability, and functionality?)
4) Reason for article finish. (What type of finish, how did you finish or why did you choose this finish?)
5) Build the item (What was your woodworking plan, and what processes did you use to build your item?)

6) Evaluate (How does your item solve the original need?)
7) Present results (How would you do this better next time?)

WELDING

All metal welding processes accepted. This division helps learn the basics of welding. In addition, 4-H'ers get the opportunity to present their knowledge on the topic and display what they have made. Involvement in Welding gives a first-hand experience in a skill that can be used for a lifetime.

Rules:

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. All welds exhibited in class 1 or 2 must be mounted on a 12" high 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, Oxy-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 the display board so it can be hung like a picture frame. No picture frame hangers accepted.**
3. Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
4. Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
5. 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.
6. If no plans are included with welding art, welding article, welding furniture or composite weld, project item will be disqualified.
7. All outside projects MUST have an entry tag and supporting information placed in a protective bag to prevent damage from weather events such as rain and be ATTACHED to projects with string, zip ties, etc.

ARCS AND SPARKS

Learn to cut metal with an arc solder; weld high carbon, spring steel and alloy steels; weld horizontal, vertical, and overhead positions, 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 a 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.
5. Stick welding: Suggested coupon thickness - 1/4” if using 1/8” rod. Suggested rod-AC and DC straight or reverse polarity- first E-7014, second E-6013
6. MIG welding: Suggested coupon thickness - 1/4" if using .035 wire and 1/8" if using .023 wire
7. Oxy-Acetylene: Suggested coupon thickness - 1/8". Suggested rod– 1/8" mild steel rod.

4-H Welding Project Tips and Suggestions: Class 2

1. It is suggested that all welds be of the same size and thickness as metal. 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-7014 and 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.
3. 4-H Welding Project Tips and Suggestions: Class 3 & 4. 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.

4-H Welding Project Tips and Suggestions: Class 3 & 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.

2. All projects MUST have entry tag and supporting information placed in a protective bag to prevent damage from weather events such as rain and be ATTACHED to projects with string, zip ties, etc.

Dept. H Division 920

Classes

1 Welding Joints (SF281)-a display of one butt, one lap and one fillet weld.

2 Position Welds (SF281)-a display showing three beads welded in the vertical down, horizontal and overhead positions.

3 Welding Art – (SF283) – any art created using tack welds to hold the metal pieces together (examples include horseshoe projects). Type of welder, welder settings, all plans, plan alterations, and a bill for material must be attached to the article. Protect plans with a cover. If a project is designed to be outside, it is required to have an appropriate outdoor finish.

4 Welding Article- (SF281)- any shop article where welding is used construction. 60% of the item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. Type of welder, welder settings, all plans, plan alterations, and a bill for material must be attached to the article. Protect plans with a cover. If a project is designed to be outside, it is required to have an appropriate outdoor finish because project may be displayed outside.

5 Welding Furniture (SF282)– any furniture with 75% welding is used in the construction. 60% of the item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. **Type of welder, welder settings, all plans, plan alternations, and a bill for material must be attached to the article**. Protect plans with a cover. If a project is designed to be outside, it is required to have an appropriate outdoor finish because project may be displayed outside.

6 Plasma Cutter/Welder Design-(SF279)–Plasma cutters/welders allowed for detailed design(s) to butt cut into metal. 4Hers will create a notebook describing the design process to create the “artwork” to butt cut into the metal. This exhibit is not eligible for entry at the State Fair.
In the notebook include:

a) A photo (front and back) of the finished project.
b) Instructions on how the design was created, this allows for replication of the project.
c) Lessons learned or improvements to the project.
d) Steps to finish the project.

7 Composite Weld Project- Scoresheet SF280- 60% of the project must be welded and 40% made from other materials such as wood, rubber, etc. Type of welder, welder settings, all plans, plan alternations, and a bill for

material must be attached to the article. All plans, plan alternations, and a bill for materials must be attached to the article. Protect plans with a cover. If a project is designed to be used outside, it is required to have an appropriate outdoor finish because the project may be displayed outside.

8 **Medium Welded Article (SF281)-** any shop article or piece of furniture where welding is used in the construction (carts, welding table, stools, panels, troughs, etc.) 60% of item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. Type of welder, welder settings, all plans, plan alternations, and a bill for material must be attached to the article. All plans, plan alternations, and a bill for materials must be attached to the article. Protect plans with a cover. If a project is designed to be outside, it is required to have appropriate outdoor finish because project may be displayed outside.

9 **Large Welded Article (SF281)-** any shop article or piece of furniture where welding is used in the construction (wagon, trailer, presses, chute, bale carrier, feeder, etc.) 60% of item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. Type of welder, welder settings, all plans, plan alternations, and a bill for material must be attached to the article. All plans, plan alternations, and a bill for materials must be attached to the article. Protect plans with a cover. If the project is designed to be outside, it is required to have an appropriate outdoor finish because the project may be displayed outside.