

DEPARTMENT H - SCIENCE ENGINEERING & TECHNOLOGY

General Information for All Exhibits in Department H (unless otherwise stated)

- A. The name and county of each exhibitor should appear separately on the back of each board, poster or articles, and on the front cover of the notebooks so owner of exhibit may be identified if the entry tag is separated from the exhibit.
- B. Each individual is limited to one exhibit per class.
- C. Several classes require a display board which should be a height of 24 inches and not to exceed 1/4" in thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24 inch boards are cut from one end of a 4' X 8' sheet of plywood. Nothing should be mounted within 3/4" of the top or bottom of the board. (Example: Woodworking, Small Engines, & Electricity)
- D. 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.
- E. Demonstration boards should include an overall title for the display, plus other necessary labeling.
- F. All reports should be clearly written or typed and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

Department H, Division 850 - Aerospace

Pay Category #4

Rockets must be supported substantially 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 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. Rockets must be equipped as prepared for launching, with wadding and parachute or other recovery system. Rockets entered with live engines, wrong base size or sideboards will be disqualified. A report, protected in a clear plastic cover, must include: 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 the rocket did in flight and recovery success. (Include original or photo of manufacture packaging stating rocket skill level; Safety, how did you choose your launch site; Document safe launch, preparations, and precautions.) 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 will not be accepted. 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 sheets. Score Sheet SF92/rev04.

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.

Skill level of project is not determined by number of years in project. Skill level is determined by the level listed on the manufacturing packaging.

Classes:

Lift Off - Unit 2

- H-850-001 **Rocket:** Any Skill Level 2 Rocket with wooden fins painted by hand or air brush. Scoresheet SF92.
- H-850-002 **Rocket 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". Include a notebook containing terminology (definition), and what was learned. Scoresheet SF93.
- H-850-003 **Rocket:** Any Skill Level 2 Rocket with wooden fins painted using commercial application example commercial spray paint. Scoresheet SF92.
- *H-850-900 **Diamond Kite** - include a picture of the kite in flight, and a description of the flight.
- *H-850-901 **Educational Display** - exhibit could be a poster, scrapbook, notebook or three-dimensional display on a topic related to aerospace such as: four forces of flight, types of aircraft, weather and flight, parts of a hot air balloon, or parts of an airplane.

Reaching New Heights - Unit 3

- H-850-004 **Rocket:** Any Skill Level 3 Rocket with wooden fins painted by hand or air brush. Scoresheet SF92.
- H-850-005 **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.
- H-850-006 **Rocket:** Any Skill Level 3 Rocket with wooden fins painted using commercial application example commercial spray paint. Scoresheet SF92.
- *H-850-902 **Fighter Kite** - include a picture of the kite in flight, and a description of the flight.
- *H-850-903 **Educational Display** - exhibit could be a poster, scrapbook, notebook or three-dimensional display on a topic related to aerospace such as: space flight, flight simulator, parts of a remote control, parts of a helicopter, or hang gliders.

Pilot in Command - Unit 4

- H-850-007 **Rocket:** Any Skill Level 4 Rocket with wooden fins or any self-designed rocket. Scoresheet SF92.
- H-850-008 **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.
- *H-850-904 **Box Kite** - include a picture of the kite in flight, and a description of the flight.
- *H-850-905 **Educational display** - exhibit could be a poster, scrapbook, notebook or three-dimensional display on a topic related to aerospace such as planning a flight route, navigation systems, life in space, aerospace careers or emergency medical service.

Classes:

- *H-851-001 **Safety Poster**- six photos of yourself demonstrating safety measure necessary for ATV operation.
- *H-851-002 **Demonstration Display**- show some part or system of an ATV, worn or broken part, step-by-step repair procedure, etc. Include a brief description. Display on a board 24" high x 32" wide and 1/4" thick.
- *H-851-003 **You Be the Teacher**- Educational notebook, display, collection of materials that relate to project. Include 8 ½ x 11" page describing exhibit and summary of learning.

Department H, Division 895-4 Wheelin'

Pay Category #4

Classes:

- H-895-001 **Poster** – Poster should exemplify one of the lessons learned in the 4-Wheelin' project. Posters can be any size up to 28" x 22".
- *H-895-002 **Complete 4 Wheelin' project book.**

Department H-Division 860 - Computers

Pay Category #4

Classes:**Computer Mysteries-Unit 1**

- *H-860-900 **Greeting Card** made on Computer
- *H-860-901 **Sign** - 8 ½" x 11" paper, mounted on poster board
- *H-860-902 **Story** - type a story using a word processing program
- *H-860-903 **Other** - business card, letterhead, etc. created on computer

Computer Mysteries - Unit 2

Pay Category #4

- H-860-001 **Computer Application Poster** – Exhibit designed to educate yourself and others on the use of computer application/program or techniques of internet/social media safety. Examples of the computer application/program could include but are not limited to: how to download digital photos from a camera and create a usable way of storing and accessing them in the future; details of how to use instant messaging programs like Skype; or how to create a social networking page (ex. "Facebook," "SnapChat," "Instagram," "Twitter," "FaceTime," etc). Examples of internet/social media safety include but not limited to identity theft, predator safety, internet etiquette, social networking pages precautions, etc. Posters can be any size up to 28" by 22". Scoresheet SF.
- H-860-002 **Produce a Computer Slideshow Presentation** – Using presentation software. The slideshow should include a minimum of 10 slides and no 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 presenter. The exhibit is saved to a CD. All slideshows must be up loaded. Scoresheet SF277.

Computer Mysteries - Unit 3

Pay Category #4

Classes:

- H-860-004 **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.
- H-860-005 **How to STEM (Science, Technology, Engineering and Math)** – 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.
- H-860-006 **Create a Web Site/Blog or App** – Design a simple Web site 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 isn't live include all files comprising the Web site 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.
- H-860-007 **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 objects printed for their own sake. May be an art design, tool, or other object. Include a notebook with the following: software used to create 3D design; design or, if using a re-design, the original design and the youth's design with changes; orientation on how the object was printed.
- H-860-008 **3D 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: software used to create a 3D design; design or if using a re-design, the original design and the youth's design with changes, orientation on how the object was printed.
- H-860-009 **3D Pen Creation:** 3D pens rapidly melt and cool plastic filament allowing the 4-H'er to draw in 3D. You may use original designs or use a template to create their 3D item. Exhibits will be judged based on the complexity of the design and shape. 3D pen creation will include a notebook with the following: 1) copy of the template if used and description of any changes the youth created. 2) If no template used-an example of how the creation was built. 3) Must include a paragraph of what the youth learned while creating their project (i.e. sway to improve their next creation). 4) Paragraph on how 3D pens impact Science, Engineering and Technology.

Youth enrolled in Robotics Explorer, Robotics Probe or GEAR TECH 21 may exhibit in any class within this division.

Classes:

- H-861-001 **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. (SF236)
- H-861-002 **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. (SF237)
- H-861-003 **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. (SF238)
- H-861-004 **Robotics /Careers Interview** (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 (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. (SF239)
- H-861-005 **Robotics Sensor Notebook** (SF241)-Write pseudo code which includes at least one sensor activity. Include the code written and explain the code function. (SF241)
- H-861-006 **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. Submit a video of robot in action of Amy Timmerman (atimmerman2@unl.edu) by August 15th. Files must be saved in a PC compatible format with county name and last name of participant before emailing. (SF2434)
- H-861-007 **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. (SF243)

Department H, Division 870 - Electricity

Pay Category #4

Classes:

Magic of Electricity - Unit 1

- *H-870-900 **Flashlight:** Made to specifications in Magic of Electricity manual.
- *H-870-901 **Switch:** Made to specifications in Magic of Electricity manual.
- *H-870-902 **Circuit:** 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. Make a table that shows the results of finding five items that are conductors and five items that are insulators.
- *H-870-903 **Parallel or Series Circuit:** Using a D cell battery, battery holder, insulated wire, bulb holder and a 2 or 2.5 volt light bulb construct a parallel or series circuit.

Investigating Electricity - Unit 2

- *H-870-906 **Switching Circuit:** Made to specifications in Investigating Electricity manual.
- *H-870-907 **Short Essay or Poster** illustrating how three way switches function.
- *H-870-908 **Rocket Launcher:** Made to specifications in Investigating Electricity manual.
- *H-870-909 **Poster** showing step by step process of building rocket launcher.
- *H-870-910 **Alarm:** Made to specifications in Investigating Electricity manual.
- *H-870-911 **Poster** showing step by step process of building an alarm.

Electricity - Wired for Power - Unit 3

- H-870-001 **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.
- H-870-002 **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.
- H-870-003 **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.
- H-870-004 **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.

Electronics - Unit 4

- H-870-005 **Electrical/Electronic Part Identification** - Display different parts used for electrical/electronics 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.
- H-870-006 **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.
- H-870-007 **Electronic Project** - Exhibit an electronic item designed by the 4-H'er or form 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.

H-870-008 **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.

Division H, Division 880 - GPS

Pay Category #4

Youth enrolled in Geospatial or GEAR TECH21 may exhibit in any class within this division.

Classes:

- H-880-001 **Poster (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. (SF299)
- H-880-002 **4-H Favorite Places or Historical Site Poster (SF272)** – 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". (SF272)
- H-880-003 **GPS Notebook (SF300)** -Keep a log of at least 5 places visited using a GPS enabled device. 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. (SF300)
- H-880-004 **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. (SF301)
- H-880-005 **Agriculture Precision Mapping** – 4-H'ers 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 where applications can be purchased is acceptable). A report of how the analysis of the various data will be used to make a management decision.
- H-880-007 **4-H History Map** – Preserve 4-H History. Nominate a Point of Interest for the 4-H History Map Project include a copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to <http://arcgis.com/arcgis/1bvGogV> For more information about 4-H history 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)
- H-880-008 **GIS Thematic Map** - Using any GIS software, create a thematic. Thematic maps can utilize any subject of interest to the 4-H'er. Example map would be Amelia Earhart's or Sir Francis Drake's voyage population density maps, water usage "x 11" 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 8.5" 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 map.

Department H, Division 890 - Small Engines

Pay Category #3

Classes:

Crank it Up - Unit 1

- *H-890-900 **Small Engine Display/Item:** Show an application or one of the concepts learned in the Crank It Up project. Examples include: comparison and/or identification of hand tools used to maintain/fix small engines, spark plug maintenance, importance of air filters, function of oil, classifying sources of power and safety.

Warm it Up - Unit 2

- *H-890-901 **Small Engine Display/Item:** Show an application of one of the concepts learned in the Warm It Up project. Examples include: comparison of engine oil types, transmissions, or safety related to engines. Exhibit could be a poster display, or an actual item. Scoresheet SF222.

Tune it Up - Unit 3

- *H-890-902 **Engine Display/Item:** Display/Item should exemplify one of the lessons learned in the Tune It Up Project. Examples include: 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.). Scoresheet SF222.

Department H, Division 900 – Power of Wind

Pay Category #3

Classes:

- H-900-001 **Create and Compare Energy Resources Poster** – Poster should explore two alternative/renewable energy resources. Compare and contrast the two resources including two of the following information: amount of energy created, costs of production, usability of the energy, pros/cons of environmental impacts, etc. Posters can be any size up to 28" x 22".
- H-900-002 **Experiment Workbook**– Notebook will explore the scientific method involving alternative/renewable energy sources. Information required. 1) Hypothesis. 2) Research. 3) Experiment. 4) Measurement. 5) Report or Redefine Hypothesis.
- H-900-003 **Solar 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 the sun.
- H-900-004 **Water 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 water.
- H-900-005 **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. (SF308)

H-900-006 **Other Nebraska Alternative Energy** –Notebook should explore Nebraska an 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 uses of bio-products.

Resources:

<https://4-h.org/parents/national-youth-science-day/wired-for-wind/>
<https://4-h.org/parents/national-youth-science-day/biofuel-blast/>
<http://biodieseleducation.org/Education/4H.html>
<http://extension.oregonstate.edu/clackamas/energy-education-curriculum-lessons>

Department H, Division 911 - Woodworking

Pay Category #3

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 (drawing or sketch, or blueprints) stating dimensions and other critical instructions a builder would need to know to build the project. 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 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.

4-H'ers must be in advanced woodworking projects for the exhibit to be considered for State Fair.

All projects must have appropriate finish and/or sealed.

Classes: (Scoresheet SF91 for all classes)

Measuring Up - Unit 1

*H-911-900 **Article Made With Hand Tools (Manual):** Select from these Level 1 manual items: flower box, napkin or letter holder or frame.

*H-911-901 **Article Made With Hand Tools (Not in Manual):** Item comparable to those in Level 1 manual, but not listed in class 900.

Making the Cut - Unit 2

*H-911-902 **Article In Level 2 Manual or Comparable item:** Item using power hand tools, electric jig saw, power drill and/or oscillating sander.

*H-911-903 **Comparable Article:** Item fitting criteria similar to those in Level 2 Woodworking manual.

Nailing It Together - Unit 3

H-911-001 **Woodworking Article:** Using skills learned in the Nailing it Together manual. Examples include: bookcase, coffee table or end table. Item should be made using either joints, hinges, dowels, or a dado joining.

H-911-002 **Woodworking Display:** Display exemplifying one of the principles learned in the Nailing it Together Project. Examples include: measuring angles, wood lamination and joint types. Report must have –reason for article finish (What type of finish, how did you finish or why you chose the finish?)

H-911-003 **Recycled Woodworking Display:** Recycled Woodworking Display (SF91) – 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. 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?)

*H-911-907 **Additional Article**

Finishing Up - Unit 4

H-911-004 **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.

H-911-005 **Woodworking Display:** Display exemplifying one of the principles learned in the Finishing It Up Project. Examples include: career opportunities, types of finishes, or dovetailing.

H911-006 **Recycled Woodworking Display** (SF91) – 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.

- 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?)

*H-911-908 **Additional Article**

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 display board so it can be hung like a picture frame. If no plans are included with welding item, it will be disqualified.

If project is designed to be outside it is required to have appropriate outdoor finish because project may be displayed outside.

- H-920-001 **Welding Joints** - a display of one butt, one lap and one fillet weld. SF281
- H-920-002 **Position Welds** - a display showing three beads welded in the vertical down, horizontal and overhead positions. SF281
- H-920-003 **Welding Article** - any shop article 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. All plans and bill of materials must be attached to the article. Protect plans with a cover. SF281
- H-920-004 **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. SF239
- *H-920-005 **Plasma Cutter/Welder Design** – Plasma cutters/welders allowed for detailed design(s) t butt cut into metal. 4-H'ers will create a notebook describing the process to crate the "artwork" to butt cut into the metal. Notebook includes: A photo (front and back) of the finished project. Also include detailed photographs of the project to allow judges to determine the cuts. Instructions on how the design was created, allows for replication of the project, lessons learned or improvements to the project.
- *H-920-006 **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 include. All plans, plan alternations, dimensions and a bill for materials must be attached to the article. Protect plans with a cover. SF282

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 1/8" 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 1/8" if using .023 wire.

Oxy-Acetylene - Suggested coupon thickness– 1/8". Suggested rod – 1/8" mild steel rod.

Class 2:

1. It is suggested that all welds be on same size and thickness of 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.

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.

Department H, Division 930-Science, Engineering and Technology Careers

H-930-001 **Careers Interview**

Department H, Division 800 - Entomology General Information

Pay Category #3

Specimens be mounted properly and labeled with 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 (<http://4h.unl.edu/web/4hcurriculum/4h26>). Purchased insects and other insects not collected by the participant 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 x 18" wide, landscape orientation, so they fit in display racks. Purchase of commercially-made boxes is allowed. All specimens must be from the collector.

- H-800-001 **Entomology Display, First-Year Project (Class I).** Collection to consist of 25 or more different kinds (species) of insects representing at least 6 orders. Limit of one box.
- H-800-002 **Entomology Display, Second-Year Project (Class II).** 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 after July 1 of the previous year. Limit 2 boxes.
- H-800-003 **Entomology Display, Third-Year or More Project (Class III).** 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.
- H-800-004 **Special Interest Display.** Educational display developed according to individual 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 1-4 and be protected in an insect box. Each specialty display should include 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 the 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.).
- H-800-005 **Insect Habitats.** A one-page report must accompany the exhibit. (SF188)
- H-800-006 **Macrophotography.** Subjects should be insects, spiders or other arthropods, or any nests, webs or constructions they make. All exhibit prints should be 8 ½" x 11" and mounted on rigid, black 11" x14" poster or black matt board. Either orientation is acceptable. No frames or mat board framing is allowed. A short caption explaining the subject, printed on white paper and glued below the print on the poster or matt board. (SF 189)
- H-800-007 **Insect Poster/Display.** 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.
- H-800-008 **Reports or Journals.** 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 of kinds of butterflies over the summer, rearing a specific insect from egg to adult, managing a bee hive, observations of insects in a specific habitat, accounts of insect behavior in a forest or flower garden, etc.

Department H – Veterinary Science

Pay Category #4

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 any of the Veterinary Science 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 exhibitor's 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 publication, professional journals and publications, professional AVMA accredited websites, interviews with Veterinarians and excerpts from Veterinary Educational Literature.

Department H, Division 840 - Veterinary Science

Pay Category #4

Classes:

- H-840-001 4-H Veterinary Science **Large Animal Poster or Display**
- H-840-002 4-H Veterinary Science **Small Animal/Pet Poster or Display**

DEPARTMENT I - CLOVER KIDS

Ages 5-7 (4-H ages, as of January 1 of the current year). Must be enrolled in Clover Kids Program. All entries are to be accompanied by completed entry cards. Only one exhibit per class. Limit 10 entries. All entries will receive a special ribbon. Be creative! These items are not eligible for State Fair competition.

Classes:

Department I, Division 10 - Just Outside the Door

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| I-10-001 | Treasure Hunt Collage | I-10-006 | Insect Model - Create your very own insect using non-edible media and include all the parts of an insect: 6 legs, one pair of antennae and three body sections. |
| I-10-002 | Plant Grown From Seed | I-10-007 | Float Your Boat (reference page 36 of project manual)- Design and build a boat. |
| I-10-003 | Seed Mosaic | I-10-008 | Leaf Rubbing |
| I-10-004 | Bird Feeder –Any homemade bird feeder using recycled products | I-10-009 | Plaster Cast of Nature |
| I-10-005 | Bird House -Any homemade bird house | | |

Department I, Division 20 – Aerospace 1

- I-20-001 **Rocket** made from food. Must be non-perishable. See directions in project manual.
- I-20-002 **Spacey Suit.** See directions in project manual.
- I-20-003 **Paper Flyers** - Make your favorite kind of paper flyer. This can be a helicopter, airplane, rocket or any other flying machine.
- I-20-004 **4-H Aerospace Manual** - Enter your manual showing what activities you have completed.
- I-20-005 **“Go Green In Space”**- Create a flying machine (airplane, helicopter, rocket, space-buggy, etc.) out of recycled materials.
- I-20-006 **Windsock**

Department I, Division 30 - Family Celebrations from Around the World

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| I-30-001 | Family Traditions - photograph and description of a family celebration - mounted on 8 ½ x 11" poster board. | I-30-004 | Japanese Hat |
| I-30-002 | Name Rhyme - write a rhyme about your name and what it means. | I-30-005 | China Dolls |
| I-30-003 | Mexican Piñata | I-30-006 | Carp Kite |
| | | I-30-007 | Mother’s/Father’s/Grandparent’s Day Poster |
| | | I-30-008 | 4th of July - U.S. Flag |

Department I, Division 40 - Exploring Farm Animal

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| I-40-001 | Create a Critter | I-40-005 | “Gate to Plate” -Show what products or by-products we get from animals. Maximum exhibit size 14”x22”. |
| I-40-002 | Animal Care Collage | I-40-006 | Parts of a Farm Animal - Exhibit may focus on one species or show multiple species. Maximum exhibit size 14”x22”. |
| I-40-003 | Animal Story - Handwritten, no more than 3 photos or 3 paragraphs. Ex.: Animal Care | I-40-007 | Know Your Breed - Create an exhibit that shows what you have learned about the breed of any farm animal |
| I-40-004 | Animal Sculpture - any type of medium, i.e. clay, play dough, bread dough clay, etc. | | |

Department I, Division 50 – Making Food For Me

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| I-50-001 | Making Food for Me Place Mat – Colored and decorated. Lamination or protection with clear contact paper advised. | I-50-005 | Protein Collage – Neatly cut and pasted pictures of protein sources and food displayed on collage. |
| I-50-002 | Food Cards – Neatly cut and colored Food Cards, in self-sealing plastic bag or other secure container. | I-50-006 | Healthy Snack – Four cookies, bars, muffins, etc., on a paper plate or at least 1 cup of mix. (examples: snack mix made from a cereal base, no-bake or simple cookie or granola bar.) |
| I-50-003 | Grain Collage – Neatly cut and pasted pictures of grains cut out and displayed on collage. | I-50-007 | Decorated Cupcake or Cookie -Four on a paper plate. Decorated with frosting, candies and/or edible items. |
| I-50-004 | Dairy Tasting Party – Completed Dairy Tasting Party form from Project Book (Page 17). May be copied or cut from manual. | | |

Department I, Division 60 - Theater Art

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| I-60-001 | Sock Puppet | I-60-004 | Picture Story - See page 28 of manual |
| I-60-002 | Spoon Puppet | I-60-005 | Theater Arts Manual - with completed activities |
| I-60-003 | Other Puppet | I-60-006 | Strike up the Band - create a musical instrument |