

## DEPARTMENT H -- SCIENCE, ENGINEERING & TECHNOLOGY

Divisions	Purple	Blue	Red	White
All	\$2.00	\$1.50	\$1.00	\$.50

### General Information

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

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 the owner of exhibit may be identified if the entry tag is separated from the exhibit.

Several classes require a display board which should be a height of 24 inches and not to exceed ¼" in thickness. A height of 23 7/8 inches 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 ¾" of the top or bottom of the board (Example: Woodworking & Electricity).

Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.

Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.

Demonstration boards should include an overall title for the display, plus other necessary labeling. Reports should be written using the scientific method whenever possible. Background, the Question or hypotheses, what you plan to do and what you did. Method used and observations. Results: what you learned. All reports should be computer generated.

### DEPARTMENT H, Division 850 - AEROSPACE

Rockets must be supported substantially to protect from breakage. Rockets should be mounted on base that has dimensions equal or less than 12" x 12" and the base should be ¾" 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. Use a short section (i.e., no taller than the rocket length) of launch rod to support the rocket. 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 should be glued and/or screwed into the board and extended up into the rockets engine mount to give added stability. Rockets must be equipped as prepared for launching, with wadding and parachute or other recovery system. Rockets entered with live engines, wrong base size or sideboards will be disqualified.

A report, protected in clear plastic cover, should 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. 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 at the State Fair. Judging is based upon display appearance, rocket appearance, workmanship, design or capabilities for flight, number of times launched and report. Three launches are required to earn the 9 launch points given on score sheets. Only actual launches count, misfires will not count towards one of the required three launches. For self designed rockets only, please include a digital recorded copy of one flight. In the documentation please include a description of stability testing before the rocket was flown.

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

### All Units

- \*H850928 - **Rocket Launch**-(see county fair 4-H activity calendar).
- \*H850929 - **Rocket Launch Equipment**-Launch Pad, Launch Box, etc.
- \*H850930 - **Aerospace Project completed Activity Guide**.

### Lift off - Unit 2

**H850001 - Rocket: Any Skill Level 2 Rocket with Wooden Fins Painted by Hand or Air Brush.**

**H850002 - 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".

**H850003 - Rocket: Any Skill Level 2 Rocket with Wooden Fins Painted Using Commercial Application Example Commercial Spray Paint.**

### Reaching New Heights - Unit 3

**H850004 - Rocket: Any Skill Level 3 Rocket with Wooden Fins Painted by Hand or Air Brush.**

**H850005 - 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" x 22".

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

### Pilot in Command - Unit 4

**H850007 - Rocket: Any Skill Level 4 Rocket with Wooden Fins or Any Self Designed Rocket.**

**H850008 - 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".

### Careers

**H850020 - Careers Interview**-Interview someone who is working in the field of aerospace and research that career. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12 point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

### DEPARTMENT H, Division 860 - COMPUTERS

#### All Units

\*H860901 - **Computer Project completed Activity Guide**

#### Computer Mysteries - Unit 1

\*H860902 - **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.

\*H860903 - **Commercial Software Utilization**-Exhibit will be a notebook of the documentation and printouts using each section of the commercial program. (i.e. - Microsoft Works: Word Processor, Database, Spreadsheet.) The notebook will consist of the following areas: a) cover page; b) printouts of each of the sections offered by the software; c) a paragraph explaining can be used.

\*H860904 - **Hardware/Software Selection**-The exhibitor shall enter a completed software selection record book including a report on the hardware and/or software that was selected to meet specific needs. Exhibits should be written from a consumer point of view explaining the steps taken during the experience.

\*H860905 - **4-H Promotional Flyer**-Exhibit should be created on an 8½" x 11" page using a commercially available graphics software package. Flyer can be color or black and white. Flyers can be a whole page or a folded flyer.

\*H860906 - **Computer Art Poster (Black & White)**-Exhibit should be created on at least an 8 ½" x 11" page using a commercially available graphics software package and a single color printer. No theme required.

\*H860907 - **Computer Art Poster (Color)**-Exhibit should be created on at least an 8 ½" x 11" page using a commercially available graphics software package and color printer/plotter. No theme required.

\*H860908 - **Computer Designed Greeting Card**-Exhibit will consist of six (6) greeting cards, each for a different occasion/holiday. Cards should be created on an 8 ½" x 11" page using commercially available graphics program and either single color or color printer/plotter. The cards should vary in folds and design. 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.

**\*H860909 - Utilizing the Internet**-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 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**

**H860001 - Computer Application** - 4-H exhibitor should use computer application to create a graphic notebook utilizing computer technology. 4-H'er may create any of the following: greeting card (3 different cards should be 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 (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.

**H860002 - Produce a Computer Slideshow Presentation - Unit 2**-Using presentation software. All county fair projects with a printout should be saved on a CD Rom to be submitted for county fair. Slideshow should include a minimum of 10 slides and no more than 25. Incorporate appropriate slide layouts, graphics and animations and audio (music or voice and transition sounds do not count). Each slide should include notes for a presenter. All slideshows must be up loaded .

#### **Computer Mysteries - Unit 3**

**H860004 - Produce an Audio/Video Computer Presentation**-Using presentation software a 4-H exhibitor designs a multimedia computer presentation on one topic related to youth. The presentation should be at least 2 minutes in length and no more than 5 minutes in length, appropriate graphics, sound and either a video clip, animation or voice over and/or original video clip. The presentation must be able to be played and viewed on a PC using Windows Media Player, Real Player, iTunes or QuickTime Player.

**H860005 - How to STEM (Science, Technology, Engineering and Math) Presentation** -Youth design a fully automated 2 to 5 minute 4-H "how to" video. Submissions should incorporate a picture or video of the 4-H'er, as well as their name (first name only), age (as of January 1 of the current year), years in 4-H, and their personal interests or hobbies. Videos should be designed for web viewing. Any of the following formats will be accepted: .mpeg, .rm, .wmv, .mp4, .ov, .ppt, or .avi.

**H860006 - Create a Web Site/Blog or App**-Design a simple web site/Blog or App for providing information about a topic related to youth using either software programs such as an HTML editor like Microsoft's FrontPage or Macromedia's Dreamweaver, and image editor like IrfanView or GIMP or online using a WIKI such as Google Sites. If the Web site, Blog or App isn't live include all files comprising the Web site 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.

**H860007 - 3D Printing** - Unique Items: 3D printing uses plastic or other materials to build a 3-dimensional object from a digital design. Youth may use original designs or someone else's they have re-designed in a unique way. Exhibits will be judged based on the complexity of the design and shape. 3D Unique Object: 3D objects printed for their own sake. May be an art design, tool, or other object. 3D printing will include a notebook with the following: (a) software used to create 3D design, (b) design or, if using a re-design, the original design and the youth's design with changes, (c) orientation on how the object was printed.

**H860008 - Printing Prototypes** - 3D printing uses plastic or other materials to build a 3 dimensional object from a digital design. Youth may use original designs or someone else's they have re-designed in a unique way. Exhibits will be judged based on the complexity of the design and shape. 3D objects printed as part of the design process for robot or other engineering project or cookie cutter, be creative. Must include statement of what design question the prototype was supposed to answer and what was learned from the prototype. 3D printing will include a notebook with the following: a) software used to create 3D design, b) design or, if using a re-design, the original design and the youth's design with changes, c) orientation on how the object was printed.

#### **DEPARTMENT H, Division 870 - ELECTRIC**

##### **All Units**

##### **\*H870914 - Electric Project completed Activity Guide**

##### **Electric 1 "Magic of Electricity"**

**\*H870915 - Unit 1 Bright Lights**-Create your own flash light using items found around your house. Flash lights should be made out of items that could be recycled or reused. No kits please.

**\*H870916 - Control the Flow-Make a Switch**-Use the following items: D cell battery, battery holder, insulated wire, 2 or 2.5 volt light bulb, bulb holder, paper clip, cardboard, and two brass paper fasteners to create a circuit that you can open and close.

**\*H870917 - Unit 1 Conducting Things**-Make a circuit with a switch and a light bulb that can be used to test different household items for their ability to act as an insulator or conductor. You must find five items that are conductors and five items that are insulators. Create a table that illustrates your results.

**\*H870918 - Unit 1 Is There a Fork in the Road**-Use the following items to construct one parallel and one series circuit. Items: D cell battery, battery holder, insulated wire, bulb holder and a 2 or 2.5 volt light bulb.

##### **Electric 2 "Investigating Electricity"**

**\*H870919 - Unit 2 Case of the Switching Circuit**-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. two feet of 24 gauge insulated wire to build a three way switch. Write a short essay or create a poster that illustrates how three way switches function.

**\*H870920 - Unit 2 Rocket Launcher**-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 feet of 18 or 22 gauge stranded wire, 4 alligator clips, 2" x 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" used to build your launcher.

**\*H870921 - Unit 2 Stop the Crime**-Build an ALARM using the following materials: On-off push button switch, mercury switch, buzzer-vibrating or piezoelectric, 9-volt battery, 9-volt battery holder, 4"x 4" x 1/8" Plexiglas board to mount circuit on; rosin core solder, soldering gun/iron, two feet of 22 gauge wire, wire strippers, hot glue sticks, hot glue gun and a plastic box with a lid to mount your alarm circuit on. Create a poster using photographs to show the "step by step process" you used to build your alarm.

##### **Electricity 3 "Wired for Power"**

**H870001 - Electrical Tool or 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.

**H870002 - Lighting Comparison Display**-Display studying the efficiency of various lighting (incandescent, fluorescent, halogen, Light Emitting Diodes, etc.). Exhibit could be a poster display, or an actual item.

**H870003 - Electrical Display or 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.

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

#### **Electricity 4 "Electronics"**

**H870005 - Electrical or Electronic Part ID**-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.

**H870006 - Electronic Display**-Show an application of one of the concepts learned in the Electronics project. Examples include: components of a electronic device.

**H870007 - Electronic Project**-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 volt meter.

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

#### **Careers**

**H870010 - Careers Interview**-Interview someone who is working in the field of electricity and research that career. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12 point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

#### **DEPARTMENT H, Division 861 - ROBOTICS**

Youth enrolled in Virtual Robotics, Junk Drawer Robotics (levels 1, 2 or 3), Robotics Platforms, or GEAR TECH 21 may exhibit in any class in this division.

##### *Unit 1 Robotic Explorer*

**H861001 - Robotics Poster**-Create a poster (14" x 22") communicating a robotics theme such as "Robot or Not," "Pseudocode," "Real World Robots," "Careers in Robots" or "Autonomous Robotics," "Precision Agriculture" or a robotic topic of interest to the 4-H'er.

**H861002 - Robotics Notebook**-Explore a robotics topic in-depth and present your findings in a notebook. Documentation should include any designs, research, notes, pseudocode, data tables or other evidence of the 4-H'ers learning experience. The notebook should contain at least three pages. Topics could include a programming challenge, a programming skill, calibration, sensor exploration, or any of the topics suggested in Class 1.

**H861003 - Robotics Video**-This class should be displayed in a notebook. The notebook should include a video clip on a CD/DVD that demonstrates the robot performing the programmed function. Include your pseudo code and screenshots of the actual code with a written description of the icon command functions.

**H861004 - Robotics Careers Interview**-Interview someone who is working in the field of robotics and research the career in robotics. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3-5 pages, double spaced, 12 point font, and 1" margins. Multimedia reports should be 3-5 minutes in length.

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

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

**H861007 - Kit Labeled Robot** (cannot be programmed)-This class is intended for explorations of robotic components such as arms or vehicles OR educational kits marketed as robots that do not have the ability to be programmed to "sense, plan and act." The exhibit should include a project the

youth has constructed, a description of what it does and an explanation of how it is similar to and different from a robot.

**\*H862900 - Project Constructed from Lego Elements** The exhibit should include a project the youth has designed and constructed out of Lego elements, a description of what it does and an explanation of the basic structural and mechanical engineering concepts incorporated.

#### **DEPARTMENT H, Division 880 - GEOSPATIAL**

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

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

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

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

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

**H880005 - Agriculture Precision Map** -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.

**H880007 - 4-H History Map** - Preserve 4-H History: nominate a Point of Interest for the 4-H History May Project include copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to [http://4hhistorypreservation.com/History\\_Map/](http://4hhistorypreservation.com/History_Map/). For a step by step video on nominating a point, please go to this link: <http://tinyurl.com/nominate4h>. Write a brief description of historical significance of 4-H place or person (a minimum of one paragraph).

#### **Careers**

**H880010 - Careers Interview**-Interview someone who is working in a geospatial field 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.

#### **DEPARTMENT H, Division 900 - POWER OF WIND**

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

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

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

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

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

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

#### **DEPARTMENT H, Division 911 - WOODWORKING**

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

Requirements: All articles exhibited must include a plan (with drawings or sketch or blueprint) stating dimensions and other critical instructions a builder would need to know how to build the project. Plans may include narrative instructions in addition to the dimension drawings and include any 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.

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

**You may make two entries per class in classes 925 and 926.**

#### **All Units**

**\*H911924** - Woodworking Project completed Activity Guide.

#### **Woodworking 1 "Measuring Up"**

**\*H911925 - Woodworking Article**-Item made using skills learned in the Measuring Up Project Guide. Examples include: recipe holder, stilts or other skill level appropriate item. Items should be entered with construction plans.

#### **Woodworking 2 "Making The Cut"**

**\*H911926 - Woodworking Article**-Item made using skills learned in the Making the Cut project guide. Examples include: birdhouse, foot stool, napkin or letter holder. Items should be entered with construction plans.

#### **Woodworking 3 "Nailing it Together"**

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

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

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

**\*H911927 Extra Level 3 Article**

#### **Woodworking 4 "Finishing Up"**

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

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

**H911006 - Recycled Woodworking Display** - Article made from recycled, reclaimed or composite wood. Article must be sanded and sealed and utilize one or more woodworking techniques from page 2 of the Unit 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?).

**H911010 - Careers Interview**-Interview someone who is working in the field of woodworking and research that career. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12 point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

**\*H911928 - Extra Level 4 Article**

#### **DEPARTMENT H, Division 920 - WELDING**

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 article or welding furniture, item will be disqualified.

**H920001 - Welding Joints**-A display of 1 butt, 1 lap and 1 fillet weld.

**H920002 - Position welds**-A display showing three beads welded in the vertical down, horizontal and overhead positions.

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

**H920004 - Welding furniture** - any furniture with 75% welding is used in the construction. 60% of item must be completed by a 4-H'er and notes regarding laser welding or machine welding must be included. All plans, plan alterations, dimensions and a bill for materials must be attached to the article. Protect plans with a cover.

**H920005 - Careers Interview**-Interview someone who is working in the field of welding and research that career. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages double spaced, 12 point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

**\*H920927 - Welding Project completed Activity Guide**

#### **4-H Welding Project Tips and Suggestions**

##### **CLASS 1:**

- ▶ All welds should be made with the same electrode/wire/rod size and number.
- ▶ Welds should be made only on one side of metal so penetration can be judged.
- ▶ 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.
- ▶ It is suggested that all welds be on the same size and thickness of metal. These pieces, referred to as coupons, should be 1.5 to 2 inches wide and 3.5 to 4 inches long. A good way to get this size is to buy new cold rolled strap iron and cut to length. The extra width is needed to provide enough metal to absorb the heat from the welding process and prevent the coupons from becoming too hot before the bead is completed. Narrower coupons will become very hot, making an average welder setting too cold at the bead start, just about right in the middle, and too hot at the end. The correct way

to weld narrow strips is to make short beads and allow time to cool, however this project requires a full length bead.

#### *Stick welding*

- ▶ Suggested coupon thickness- ¼" if using ⅛" rod
- ▶ Suggested rod-AC and DC straight or reverse polarity- first E-7014, second E-6013

#### *MIG welding*

- ▶ Suggested coupon thickness--¼" if using .035 wire and ⅛" if using .023 wire

#### *Oxy-Acetylene*

- ▶ Suggested coupon thickness- ⅛"
- ▶ Suggested rod- ⅛" mild steel rod

#### **CLASS 2:**

- ▶ 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.
- ▶ 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:**

- ▶ All welds should be cleaned and protected from rust with paint or light oil. Plans are to be complete so 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 800 - ENTOMOLOGY**

Specimens should be mounted properly and labeled with the date and location of collection, name of collector, and order name. Follow mounting and labeling instructions in the Nebraska 4-H Entomology Manual.

Boxes are preferred to be 12" high x 18" wide and landscape orientation so they fit in display racks. Purchase of commercially made boxes is allowed. All specimens must be from the collector.

**H800001 - Entomology first year project display**-Collection to consist of 25 or more different kinds (species) of insects representing at least 6 orders. Limit of 1 box.

**H800002 - Entomology second year project display**-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.

**H800003 - Entomology third or more year project display**-Collection to consist of a minimum of 75 kinds (species) of insects representing at least 10 orders. Replace damaged/poorly mounted specimens. About 25 species should be present from after July 1 of previous year. Limit 3 boxes.

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

**H800005-Insect Habitats (Class V)**-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 must accompany the exhibit.

**H800006-Macrophotography (Class VI)**-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" x 14" poster or matt board. Either orientation is acceptable. NO frames are allowed. A short caption explaining the subject, printed on white paper, should be glued below the print on the poster or matt board.

#### **\*H800935 - Entomology Project completed Activity Guide 1, 2 or 3**

#### **DEPARTMENT H, Division 840 - VETERINARY SCIENCE**

Premier 4-H Science Award is available in this area. Please refer to 4-H Judging Rules for details.

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, or a display. The exhibit may represent material from exhibitors enrolled in Animal Disease or Animal Health.

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

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

#### *Veterinary Science Posters*

This exhibit presents the viewer with a design that is simple and direct, unlike a display that usually presents more information.

A poster should not exceed 22" x 28" and may be either vertical or horizontal.

#### *Veterinary Science Displays*

A display may include but is not limited to: a 3-dimensional exhibit, a scale model, the actual product (for example: skeleton; teeth; samples of leather, fur, or dried skin damaged by disease or parasites) or a notebook.

*A display is not a poster.*

A display may be mounted on poster board not to exceed 22" x 28" or on 1/4" plywood or equivalent that does not exceed 24" high or 32" wide or in a three ring binder or another bound notebook format.

Appropriate Veterinary Science Topics:

- Maintaining health
- Specific disease information
- Photographic display of normal and abnormal characteristics of animals
- Animal health or safety
- Public health or safety
- Proper animal management to ensure food safety & quality
- Efficient and safe livestock working facilities
- Or a topic of the exhibitors choosing
- Related to veterinary medicine or veterinary science.

Remember since these are science displays, all references and information must 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.

**H840001 - Veterinary Science Large Animal Poster, Notebook or Display**

**H840002 - Veterinary Science Small Animal or Pet Poster, Notebook or Display**

#### **DEPARTMENT H, Division 851 - BICYCLE**

**\*H851936 - Demonstration Display**-The exhibit is to be prepared on a 24" high and 32" wide board, not to exceed ¼" thickness. It may include: parts or system of a bicycle, working or broken parts, or a step-by-step procedure of how some repair or service job is performed. A limited number of photographs are acceptable. Actual parts or cut away of parts are recommended.

\***H851937 - Bike Restoration**-Exhibitors need to restore/overhaul/upgrade a bicycle to include current safety features. A report must be included, covered by clear plastic, describing costs, repair costs, and what was done. "Before" and "after" photographs should be included.

\***H851938 - Bicycle Poster**-14" x 22" either vertical or horizontal arrangement. They may be in any medium - watercolor, ink, crayon, etc. as long as they are not three dimensional.

\***H851939 - Display**-showing your features checklist used when comparing three different bicycles.

\***H851940 - You Be the Teacher**-Educational notebook, display, or collection of materials that relate to the project. Include 8½" x 11" page describing exhibit and summary of learning.

\***H851941 - Bicycle Rodeo**-There must be at least three contestants before contest will be held. Only 4-H'ers enrolled in the bicycle project are eligible to compete. Contestants will compete in each of the following events: safety quiz, control events, slalom and figure eight. (See pre-county fair 4-H activities in front of fair book).

\***H851942 - Bicycle Project completed Activity Guide**

#### DEPARTMENT H, Division 871 - SHOOTING SPORTS

**Shooting Competition:** Competition will be held in the following events. Specific rules and guidelines are listed below and by each discipline.

**Age Divisions:** will vary with the events. Please read carefully to enter the proper age division. All ages are as of January 1 of the current year.

**Dress Code:** Any contestant not following the dress code will be dropped one ribbon placing.

- Acceptable shirts include any shooting club shirt or white shirt or white t-shirt with a 4-H emblem or 4-H chevron.
- No sleeveless shirts, tank tops, holey blue jeans, or shooting jackets.
- No boots of any kind, tennis shoes only for BB gun, air rifle and air pistol.

**Protective Equipment:** Any contestant or coach without the proper eye or ear protection will not be allowed to compete or assist.

- Shooters and coaches on the firing line are responsible for and must wear ear protection for the trap competition.
- Shooters and coaches on the firing line are responsible for and must wear eye protection for the BB gun, air rifle and trap competition.

**Eligibility:** To participate in these events, a 4-H'er must have been enrolled in a Burt County Shooting Sports Club and be approved for county competition by their 4-H leader(s). They must have attended the mandatory club safety training meeting(s), at least four practice sessions per discipline in which they are participating, and demonstrated they can handle their firearm or archery equipment safely at club meetings.

**Acceptable Firearms:** Any firearm brought to county competition:

- Will meet the criteria for that competition.
- All firearms will be clean and in good working condition.
- Any firearm must be brought in a case or box straight from the vehicle to the range and immediately check it in. Following the competition, it must be returned straight to the vehicle.

#### BB Gun

BB Guns are defined as a spring gun or air powered gun that shoots BB's. It must be smooth bore and weigh six pounds or less. No scopes allowed. BB Gun contestants will shoot 10 shots prone, 10 shots standing, 10 shots kneeling and 10 shots sitting (total of 40 shots) at 5 meters (16' 4¾").

\***H871946 - BB Gun - 8 years old**

\***H871947 - BB Gun - 9-10 years old**

\***H871948 - BB Gun - 11-12 years old**

\***H871949 - BB Gun - 13-15 years old**

#### Air Rifle

Air rifles are defined as the description in the CMP 2014-16 National Standard Three-Position Air Rifle Rules. Scopes will not be allowed. Air rifle contestants will shoot 10 shots prone, 10 shots standing and 10 shots kneeling (total of 30 shots) at 10 meters (32' 9¾").

\***H871950 - Air Rifle - 8-10 years old**

\***H871951 - Air Rifle - 11-12 years old**

\***H871952 - Air Rifle - 13-14 years old**

\***H871953 - Air Rifle - 15 years old and older**

#### Trap Shooting

Trap contestants will shoot 50 shots and also take a written test. There will be two rounds of 25 with 5 per station. A 10 shot shoot-off will break ties.

\***H871954 - Trap - 12-13 years old**

\***H871955 - Trap - 14-15 years old**

\***H871956 - Trap - 16 years old and older**

#### Archery

Archery contestants will shoot 10 arrows at 3 distances (30 shots total). Archery classes are defined as:

**Barebow:** arrows drawn by hand, no sights on bow or string

**Freestyle Limited:** arrows drawn by hand, no limit on sights or stabilizers

**Freestyle:** same as limited, but allows use of mechanical releases

\***H871957 - Archery (Barebow) - 8-11 years old**

\***H871958 - Archery (Barebow) - 12-14 years old**

\***H871959 - Archery (Barebow) - 15 years old and older**

\***H871960 - Archery (Freestyle Limited) - 8-11 years old**

\***H871961 - Archery (Freestyle Limited) - 12-14 years old**

\***H871962 - Archery (Freestyle Limited) - 15 years old and older**

\***H871963 - Archery (Freestyle) - 8-11 years old**

\***H871964 - Archery (Freestyle) - 12-14 years old**

\***H871965 - Archery (Freestyle) - 15 years old and older**

**Exhibits:** 4-H'ers enrolled in shooting sports may exhibit in the classes for the particular discipline(s) in which they are enrolled.

*Premiums will be paid to the exhibitors for exhibits in these classes.*

#### General Information:

- NO FIREARMS MAY BE EXHIBITED.
- All SHARP items (i.e. - knives, broadheads, etc.) must be enclosed in a secure display case. Display cases should be 12" x 18" x 4" and should be displayed so judges can open them to examine items. Items must be secured in the case.

- All exhibits must have a 5" x 8" card securely attached describing:

1. The project and how it applies to Shooting Sports;
2. Experience gained in making the project; and
3. How the project will be used.

- Information should be neatly written or typed on one side only of the card
- All exhibits should be self-explanatory and educational to viewers. Written explanations should be short and neat.
- Name and address of exhibitor must be on the back of each exhibit. This should be permanently written on the project to identify the owner if entry card becomes lost.
- Dangerous or improperly prepared exhibits will not be accepted.

\***H871966 - Archery Educational Display**-Poster or display concerning archery as part of the Shooting Sports project. Must be mounted on 1/4" or 3/8" plywood, masonite, or similar panel, 24" high x 22-24" wide. Displays may be three-dimensional not to exceed 2" from the face of the poster. Display may include safety, building, or using equipment, or any aspect of archery.

\***H871967 - Archery Accessory**-Any accessory such as quivers, targets, possible boxes, survival kits, etc. All items must be made by the exhibitor except for items such as a broadhead collection.

\***H871968 - Archery Equipment**-Includes all archery equipment which has been made by the exhibitor. NO BOWS are allowed due to safety and theft factors. Examples of acceptable items would include arrows, hand chipped flint arrow heads, etc. Bows made by exhibitor may be shown in a photograph story in this class.

\***H871969 - BB Gun/Air Rifle/Rifle Education Display**-Poster or display concerning bb gun/air rifle/rifle as part of the Shooting Sports project. Must be mounted on 1/4" or 3/8" plywood, masonite, or similar panel, 24" high x

22-24" wide. Displays may be three-dimensional not to exceed 2" from the face of poster. Display may include safety, building, or using equipment, or any aspect of bb gun/air rifle/rifle.

**\*H871970 - BB Gun/Air Rifle/Rifle Accessory**-Any accessory such as shooting mats, slings, targets, etc. that have been made by the exhibitor. All items must be safe to display. (NO FIREARMS)

**\*H871971 - BB Gun/Air Rifle/Rifle Equipment**-Includes equipment made by the exhibitor such as stocks, gun racks, target stands, etc. Custom fire-arms may be shown in a photo story in this class. (NO FIREARMS)

**\*H871972 - Shotgun Educational Exhibit**-Poster or display concerning shotguns as part of the Shooting Sports project. Must be mounted on 1/4" or 3/8" plywood, masonite, or similar panel, 24" high x 22-24" wide. Displays may be three-dimensional not to exceed 2" from the face of poster. Display may include safety, building, or using equipment, or any aspect of shotgun.

**\*H871973 - Shotgun Accessory**-Any accessory made by the exhibitor such as trap vests, trap bags, sling, etc. All items must be safe to display. (NO FIREARMS)

**\*H871974 - Shotgun Equipment**-Any equipment made by the exhibitor such as a custom stock or gun rack. (NO FIREARMS)

**\*H871975 - Shooting Sports Record Book**