Department H
Science, Engineering and Technology

All entries must be pre-entered on a General Entry Form at the York County Extension Office by the first Friday of July. All Exhibits will be judged on Wednesday of fair week in Ag Hall. Entries must receive a Purple ribbon at county fair and be selected to advance to State Fair.

Entomology

Pay Category 200

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

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

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

H800003 - Entomology Display, Third-Year or More Project Collection to consist of a minimum of 75 kinds (species) of insects representing at least 10 orders. Replace damaged or poorly mounted specimens.

About 25 species should be present from after July 1 of previous year. Limit of 3 boxes.

H800004 - Special Interest Display Educational display developed according to personal interests and/or advanced identification capability. This also is an opportunity to highlight favorite insects in a creative arrangement. Insects should conform to pinning and mounting standards as in Classes 1-3 and be protected in an insect box. Each specialty display should include names of the insects, interesting information about them, and why the display was made. Advanced identification collections should have insects grouped with labels that correspond with identification level (e.g. family, genus , species). A specialty collection may consist of insects by taxonomic group (e.g. butterflies, grasshoppers, dragonflies, scarab beetles) or by host, subject or habitat (e.g. insect pests of corn, aquatic insects, insect mimicry, insect galls, insects from goldenrod, insect pollinators, etc.).

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

H800006 - Macrophotography Subjects should be insects, spiders or other arthropods, or any nests, webs or constructions they make. All exhibit prints should be 8½" x 11" and mounted on rigid, black 11" X 14" poster or matt board. Either orientation is acceptable. No frames or mat board framing is allowed . A caption of a few

sentences should explain the subject and be printed on white paper and glued below the print on the poster board.

H800007 - Insect Poster/Display Exhibits 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.

H800008 - 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.

County Only Class

H800901 - Insectigator—Entries are to create an insect with insect characteristics. Insect creations may be constructed using any materials: including but not limited to: clay, egg cartons, paper, paper clips, packing peanuts, tape and glue, markers or paint, ribbon, beads, eyes, wire, yarn, pipe cleaners or plastic film. The created insect and display base if a base is used should be equal to or less than (12"x12") and no taller than 12". The created insect must be accompanied by a paper describing the created insect's anatomy such as legs and how they would use them to move; mouth parts and what they might eat; wings and how they might use them to fly; the coloration of the insect and why the coloration was selected for this insect to live with in its habitat.

Veterinary Science

Pay Category 200

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, history 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 projects including entry level exhibits from Unit I.

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:

1. 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.

Posters

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

Displays

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

Appropriate Veterinary Science Topics:

- Maintaining health
- Specific disease information
- Photographic display of normal and abnormal characteristics of animals
- Animal health or safety
- Public health or safety
- Proper animal management to ensure food

safety & quality
- Efficient and safe livestock working facilities
- Or a topic of the exhibitors choosing related to veterinary medicine or veterinary science

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

H840001 - 4-H Veterinary Science Large Animal Poster, Notebook or Display
H840002 - 4-H Veterinary Science Small Animal/ Pet Poster, Notebook or Display

Science, Engineering, & Technology Careers

Pay Category 200

General SET Rules:

1. The name, class number and county of each exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Each individual is limited to one exhibit per class. All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.
3. Several classes require a display board which should be a height of 24 inches and not to exceed 1/4-inch thickness. A height of 24 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 foot by 8-foot sheet of plywood. Nothing should be mounted within 3/4 inch of the top or bottom of the board. (Example: Woodworking & Electricity.)
4. Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.

5. Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
6. Demonstration boards should include an overall title for the display, plus other necessary labeling.
7. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned. All reports should be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
8. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations. Results: What you learned. All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

Careers

H930001 - Careers Interview (SF239) – Interview someone who is working in any field associated with science, engineer and technology and research that career (i.e. computer programmer, architect, engineer, pilot, etc.). Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12-point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

Aerospace / Rockets

See SET General Rules

Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations. Results: What you learned. All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

Rockets 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 (include original or photo of manufacture packaging stating rocket skill level)
2) a flight record for each launching (weather, distance, flight height)
3) number of launchings
4) flight pictures
5) Safety (how did you choose your launch site? Document safe launch, preparations, and precautions)
6) objectives learned
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 maximum launch points given on the score sheets. For scoring for the State Fair, only actual launches count, misfires will not count towards one of the required three launches.

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

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.

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

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

Pre-Flight - Unit 1 - County Only
H850901 - Any skill level 1 rocket
H850902 - Level 1 rocket Display

Lift Off - Unit 2
H850001 - Rocket (SF92) - Any Skill Level 2 Rocket with wooden fins painted by hand or air brush.
H850002 - Display (SF93)- 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 (SF92)- Any Skill Level 2 Rocket with wooden fins painted using commercial application ex. commercial spray paint

Reaching New Heights - Unit 3

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

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

H850006 - Rocket (SF92) - Any Skill Level 3 Rocket with wooden fins painted using commercial application example commercial spray paint.

Pilot In Command - Unit 4

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

H850008 - Display (SF93) - 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".

Computer Mysteries

See SET General Rules

Computer Mysteries - Unit 2

H860001 - 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".

H860002 - Produce a Computer Slideshow Presentation (SF277) Using presentation software. All slide shows for state fair should be emailed to Amy Timmerman atimmerman2@unl.edu before August 15. Files must be saved in a PC compatible format with county name and last name of participant before emailing. 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, 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 (SF276) – 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 (SF276) – Youth design a fully automated 2 to 5 minute 4-H "how to" video. Submissions should incorporate a picture or video of the 4-Her, as well as their name (first name only), age (as of January 1 of the current year), years in 4-H, and their personal interests or hobbies. Videos should be designed for web viewing. 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, Blog or App should be submitted on a CD-ROM in a plastic case along with the explanation of why the site was created. If developed using a WIKI or other online tool include a link to the website in the explanation of why the site was created.

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:

1. Software used to create 3D design.
2. Design or, if using a re-design, the original design and the youth's design with changes.
3. Orientation on how the object was printed.

H860008 - 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:

1. Software used to create 3D design.
2. Design or, if using a re-design, the original design and the youth's design with changes.
3. Orientation on how the object was printed.

H860009 - 3D Pen Creation: 3D pens rapidly melt and cool plastic filament allowing the 4-Her to draw in 3D. Youth may use original designs or use a template to create their 3D item. Exhibits will be judged based on the complexity of the design and shape. 3D pen creation will include a notebook with the following:

1. Copy of the template if used and description of any changes the youth created.
2. If no template used – an explanation of how the creation was built.
3. Must include paragraph of what the youth learned while creating their project (i.e. way to improve their next creation)
4. Paragraph on how 3D pens impact Science Engineering and Technology

Robotics

See General SET Rules

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

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

Creating a video of your robot in action would be helpful for the judges but is not mandatory present as a CD Rom with your robot entry.

H861001 - Robotics Poster (SF236)-Create a poster (14" X 22") communicating a robotics theme such as "Junk Drawer Robotics Level 3 & 4", "Robotics Engineering," "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 (SF237) – Explore a robotics topic in-depth and present your findings in a notebook. Documentation should include any designs, research, notes, pseudocode, data tables or other evidence of the 4-H'ers learning experience. The notebook should contain at least three pages. Topics could include a programming challenge, a programming skill, calibration, sensor exploration, any of the topics suggested in Class 001 or junk drawer robotics level 3 and 4.

H861003 - Robotics Video (SF238) – This class

should be displayed in a notebook. The notebook should include a video clip on a CD/DVD that demonstrates the robot performing the programmed function. Include your pseudo code and screenshots of the actual code with a written description of the icon/command functions. All videos for state fair should be emailed to Amy Timmerman atimmerman2@unl.edu before August 15. Files must be saved in a PC compatible format with county name and last name of participant before emailing.

H861004 - 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.

H861005 - Robotics Sensor Notebook (SF241) – Write pseudo code with a loop which includes at least one sensor activity. Include the code written and explain the code function.

H861006 - Build a Robot (may use kit) (SF243) – Include a robot and notebook including the pseudocodes for at least one program you have written for the robot, the robots purpose, and any challenges or changes you would make in the robot design or programming. If robot is more than 15" inches wide and 20" inches tall they may not be displayed in locked cases. We recommend that you submit the project under class H861003 – Robotics Video. Junk Drawer Robotics do not qualify. For State Fair, submit a video of robot in action to 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.

H861007 - Kit Labeled Robot (cannot be programmed.) (SF243) – This class is intended for explorations of robotic components such as arms or vehicles OR educational kits marketed as robots that do not have the ability to be programmed to "sense, plan and act." The exhibit should include a project the youth has constructed, a description of what it does and an explanation of how it is similar to and different from a robot. If robot is more than 15" inches wide and 20" inches tall they may not be displayed in locked cases. We recommend that you submit the project under class H861003 – Robotics Video.

Electricity

See SET General Rules

Wired for Power - Unit 3

H870001 - Electrical Tool/Supply Kit (SF224) - Create an electrical supply kit to be used for basic electrical repair around the house. Include a brief description of each item and its use. Container should be appropriate to hold items.

H870002 - Lighting Comparison (SF225) - 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/Item (SF226) - Show an application of one of the concepts learned in the Wired for Power project. Examples include: re-wiring or building a lamp, re-wiring or making a heavy duty extension cord or developing an electrical diagram of a house. Exhibit could be a poster display, or an actual item

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

Electronics - Unit 4

H870005 - Electrical/Electronic Part Identification (SF228) - 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 (SF229) - 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).

H870007 - Electronic Project (SF230) - Exhibit an electronic item designed by the 4- Her 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.

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

Geospatial

See SET General Rules

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

H880001 - Poster (SF299) - Create a poster (not to exceed14" 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 (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".

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

H880004 - Geocache (SF301) - 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, geo-coins, etc. for the finders to trade. Documentation should include a title, teaser description and the geographic coordinates of intended placement. Register the site at 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 Mapping (SF302) – 4-Hers will assemble a notebook that will include a minimum of 2 digital copies of various data layers that can be used in precision agriculture to identify spatial patterns and/or correlations (printed copies of websites were applications can be purchased is acceptable) A report of how the analysis of the various data will be used to make a management decision.

H880007 - 4-H History Map Preserve 4-H History:

Nominate a Point of Interest for the 4-H History Map Project include copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to http://arcg.is/1bvGogV For more information about 4-H history go to http://www.4-hhistorypreservation.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)

H880008 - 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.

Alternative / Renewable Energies

See SET General Rules

H900001 - Create and Compare Energy Resources Poster – Poster should explore 2 alternative/renewable energy resources. Compare and contrast the 2 resources including two of the following information: amount of energy created, costs of production, usability of the energy, pros/ cons of environmental impacts, etc. Posters can be any size up to 28" by 22."

H900002 - Experiment Notebook (SF…) – Notebook will explore the scientific method involving

alternative/renewable energy sources. Information required. 1.) Hypothesis 2.) Research 3.) Experiment 4.) Measure 5.) Report or Redefine Hypothesis.

H900003 - Solar as Energy Display (SF….) - Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of water. Examples include solar ovens, solar panels, etc.

H900004 - Water as Energy Display (SF….) - Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of water.

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

H900006 - Other Nebraska Alternative Energy (SF..) –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.

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 blueprints) stating dimensions and other critical instructions a builder

would need to know how to build the project. Plans may include narrative instructions in addition to the dimension drawings and include any alternations to the original plan. Part of the score depends on how well the project matches the plans. If the plans are modified, the changes from the original need to be noted on the plans. All plans used for making the article must be securely attached and protected by a clear plastic cover.

4-H'ers must be in Unit 3 or Unit 4 for the exhibit to be considered for State Fair. All projects must have appropriate finish. If the project (i.e. picnic tables, wishing wells, swings, chairs, bridges, doghouses, etc.) is designed to be used outside, it will be displayed outside.

All exhibits must have appropriate finish.

Measuring Up - Unit 1
County Fair Only Classes

H911901 - Article item made using skills learned in the Measuring Up project. Examples include: recipe holder, stilts or other skill level appropriate item.

H911902 - Display exemplifying one of the principles learned in the Measuring Up project. Examples include: safety, tools and proper way to use them, etc.

Making the Cut - Unit 2
County Fair Only Classes

H911903 - Article - item made using skills learned in the Making the Cut project. Examples include: birdhouse, foot stool, napkin or letter holder.

H911904 - Display exemplifying one of the principles learned in the Making the Cut project. Examples include: woodworking careers, different wood species, sanding, types of finishes, etc.

Nailing it Together - Unit 3

H911001 - Woodworking Article (SF91) - Item made

using skills learned in the Nailing it Together manual. Examples include: bookcase, coffee table or end table.

H911002 - Woodworking Display (SF91) - Display exemplifying the principles learned in the Nailing it Together Project. Examples include: measuring angles, wood lamination and joint types.

H911005 - 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?)

Finishing Up - Unit 4

H911003 - Woodworking Article (SF91) - Item made using skills learned in the Finishing it Up Project. Examples include: dovetailing, making a pen using lathe, overlays, using a router, etc.

H911004 - Woodworking Display (SF91) - 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 (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?)

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.

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:

1. Suggested coupon thickness- ¼" if using 1/8" rod
2. Suggested rod-AC and DC straight or reverse polarity- first E-7014, second E-6013

MIG welding

1. Suggested coupon thickness--¼" if using .035 wire and 1/8" if using .023 wire

Oxy-Acetylene

1. Suggested coupon thickness– 1/8"
2. 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

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.

H920001 - Welding Joints (SF281) -a display of one butt, one lap and one fillet weld.

H920002 - Position welds (SF281) -a display showing three beads welded in the vertical down, horizontal and overhead positions.

H920003 - Welding article (SF281) -any shop article where welding is used in the construction. All plans and bill of materials must be attached to the article. Protect plans with a cover.

NOTES: