

# SCIENCE, ENGINEERING & TECHNOLOGY

## CHECK IN:

Tuesday, August 2, 2016 from 6:00 - 8:00 p.m.  
& Wednesday, August 3, 2016 from 7:30 – 9:00 a.m.

## JUDGING TIME:

Wednesday, August 3, 2016 beginning at 9:30 a.m. (closed to public)

## PREMIUMS:

Purple \$2.00; Blue \$1.50; Red \$1.00; White \$0.50

## GENERAL GUIDELINES

- A. The name and county of each exhibitor should appear separately on the back of each board, article and set of plans so the 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 with a height of 24 inches and not to exceed 1/4" 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 3/4inch of the top or bottom of the board. (Example: Woodworking & Electricity).
- D. Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
- E. Demonstration boards could be sanded and finished to improve their appearance. The finish on a demonstration board is not to be judged as critically as a woodworking exhibit.
- F. Demonstration boards should include an overall title for the display, plus other necessary labeling.
- G. All 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.

- b. a flight record for each launching (weather, distance, flight height)
- c. number of launchings and
- d. flight pictures

- 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. Judging is based upon display appearance, rocket appearance, workmanship, design or capabilities for flight, and number of times launched. Three launches are required to earn the 25 launch points given on the score sheets. For scoring for the State Fair, only actual launches count, misfires will not count towards one of the required three launches.
- For self- designed rockets only, please include a digital recorded copy of one flight. In the documentation please include a description of stability testing before the rocket was flown.
- 4-H Rocket project levels are not intended to correspond to National Association of Rocketry model rocket difficulty ratings or levels.

## INTERVIEW JUDGING / PROJECTS INCLUDE: Aerospace Projects (Dept H/Div. 850)

4-H members are encouraged to participate in interview judging. Interview judging allows 4-H members to discuss their 4-H exhibits directly with the judge. This will give 4-H members the opportunity to discuss the process they took preparing their project. In addition, interview judging will give judges the opportunity to provide positive input and helpful suggestions to the 4-H member. REQUEST FOR INTERVIEW JUDGING:

- Department Superintendents are to be notified when a 4-H project is entered by a 4-H member intending to Interview Judge.
- Entry cards of 4-H exhibits must designate Interview Judging Request by checking the "INTERVIEW" box at the upper right corner (above "Dodge County Fair") of the entry card.
- **Exhibitors are limited to ONE interview entry per division (project area).**

TIME: (Optional) Interview Judging / Wednesday, August 3 by appointment / 4-H Exhibit Hall

- Exhibitors will make appointments (9:30 am-3:00 pm) with superintendent at time of check in.

INTERVIEW JUDGING IS OPTIONAL:

- Projects are not required to be interview judged. Therefore, no projects will be deducted a ribbon placing for not interview judging.

## AEROSPACE

**INTERVIEW JUDGING OPPORTUNITY**  
Wednesday, August 3 by Appointment

**STATE FAIR ENTRIES:**  
Premier 4-H Science Award is available in this area.

## AEROSPACE GUIDELINES

- Rockets should be supported substantially to protect it from breakage. Rockets should 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"x12"), 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 should 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 recover system.
- Rockets entered with live engines, wrong base size or sideboards will be disqualified.
- A report, protected in clear plastic cover, should include:
  - a. rocket specification,

DEPT. H / DIV. 850

## AEROSPACE

### AEROSPACE 2

Class 1 Rocket: Any skill level 2 rocket with wooden fins painted by hand or air brush.

Class 2 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".

Class 3 Rocket: Any Skill Level 2 Rocket with wooden fins painted using commercial application example commercial spray paint.

### AEROSPACE 3

Class 4 Rocket: Any skill level 3 rocket with wooden fins painted by hand or air brush.

Class 5 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".

Class 6 Rocket: Any Skill Level 3 Rocket with wooden fins painted using commercial application example commercial spray paint.

### AEROSPACE 4

Class 7 Rocket: Any skill level 4 rocket with wooden fins or any self designed rocket. Designated for single and multiple stage rockets at skill level 4 or any single or multiple stage self design rocket.

Class 8 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".

### CAREER EXPLORATION

Class 20 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.

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# COMPUTERS

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**STATE FAIR ENTRIES:**  
**Premier 4-H Science Award is available in this area.**

## COMPUTER GUIDELINES

All Computer Projects containing E-mail addresses need to black out personal E-mail addresses for the protection of each exhibitor.

DEPT. H / DIV. 860  
COMPUTERS

### COMPUTER MYSTERIES – UNIT 2

Class 1 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 (2 cards or 2 different individuals and businesses); menu (minimum of 2 pages including short description of foods and pricing); cd cover (front and back); book layout (I-book); promotional flyer (2 flyers promoting 2 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 and;

2. Print out of your project. Project may be in color or black or white.

Class 2 Produce a Computer Slideshow Presentation – Using presentation software. All county fair projects with a printout should be saved on a CD Rom to be submitted for county fair. Slides should include a minimum of 10 slides and no more than 25. Incorporate appropriate slide layouts, graphics and animations. Each slide should include notes for a presenter. All slideshows must be up loaded.

### COMPUTER MYSTERIES – UNIT 3

Class 4 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.

Class 5 Know How Know Now Computer 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.

Class 6 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 Irfan View 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.

Class 7 3D Printing – 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 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.

Suggested ideas: (1) 3D PROTOTYPES: 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. (2) 3D UNIQUE OBJECT: 3D objects printed for their own sake. May be an art design, tool, or other object.

### CAREER EXPLORATION

Class 10 Careers Interview: Interview someone who is working in the field of computers 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.

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# ELECTRICITY

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**STATE FAIR ENTRIES:**  
Premier 4-H Science Award is available in this area.

DEPT. H / DIV. 870

## ELECTRICITY

### POSTERS:

The following 4-H electricity related posters (classes 901 and 902) exhibiting and judging should refer to Department B, Division 152, Posters, for general requirements. **Exhibits from these classes (901-902) are NOT eligible to go on to State Fair**

- Class 901 **Electricity Safety Poster:** Must deal with a specific topic. EXAMPLE: "Overhead Power Line Safety," "Safety In The Home", "On Farm Safety."
- Class 902 **Electric Energy Conservation:** Must show useful methods of efficient use of electrical energy and conservation.

**ELECTRICITY CLASSES:** The following 4-H Electricity Exhibits should refer to the 4-H Electricity Manuals for general guidelines.

### ELECTRIC EXCITEMENT 1

**Exhibits from these classes (903-906) are NOT eligible to go on to State Fair**

- Class 903 **Bright Lights:** Create your own flashlight using items found around your house. Flashlights should be made out of items that could be recycled or reused. No kits please.
- Class 904 **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.
- Class 905 **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.
- Class 906 **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 EXCITEMENT 2

**Exhibits from these classes (907-909) are NOT eligible to go on to State Fair**

- Class 907 **Case of the Switching Circuit:** Use the following items: two D cell batteries, two battery holders, light bulb, bulb holder, a 3 inch by 6 inch piece of cardboard, six brass paper fasteners and approx. two feet of 24 gauge insulated wire to build a three way switch. Write a short essay or create a poster that illustrates how three way switches function.
- Class 908 **Rocket Launcher:** Construct a rocket launcher out of the following materials: a plastic pencil box that is at least 4 inches by 8 inches, single pole switch, single throw switch, normally-open push button switch, 40 feet of 18 or 22 gauge stranded wire, 4 alligator clips, 2- by 6- board 6 inches long, 1/8 inch diameter metal rod, rosin core solder, soldering iron or gun, wire stripper, small crescent wrench, pliers, small Phillips and straight blade screwdrivers, drill, 1/8 inch and 1/4 inch drill bits, rocket engine igniters, additional drill bits matched to holes for two switches. You must successfully build a rocket launcher and light two rocket igniters with your launcher. You DO NOT have to actually fire a rocket off of the launcher. Create a poster using photographs to show the "step by step process" you used to build your launcher.

- Class 909 **Stop the Crime:** Build an ALARM using the following materials: On-off push button switch, mercury switch, buzzer-vibrating or piezoelectric, 9-volt battery, 9-volt battery holder, 4 inch by 4 inch by 1/8 inch Plexiglass board to mount circuit on; rosin core solder, soldering gun/iron, two feet of 22 gauge wire, wire strippers, hot glue gun 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.

### ELECTRIC EXCITEMENT 3

- Class 1 **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.
- Class 2 **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.
- Class 3 **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.
- Class 4 **Poster** should exemplify one of the lessons learned in the Wired for Power Project. Posters can be any size up to 28" by 22".

### ELECTRIC EXCITEMENT 4

- Class 5 **Electrical/Electronic Part Identification:** Display different parts used for electrical/electronic work. Exhibit should show the part (either picture or actual item) and give a brief description, including symbol of each part and its function. Display should include a minimum of 10 different parts.
- Class 6 **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).
- Class 7 **Electronic Project:** Exhibit an electronic item designed by the 4-Her or from a manufactured kit that shows the electronic expertise of the 4-Her. Examples include: a radio, a computer, or a volt meter.
- Class 8 **Poster** should exemplify one of the lessons learned in the Entering Electronics project. Posters can be any size up to 28" by 22".

### CAREER EXPLORATION

- Class 10 **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.

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# ROBOTICS

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**STATE FAIR ENTRIES:**  
Premier 4-H Science Award is available in this area.

DEPT. H / DIV. 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 within this division.**

**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.**

- Class 1 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.
- Class 2 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.
- Class 3 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 pseudocode and screenshots of the actual code with a written description of the icon/command functions.

#### CAREER EXPLORATION

- Class 4 CAREER INTERVIEW – Interview someone who is working in the field of robotics and research the career in robotics. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12 point font, and 1” margins. Written reports should be between 3 to 5 minutes in length.
- Class 5 Robotics Sensor Notebook – Write pseudocode which includes at least one sensor activity. Include the code written and explain the code function.
- Class 6 Build a Robot (may use kit) –Include a robot and notebook including the pseudo codes 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.
- Class 7 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.” This 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.

DEPT. H / DIV. 880

#### GEOSPACIAL

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

- Class 1 Poster – Create a poster (not to exceed 14”x22”) communicating a GPS theme such as How CPS 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.
- Class 2 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”.
- Class 3 GPS Notebook – Keep a log of at least 5 places visited using a GPS enables 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.
- Class 4 Geocache – Assemble a themed geocache. Each geocache should be a watertight 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](http://www.geocaching.com), include a print-out of its registry.** The entry may include a photograph of the cache in its intended hiding place.

- Class 5 GIS Map – Create a GIS map with at least three data layers. The GIS should include both vector and roster data. Data may be obtained by using a GPS-enabled device, downloading data from a reputable web site or digitizing. The GIS should have a theme/purpose and include a title, north arrow, legend, labels, scale bar and source. Maps may be of any subject of interest to the 4-Hers. Include a 1-3 page report on why you chose the subject and maps, how you created the maps and the source of your data (use reliable sources such as the US Center for Disease Control or the US Census Bureau). This project could include Hurricane Tracking maps. Create a GIS map for Hurricane Tracking with a geographic information system (GIS) computer software application of the Atlantic Ocean, Pacific Ocean, or the Gulf of Mexico. The map should appear similar to the National Oceanic and Atmospheric Administration (NOAA) (<http://www.nhe.noaa.gov/>). Poster size should not exceed 22”x30”. Place report in plastic cover or notebook attached to the poster.
- Class 6 GIS Thematic Map – Using any GIS software, create a thematic map. Thematic maps can utilize any subject of interest to the 4-Her. Maps could be of Amelia Earhart’s journey, Sit Francis Drake’s voyage, population density maps, water usage maps, or 4-H projects in Nebraska (examples). Create a GIS Map using data from books and /or internet. Use reliable date, ex. U.S. Center for Disease Control or U.S. Census Bureau. Map any size up to 36”x24”, should include title, base map, neat line, north arrow, and legend. Identify the source of your information on the back of the map.
- Class 7 4-H History Map – Preserve 4-H History: Nominate a Point of Interest for the 4-H History Map Project include copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to <http://arcg.is/1bvGogV> For more information about 4-H history go to [http://4hhistorypreservation.com/History\\_Map/](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)

#### CAREER EXPLORATION

- Class 10 Careers Interview – Interview someone who is working in a Geospatial field and include research that career. Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12 point font, and 1” margins. Multimedia reports should be between 3 to 5 minutes in length.

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## WELDING

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**STATE FAIR ENTRIES:  
Premier 4-H Science Award is available in this area.**

#### WELDING GUIDELINES

All metal welding process accepted. 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 weld when necessary. Each weld should be labeled with information stating:

- 1) type of welding process (stick, MIG, TIG, Oxy-Acetylene, etc.)
- 2) kind of weld
- 3) welder setting
- 4) electrode/wire/rod size

5) electrode/wire/rod ID numbers.  
Attach a wire to display board so it can be hung like a picture frame.

## DEPT. H / DIV. 920

### ARC WELDING

Class 1 Welding Joints: A display of one butt, one lap and one fillet weld.

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

- 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  
Suggest rod –AC and DC straight or reverse polarity – first E-7014, second E-6013

#### MIG welding

Suggested coupon thickness—1/4" is using .035 wire and " if using .023 wire

#### Oxy – Acetylene

Suggested coupon thickness—1/8"  
Suggested rod – 1/8" mild steel rod

Class 2 Position Welds: A display showing 3 beads welded in the vertical down, horizontal and overhead positions.

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

- 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 Welding Article: Any shop article or piece of furniture where welding is used in the construction. All plans and bills must be attached to the article. Protect plans with a cover.

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

- 1) All welds should be cleaned and protected from rust with paint or light oil. Plans are to be complete enough that if they were given to a welding shop, the item could be made without further instructions. Bill of materials should include a cost for all items used including steel, electrodes, paint, wheels, etc.
- 2)

### CAREER EXPLORATION

Class 4 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.

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# WIND ENERGY

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**STATE FAIR ENTRIES:**  
**Premier 4-H Science Award is available in this area.**

DEPT. H / DIV. 900

### THE POWER OF WIND

- Class 1 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 cover.
- Class 2 Wind Poster – Poster should exemplify one of the lessons learned in the Power of Wind project. Posters can be any size up to 14" by 22".
- Class 3 Mini Turbine Blade Energy Display – Develop a pinwheel display that demonstrates the working power of wind. Follow guidelines on page 18 and 19 of your manual. Display should include a notebook description of the effectiveness of at least three different designs or materials. Please do not include pennies with your display.
- Class 4 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.
- Class 5 Wind as Energy Display – 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'x2'. Include a notebook of why the item was designed and how it harnesses the power of wind.

### CAREER EXPLORATION

Class 10 Careers Interview – Interview someone who is working in the field of wind and research the career in wind. 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.

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# WOODWORKING

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INTERVIEW JUDGING OPPORTUNITY  
Wednesday, August 3 by Appointment

STATE FAIR ENTRIES:  
Premier 4-H Science Award is available in this area.

## WOODWORKING GUIDELINES

- 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. 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 attached and protected by a clear plastic cover and include the exhibitors name and county.
- **4-Hers may enter 2 items per class number for woodworking projects ONLY!**
- 4-H'ers must be in your third or fourth year of a woodworking project to exhibit in woodworking classes at the State Fair.

DEPT. H / DIV. 911

## WOODWORKING

### WOODWORKING WONDERS 1

**Exhibits from these classes are NOT eligible to go on to State Fair**

- Class 904 Woodworking Article: Item made using skills learned in the Measuring Up manual. Examples include: flower box, napkin holder or letter holder, or picture frame.
- Class 905 Woodworking Display: Display exemplifying one of the principles learned in the Measuring Up project. Examples include: name the tools, safety settings, identifying woods, measuring, butt joint, sanding.

### WOODWORKING WONDERS 2

**Exhibits from these classes are NOT eligible to go on to State Fair**

- Class 906 Woodworking Article: Item made using skills learned in the Making the Cut manual. Examples include: tool box, birdhouse, sawhorse, whistle, or foot stool.
- Class 907 Woodworking Display: Display exemplifying one of the principles learned in the Making the Cut project. Examples include: safety techniques, interview a carpenter, selecting wood, cutting on an angle, chiseling, scrolling, power sanding.

### WOODWORKING WONDERS 3

- Class 1 Woodworking Article: Item made using skills learned in the Nailing it Together manual. Examples include: bookcase, coffee table or end table.
- Class 2 Woodworking Display: Display exemplifying one of the principles learned in the Nailing it Together Project. Examples include: measuring angles, wood lamination and joint types.

- Class 3 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?)

### WOODWORKING WONDERS 4

- Class 4 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.
- Class 5 Woodworking Display: Display exemplifying one of the principles learned in the Finishing It Up project. Examples include: career opportunities, types of finishes, or dovetailing.
- Class 6 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?)

### CAREER EXPLORATION

- Class 10 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.