

than 22" x 28". The 4-H member's name, age, county, and years in the project(s) must be on the back of the poster.

\*\*G777908

### **Renovate The Outdoors Portfolio (Scoresheet CF111)**

Select a space that you would like to redesign. The space can be at your home, a family member's or friend's house, or somewhere in your community. Develop a scaled base map of the site and locate the existing plants and structures in the landscape. Take photographs of the landscape. Evaluate the physical properties of the site and conduct an interview with the people who live there or use the space. Think about how you would change the space and develop a plan that would implement design elements into the space. Create different drawings that will move you through the design process. You will draw concept diagrams, form compositions, preliminary drawings, and the final design. Once the final design drawing is complete, use overlays on the original photographs to show how the landscape will look compared to how it looked in the photo you originally took of the landscape. Place photographs, interview notes, concept and program statements and drawings in a portfolio. The 4-H member's name, age, county, and years in the project(s) must be on the back of the portfolio.

## **SCIENCE, ENGINEERING, and TECHNOLOGY (SET)**

### **AEROSPACE (Rockets/Drones)**

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

#### **RULES:**

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. **Rocket Mounting** - 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.
3. The rockets must be mounted vertically. Please do not attach sideboards or backdrops to the displays. In addition, a used engine or length of dowel pin is to be glued and/or screwed into the board and extended up into the rockets engine mount to give added stability.
4. Rockets must be equipped as prepared for launching, with wadding and parachute or other recovery system. Rockets entered with live engines, wrong base size or sideboards will be disqualified.
5. **Report** - A report, protected in 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, and flight height), 3) number of launchings, 4) flight pictures, 5) Safety (How did you choose your launch site? Document safe launch, preparations, and precautions), 6) objectives learned, and 7) conclusions.
6. The **flight record** should describe 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.
7. Complete factory assembled rockets will not be accepted.
8. **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, only actual launches count, misfires will not count towards one of the required three launches.
  - a. 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.
  - b. **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.**
  - c. 4-H Rocket project levels are not intended to correspond to National Association of Rocketry model rocket difficulty ratings or levels.

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

**All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair. Entry level rockets, made with PLASTIC FINS and PLASTIC BODY TUBES, are COUNTY ONLY projects.**

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

Scoresheets can be found at <https://go.unl.edu/ne4haerospace>.

## **AEROSPACE/ROCKETS Classes**

### **County Only Classes (\*\*Denotes NOT State Fair Eligible) (Scoresheet CF92)**

PREMIUMS: Purple, \$2.25; Blue, \$1.60; Red, \$1.20; and White, \$.60

Directions can be found in the Aerospace Manuals.

- \*\*H850901 **Kite** - Kite must be homemade, no purchased kits.
- \*\*H850902 **Model Airplane or Glider**
- \*\*H850903 **Rocket** - Any skill level rocket with plastic fins
- \*\*H850904 **Rocket** - Any skill level rocket with wooden fins and plastic body tubes

Youth enrolled in Aerospace 2, 3, or 4 may exhibit in any classes 1-6.

PREMIUMS: Purple, \$3.50; Blue, \$2.75; Red, \$1.80; and White, \$.90

- H850001 **Rocket (Scoresheet SF92)**  
Any Skill Level Rocket with **wooden fins and cardboard body tubes** painted by hand or air brush.

PREMIUMS: Purple, \$2.25; Blue, \$1.60; Red, \$1.20; and White, \$.60

- H850002 **Aerospace Display (Scoresheet SF93)**  
Poster or Display Board that displays or exemplifies one of the principles learned in the Lift Off project. Examples include: display of rocket parts and purpose, explains the parts of a NASA rocker or shuttle, interview of someone in the aerospace field, or kite terminology. Include notebook containing terminology (definition), and what was learned. Display can be any size up to 28" by 22".

PREMIUMS: Purple, \$3.50; Blue, \$2.75; Red, \$1.80; and White, \$.90

- H850003 **Rocket (Scoresheet SF92)**  
Any Skill Level Rocket with **wooden fins and cardboard body tubes** painted using commercial application (example commercial spray paint).

PREMIUMS: Purple, \$5.00; Blue, \$3.75; Red, \$2.50; and White, \$1.25

- H850004 **Self-Designed Rocket (Scoresheet SF92)**  
Any Self-Designed Rocket with **wooden fins and cardboard body tubes**.

## **DRONES**

PREMIUMS: Purple, \$2.25; Blue, \$1.60; Red, \$1.20; and White, \$.60

- H850005 **Drone Poster (Scoresheet SF93)**  
Exhibit must be designed to educate yourself and others on one or more of the following topics: drone technologies, use of drones, the different types of drones, types of training needed to operate drones, and the laws and regulations users must follow. Posters can be any size up to 28" by 22".

PREMIUMS: Purple, \$2.25; Blue, \$1.60; Red, \$1.20; and White, \$.60

H850006 **Drone Video (Scoresheet SF93)**

Exhibit must demonstrate how the drone interacts with the outside world. Examples include: field scouting, surveying damage from natural disasters, drones used in commercial applications and settings, and drones used for structural engineering. Video should not exceed 5 minutes. Videos should also be uploaded to a video streaming application and exhibitors must provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions.

## COMPUTERS

This category gives 4-H'ers a chance to display their knowledge of computers. Through participation in this category 4-H'ers will develop presentations that show judges their knowledge in the different aspects of computer science. Involvement in SET Computers gives participants a first-hand experience in modern technology.

### **RULES:**

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Demonstration boards should include an overall title for the display, plus other necessary labeling.
3. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned.) All reports should be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
4. Please refer to the State Fair General Rules & Info for the policy regarding firearms, items with a blade, and other related items.
5. Please refer to the General Rules for the policy regarding use of copywritten images.
6. Premier 4-H Science Award is available in this area.
7. **Team Entries:** To qualify for entry at the Nebraska State Fair team materials entered in H860007-Maker Space/Digital Fabrication must clearly be the work of a team instead of an individual, and must have at least 50% of all team members enrolled in 4-H. 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.

**All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.**

Please see General Information for more details.

Scoresheets can be found at <https://go.unl.edu/ne4hcomputers>.

### **COMPUTERS, CLASSES**

PREMIUMS: Purple: \$2.25; Blue: \$1.60; Red: \$1.20; White, \$.60

#### **COMPUTER MYSTERIES UNIT 1 (\*\*Denotes NOT State Fair Eligible)**

\*\*H860901 **Create a Poster (Scoresheet CF83)**

Poster on a lesson learned in Unit 1. Examples might include: hardware, software programs, how to take care of a computer and operating systems. Posters can be 14" x 22" either in vertical or horizontal arrangement.

\*\*H860902 **Computer Designed Greeting Cards (Scoresheet CF83)**

Exhibit will consist of six greeting cards, each for a different occasion/holiday. Exhibit should be created on 8 ½ x 11 paper using a commercially available graphics program and a color printer/plotter or single color printer/plotter. The cards should vary in folds and design. Prefabricated cards from commercially available card programs will NOT be accepted. No theme required. May be displayed on poster or in a 3-ring notebook.

\*\*H860903 **Scanner Display (Scoresheet CF83)**

Exhibit will consist of one or more pictures scanned into your computer and printed on your printer. Exhibit should explain what hardware and software was used to create it.

#### **COMPUTER MYSTERIES UNIT 2**

H860001 **Computer Application Notebook (Scoresheet SF277)**

4-H exhibitor should use computer application to create a graphic notebook utilizing computer

technology. 4-H'ers may create any of the following:

- greeting card (5 different cards such as a birthday, wedding, anniversary, sympathy, get well, or other);
- a business card (3 cards for 3 different individuals and businesses);
- menu (minimum of 2 pages including short description of foods and pricing);
- book layout (I-book);
- promotional flyer (3 flyers promoting 3 different events);
- newsletter (minimum 2 pages);
- or other: examples such as precision farming or family business logo, etc.

This exhibit consists of a notebook (8.5" x 11" 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 (Scoresheet SF276)** – Using presentation software a 4-H exhibitor designs a multimedia computer presentation on one topic related to youth. A notebook with a printout of all the slides should be submitted. Slideshow should include a minimum of 10 slides and 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 uploaded. The presentation must be able to be played and viewed on a PC using Windows Media Player, Real Player, iTunes or Quick Time Player. (For State Fair – entries should be submitted to <https://go.unl.edu/2023nesfset> by August 15th, 2023, or videos can be uploaded to a video streaming application and exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions.)

### COMPUTER MYSTERIES - UNIT 3

- H860003 **Produce an Audio/Video Computer Presentation (Scoresheet SF276)**  
Using presentation software, a 4-H exhibitor designs a multimedia computer presentation on one topic related to youth. A notebook with a printout of all the slides should be submitted. The presentation should be at least 2 minutes in length and no more than 5 minutes in length, appropriate 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 Quick Time Player. (For State Fair: entries should be submitted to <https://go.unl.edu/2023nesfset> by August 15th, 2023, or videos can be uploaded to a video streaming application and exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions.)
- H860004 **How to STEM (Science, Technology, Engineering and Math) Presentation (Scoresheet SF276)** - Youth design a fully automated 2 to 5 minute 4-H "how to" video. Submissions should incorporate a picture or video of the 4-Her, as well as their name (first name only), age (as of January 1 of the current year), years in 4-H, and their personal interests or hobbies. Videos should be designed for web viewing or may be uploaded to a video streaming application and exhibitors can provide a hard copy QR code for public viewing. Any of the following formats will be accepted: .mpeg, .rm, .wmv, .mp4, .mov, .ppt, or .avi. (For State Fair: entries should be submitted to <https://go.unl.edu/2023nesfset> by August 15th, 2023, or videos can be uploaded to a video streaming application and exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions.)
- H860005 **Virtual Platform Presentation** – Youth design a fully automated education presentation (video, notebook, poster, etc.) The presentation must be able to be played and viewed on a PC using Windows Media Player, Real Player, iTunes or Quick Time Player. (For State Fair: entries should be submitted to <https://go.unl.edu/2023nesfset> by August 15th, 2023, or videos can be uploaded to a video streaming application and exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions.)

- H860006 **Create a Website, Blog or App (Scoresheet SF275)**  
 Design a simple Website, Blog or App for providing information about a topic related to youth. Examples include, 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 Website, Blog or App isn't live, include all files comprising the Website, Blog or App. Should be submitted on a flash drive in a plastic case along with the explanation of why the site was created or may be shared through a hard copy share link or QR code for viewing. If developed using a WIKI or other online tool include a link to the website in the explanation of why the site was created. (For State Fair: entries should be submitted to <https://go.unl.edu/2023nesfset> by August 15th, 2023, or videos can be uploaded to a video streaming application and exhibitors **MUST** provide a hard copy QR code for viewing. Exhibitors are encouraged to test their codes or links on several devices to check for appropriate permissions.)
- H860007 **3D Printing (Scoresheet SF1050)**  
 3D printing uses plastic or other materials to build a three-dimensional (3D) object for a digital design (including 3D Pen Creation). Youth may use original designs or someone else's they have re-designed in a unique way. Exhibits will be judged based on the motivation and/or problem identified. For example, 3D objects printed as part of the design process for robot or other engineering project. Must include design notebook that addresses the following questions:
1. What was the motivation for your design or the problem you were solving with your design? i.e. Is your item a functional or decorative piece?
  2. Please include a picture of original design, citation of designer/website OR if design is completely original (you created it using CAD software), then state that it's original. If item was not completely original, indicate what you did to the original design to modify it to better meet the design problem stated in #1 above. Its design was modified multiple times, please indicate what change was made with each modification, and what prompted the need for the change. i.e. I printed it and the design was too fragile, so I resliced the print to make thicker external walls, or it have a denser infill.
  3. Define your process for designing/printing. What software and/or hardware was used (indicate type of 3D printer or if item was created with 3D pen)?
  4. What materials were selected for your project?
  5. If your final design has any moving parts, define how you determined appropriate allowance in your design.
  6. Identify any changes that you would make to improve your design.
- H860008 **Maker Space/Digital Fabrication (Scoresheet SF1051)**  
 This project is a computer generated project created using a laser cutter, vinyl cutter, heat press or CNC router. Vector or 3D based software such as CorelDRAW or Fusion 360 would be an example of an appropriate software used to create your finished project. Project should include a notebook with the following:
1. What motivated you to create this project.
  2. Software and equipment used.
  3. Directions on how to create this project.
  4. Prototype of plans.
  5. Cost of creating project.
  6. Iterations or modifications made to original plans.
  7. Changes you would make if you remade the project.
- Team Entry Option: To qualify for entry materials entered in H860007 – Maker Space/Digital Fabrication must clearly be the work of a team instead of an individual, must have at least 50% of all team members enrolled in 4-H. Additionally, all enrolled 4-H members on the team should complete and attach an entry tag to the material. A supplemental page documenting the individual contributions to the project should be included. The entry will be judged as a team, with all team members receiving the same ribbon placing.

## ELECTRICITY

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

## **RULES:**

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

**All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.**

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

Scoresheets can be found at <https://go.unl.edu/ne4helectricity>.

### **ELECTRICITY - MAGIC OF ELECTRICITY - UNIT 1 (\*\*Denotes NOT State Fair Eligible)**

PREMIUMS: Purple, \$2.00; Blue, \$1.50; Red, \$1.00 and White, \$.50 (**Scoresheet CF224**)

\*\*H870901 **Switch** (see page 13 of manual for instructions)

\*\*H870902 **Electromagnet** (see page 29 of manual for instructions)

### **ELECTRICITY - INVESTIGATING ELECTRICITY - UNIT 2 (\*\*Denotes NOT State Fair Eligible)**

PREMIUMS: Purple, \$2.00; Blue, \$1.50; Red, \$1.00 and White, \$.50 (**Scoresheet CF225**)

\*\*H870903 **Rocket Launcher** - Build a rocket launcher and create a poster using photographs to show the "step by step process" you used to build your launcher (instructions available at the Extension Office).

\*\*H870904 **Burglar Alarm** - Build a burglar alarm and create a poster using photographs to show the "step by step process" you used to build your alarm (see page 33 of manual for instructions).

### **ELECTRICITY - WIRED FOR POWER - UNIT 3**

PREMIUMS: Purple, \$3.25; Blue, \$2.50; Red, \$1.60; and White, \$.80

H870001 **Electrical Tool/Supply Kit (Scoresheet SF224)**

Create an electrical supply kit to be used for basic electrical repair around the house. Include a brief description of each item and its use. Container should be appropriate to hold items.

H870002 **Lighting Comparison (Scoresheet 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 (Scoresheet SF226)**

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

PREMIUMS: Purple, \$1.75; Blue, \$1.35; Red, \$1.00; and White, \$.60

H870004 **Poster (Scoresheet SF227)**

Poster should exemplify one of the lessons learned in the Wired for Power project. Posters can be any size up to 28" x 22".

### **ELECTRICITY - ENTERING ELECTRONICS - UNIT 4**

PREMIUMS: Purple, \$3.25; Blue, \$2.50; Red, \$1.60; and White, \$.80

H870005 **Electrical/Electronic Part Identification (Scoresheet SF228)**

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.

- H870006      **Electronic Display (Scoresheet SF229)**  
 Show an application of one of the concepts learned in the Electronics project. Examples include: components of an electronic device (refer to page 35 of the Electronic manual).
- H870007      **Electronic Project (Scoresheet SF230)**  
 Exhibit an electronic item designed by the 4-H'er or form a manufactured kit that shows the electronic expertise of the 4-H'er. Examples include: a radio, a computer, or a volt meter.
- PREMIUMS: Purple, \$1.75; Blue, \$1.35; Red, \$1.00; and White, \$.60
- H870008      **Poster (Scoresheet SF231)**  
 Poster should exemplify one of the lessons learned in the Entering Electronics project. Posters can be any size up to 28" x 22".

## GEOSPATIAL

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

### **RULES:**

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned.) All reports should be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
3. Please refer to the General Rules for the policy regarding firearms, items with a blade, and other related items.
4. Please refer to the General Rules for the policy regarding the use of copywritten items.
5. Premier 4-H Science Award is available in this area.

**All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.**

Scoresheets can be found at <https://go.unl.edu/ne4hgeo>.

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

PREMIUMS: Purple: \$2.25; Blue: \$1.60; Red: \$1.20; White, \$.60

### **CLASSES**

- H880001      **Poster (Scoresheet SF299)**  
 Create a poster (not to exceed 14" x 22") communicating a GPS theme such as How GPS or GIS works, Careers that use GPS or GIS, How to use GPS, What is GIS, GPS or GIS in Agriculture, Precision Agriculture, or a geospatial topic of interest.
- H880002      **4-H Favorite Places or Historical Site Poster (Scoresheet SF299)**  
 The 4-H exhibitor identifies a favorite place or historical site (including grave sites) in Nebraska. Exhibit should include latitude and longitude, digital picture, and local area map. Poster size should not exceed 14" x 22".
- H880003      **GPS Notebook (Scoresheet SF300)**  
 Keep a log of at least 5 places visited using a GPS enabled device. At least one site should be from a community other than where you live. For each site, record the latitude, longitude, and elevation. Also include a description of the site, a paragraph explaining what was interesting about the site or finding it. Photos of each site and/or cache are optional but encouraged.
- H880004      **Geocache (Scoresheet SF301)**  
 Assemble a themed geocache. Each geocache should be a water-tight container. It should include a logbook 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 and 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 (Scoresheet SF302)**  
4-Hers will assemble a notebook that will include a minimum of 2 digital copies of various data layers that can be used in precision agriculture to identify spatial patterns and/or correlations (printed copies of websites where applications can be purchased is acceptable). Include a report of how the analysis of the various data will be used to make a management decision.
- H880006 **4-H History Map – Preserve 4-H History (Scoresheet SF303)**  
Nominate a Point of Interest for the 4-H History Map Project. Include copy of submitted form in folder or notebook. To nominate a site for the 4-H history map please go to <http://arcg.is/1bvGogV>. For more information about 4-H history go to [www.4-hhistorypreservation.com/History\\_Map](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).
- H880007 **GIS Thematic Map (Scoresheet SF302)**  
Using any GIS software, create a thematic map. 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 maps or 4-H project in Nebraska. Create GIS Map using data from books and/or internet. Use reliable data (U.S. Center or US. Census Bureau, etc.). Map any size from 8.5" x 11" up to 36" x 24", which should include Title, Base Map, Neat Line, North Arrow, and Legend. Identify the source of your information on the back of the map.
- H880008 **Virtual Geocache (Scoresheet SF300)**  
Keep a log of at least 5 places visited using a virtual geocache platform. At least one site should be from a community other than where you live. For each site, record the latitude, longitude, and elevation. Also include a description of the site, a paragraph explaining what was interesting about the site or finding it. Photos of each site and/or cache are optional, but highly encouraged.

## ENERGY

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

### **RULES:**

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

**All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.**

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

Scoresheets can be found at <https://go.unl.edu/ne4hphysics-powerofwind>.

Renewable Energy Resources:

- United States Department of Energy: <https://www.energy.gov/clean-energy>
- U.S. Energy Information Administration: <https://www.eia.gov/energyexplained/renewable-sources>
- Natural Resources Defense Council: <https://www.nrdc.org/stories/renewable-energy-clean-facts>

PREMIUMS: Purple: \$2.25; Blue: \$1.60; Red: \$1.20; White, \$.60

- H900001 **Create and Compare Energy Resources Poster (Scoresheet SF307)**  
Poster should explore 2 alternative/renewable energy resources. Compare and contrast the 2 resources including two of the following information: amount of energy created, costs of

production, usability of the energy, pros/cons of environmental impacts, etc. Posters can be any size up to 28" x 22".

H900002 **Experiment Notebook (Scoresheet SF305)**

Notebook will explore the scientific method involving alternative/renewable energy sources. Information required: 1) Hypothesis; 2) Research; 3) Experiment; 4) Measure; 5) Report or Redefine Hypothesis.

H900003 **Solar as Energy Display/Poster (Scoresheet SF308)**

Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' x 2'. Include a notebook of why the item was designed and how it harnesses the power of the sun. Examples include solar ovens, solar panels, etc.

H900004 **Water as Energy Display/Poster (Scoresheet SF308)**

Item should be the original design of the 4-Her. Include the item, or a picture if item is 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/Poster (Scoresheet SF308)**

Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' x 2'. Include a notebook of why the item was designed and how it harnesses the power of wind.

H900006 **Other Nebraska Alternative Energy (Scoresheet SF305)**

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. Examples include geothermal, biomass, ethanol, bio-diesel, methane reactors, etc.

## **ROBOTICS**

This category involves the many different aspects of Robotics. Participants will learn more about how robots are designed and developed as well as the mechanical and electronic elements of robots. Involvement in SET Robotics gives participants a first-hand experience in modern technology.

### **RULES:**

1. The name and county of each exhibitor should appear separately on the back of each board, poster, or article and on the front cover of the notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
2. Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned.) All reports should be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
3. Posters can be any size up to 28" by 22" when ready for display. Example: tri fold poster boards are not 28" by 22" when fully open for display.
4. Youth enrolled in Virtual Robotics, Junk Drawer Robotics (levels 1, 2, or 3) or Robotics Platforms may exhibit in any class within this division.
5. **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.
6. 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. Videos should be uploaded to a video streaming application and exhibitors should provide a hard copy QR code for viewing.

**All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.**

Scoresheets can be found at <https://go.unl.edu/ne4robotics>.

### **ROBOTICS CLASSES**

PREMIUMS: Purple: \$2.25; Blue: \$1.60; Red: \$1.20; White, \$.60

- H861001 **Robotics Poster (Scoresheet SF236)**  
Create a poster (28" x 22") communicating a robotics theme such as "Robot or Not", "Pseudocode", "Real World Robots", "Careers in Robots", "Autonomous Robotics", "Precision Agriculture" or a robotic topic of interest to the 4-H'er.
- H861002 **Robotics Notebook (Scoresheet SF237)**  
Explore a robotics topic in-depth and present your findings in a notebook. Documentation should include any designs, research, notes, pseudocode, data tables or other evidence of the 4-H'ers learning experience. The notebook should contain at least three pages. Topics could include a programming challenge, programming skills, calibration, sensor exploration, or any of the topics suggested in Class 1.
- H861004 **Robotics/Careers Interview (Scoresheet SF239)**  
Interview someone who is working in the field of robotics and research the career in robotics. Interviews can either be written or in a multimedia format (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 (Scoresheet SF241)**  
Write pseudo code which includes at least three sensor activities. Include the code written and explain the code function.
- H861007 **Kit Labeled Robot (cannot be programmed) and Notebook (Scoresheet SF243)**  
This class is intended for explorations of robotic components such as arms or vehicles OR educational kits marketed as robots that do not have the ability to be programmed to "sense, plan and act." The exhibit should include a notebook with the robot the youth has constructed. Included in the notebook should be (1) a description of what the robot does, (2) pictures of programs the robot can perform, (3) why they chose to build this particular form, and (4) how they problem solved any issues they might have had during building and programming. A picture story of assembly is recommended. If the robot is more than 15 inches wide and 20 inches tall they may not be displayed in locked cases (at State Fair).
- H861008 **3D Printed Robotics Parts (Scoresheet SF244)**  
This class is intended for youth to create parts through 3D printing that help create their robot or aid the robot in completing a coded function. Project should include notebook describing the process used to create the project, describe the success of your designed piece (did it work), intended use of the product and the modifications made to the item.
- \*\*H861901 **Junk Drawer Robotics Exhibit** – Not eligible for State Fair.
- \*\*H861902 **County Only Robotics Exhibit** – This exhibit does not fall into any of the State Fair Classes.

### ROPE

Each rope exhibit must be mounted on a board that is 1/4" thick x 24" high x 32" wide. All items placed on boards must be made according to instructions found in the 4-H Rope Manual, E.C. 7-01-79. Either manila or synthetic rope may be used. When halters are exhibited, the tie rope, plus a required second piece of rope must show any three of the following items: 1) end whipping; 2) eye splice; 3) crown splice; 4) rosebud knot; 5) Matthew Walter knot; or 6) diamond knot.

#### **ROPE CLASSES (\*\*Denotes NOT State Fair Eligible)**

PREMIUMS: Purple, \$2.25; Blue, \$1.60; Red, \$1.20; and White, \$.60

- \*\*H898901 **Rope Display – Scoresheet CF223**  
At least 10 and not more than 12 knots, hitches, and splices (include two splices) made of 3/8" rope. Include appropriate board title and item labels. The end of all ropes must be whipped.
- \*\*H898902 **Single Loop or Double Loop Halter – Scoresheet CF70579**  
Sheep and goats use 3/8" rope. See above requirements for halter exhibits.
- \*\*H898903 **Single Loop or Double Loop Halter – Scoresheet CF70579**  
Cattle and horses use 5/8" or 3/4" rope. See above requirements for halter exhibits.

### VETERINARY SCIENCE

The purpose of a Veterinary Science exhibit is to inform the public about a common health problem of animals, a veterinary science principle or public health/zoonotic diseases. Do not confuse veterinary science exhibit topics with animal husbandry, history or production topics.