
GEOSPATIAL

GEOSPATIAL GUIDELINES

- STEM Geospatial is a diverse category that includes a variety of exhibits 4-H Members can get involved in. Through participation in this category, 4-H Members will gain more knowledge about Nebraska's rich history and diverse geography. Take close note of the rules to ensure your exhibit qualifies.
- 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 notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
- Reports should be written using the scientific method whenever possible (Background; Question or Hypothesis; What you plan to do and What you did; Method Used and Observations; Results and 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.
- Please refer to the General Rules for the policy regarding firearms, items with a blade, and other related items.
- Please refer to the General Rules for the policy regarding the use of copywritten images.
- Scoresheets, forms, contest study materials, and additional resources can be found at <https://go.unl.edu/ne4hgeo>
- Educational resources can be found at: https://4hcurriculum.unl.edu/index.php/main/program_project/132

DEPT. H / DIV. 880

GEOSPATIAL

[Scoresheets SF299-303]

- Class 1 Poster [SF299]: Create a poster (not to exceed 14"x22") 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.
- Class 2 4-H Favorite Places or Historical Site Poster [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".
- Class 3 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.
- Class 4 Geocache [SF301]: Assemble a themed geocache. **Physical geocache is REQUIRED with exhibit.** 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 and include a print-out of its registry. The entry may include a photograph of the cache in its intended hiding place.
- Class 5 Agriculture Precision Mapping [SF302]: 4-H Members will assemble a notebook that will include a minimum of 2 digital copies of various data layers that can be used in precision agriculture to identify spatial patterns and/or correlations (printed copies of websites where applications can be purchased is acceptable). A report of how the analysis of the various data will be used to make a management decision.
- Class 6 4-H History Map/Preserve 4-H History [SF303]: Nominate a Point of Interest for the 4-H History Map Project. Include copy of submitted form in folder or notebook. Write a brief description of historical significance of 4-H place or person. (a minimum of one paragraph).

- 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>

- Class 7 GIS Thematic Map [SF302]: Using any GIS software, create a thematic map. Thematic maps can utilize any subject of interest to the 4-H Member. 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 (i.e. U.S. Center or U.S. Census Bureau, etc). Map any size from 8.5" x 11" up to 24" x 36", which should include Title, Base Map, Neat Line, North Arrow, and Legend. Identify the source of your information on the back of the map.
- Class 8 Virtual Geocache [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.

ROBOTICS

ROBOTICS GUIDELINES

- Discover the design and functions of robotic arms; Build a robotic arm that moves; Explore robot movement, power transfer, and locomotion; Design and build machines that roll, slide, draw, or move underwater; Make the connection between the mechanical and electronic elements of robots; Explore sensors, write programs, build circuits and design your own robot; Use commercial robotics kits to explore the world of robotics; Learn to program your robot using sensors, loops, and conditional statements.
- 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 STEM Robotics gives participants a first-hand experience in modern technology.
- 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 notebooks so the exhibitor may be identified if the entry tag is separated from the exhibit.
- Reports should be written using the scientific method whenever possible (Background; Question or Hypothesis; What you plan to do and What you did; Method Used and Observations; Results and 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.
- Posters can be any size up to 22" x 28" when ready for display. Example: tri-fold poster boards are not to exceed 22" x 28" when fully open for display.
- Scoresheets, forms, contest study materials, and additional resources can be found at <http://go.unl.edu/ne4hrobotics>
- Educational resources can be found at: https://4hcurriculum.unl.edu/index.php/main/program_project/136

DEPT. H / DIV. 861

ROBOTICS

GENERAL INFO [Scoresheets SF236-237, SF239, SF241, SF243-244]:

- Youth enrolled in Virtual Robotics, Junk Drawer Robotics (Levels 1, 2, or 3), or Robotics Platforms 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. Videos should be uploaded to a video streaming application. Exhibitors MUST provide a hard copy QR code for viewing. It is recommended to test codes or links on several devices to check for appropriate permissions for public viewing.

- Class 1 **Robotics Poster [SF236]:** Create a poster (28"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 Member.
- Class 2 **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 Members 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.
- Class 4 **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 such as a short video uploaded to a cloud sharing service. Include a QR code with your project to allow for judging access. 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 for public viewing. 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.
- Class 5 **Robotics Sensor Notebook [SF241]:** Write pseudo code which includes at least three sensor activities. Include the code written and explain the code function. Codes can be submitted as a multimedia format uploaded to a cloud sharing service. Include a QR code with your project to allow judging access. Multimedia presentations should be 3-5 minutes in length. 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 for public viewing.
- Class 7 **Kit Labeled Robot (cannot be free programmed) and Notebook [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 robot is more than 15" wide by 20" tall they may not be displayed in locked cases.
- Class 8 **3D Printed Robotics Parts [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 a notebook describing the process used to create the project, the success of your designed piece (did it work), intended use of the product, and the modifications made to the item.

WELDING

WELDING GUIDELINES

- Learn to cut metal with an arc solder; Weld high carbon, spring steel and alloy steels; Weld horizontal, vertical and overhead positions.
- This category helps 4-H Members learn the basics of welding. In addition, 4-H Members get the opportunity to present their knowledge on the topic and display what they have made. Involvement in STEM Welding gives participants a first-hand experience in a skill that can be used for a lifetime.
- 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 notebooks so owner of the exhibit may be identified if the entry tag is separated from the exhibit.
- 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 that the judge can look at the bottom side of the weld when necessary.
- Each weld should be labeled with information:
 - 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 back of display board so it can be hung like a picture frame.** No picture frame hangers accepted.
- Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.
- Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
- Reports should be written using the scientific method whenever possible (Background; Question or Hypothesis; What you plan to do and What you did; Method Used and Observations; Results and What you learned). All reports should include 4-H Member's name and county, be computer generated and enclosed in a clear plastic cover. The reports should be attached securely to the display.
- If no plans are included with welding art, welding article, welding furniture or composite weld project, the item will be disqualified.
- All outside projects MUST have entry tag and supporting information placed in a protective bag to prevent damage from weather events such as rain and be ATTACHED to projects with string, zip ties, etc.
- Scoresheets, forms, contest study materials, and additional resources can be found at <http://go.unl.edu/he4hwelding>
- Educational resources can be found at: https://4hcurriculum.unl.edu/index.php/main/program_project/143

DEPT. H / DIV. 920

WELDING

GENERAL INFORMATION [Scoresheets SF279-SF283]:

- All welds should be made with the same electrode/wire/rod size and number.
- Welds should be made only on one side of metal so penetration can be judged.
- Welds should be cleaned with a chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil.
- It is suggested that all welds be of the same size and thickness of metal. These pieces, referred to as coupons, should be 1.5-2" wide and 3.5-4" long.
- The welds can be on one coupon that is about 4" x 4" or on individual coupons that are about 2" x 4" and 1/4" 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.
- A good way to get this size is to buy a new cold rolled strap iron and cut it to length. The extra width is needed to provide enough