

## DEPARTMENT SCIENCE, ENGINEERING, AND TECHNOLOGY

### General Information/Rules:

- A. 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 the owner of the 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 which should be a height of 24 inches and not to exceed 1/4 inch 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 inch 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 should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit.
- F. Demonstration boards should include an overall title for the display plus other necessary labeling. .
- G. 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, enclosed in a clear, plastic cover. The reports should be attached securely to the display.H. Premier 4-H Science Award is available in this area.

### CAREERS (Science, Engineering, Technology - SET)

**H930-001 Careers Interview** Interview someone who is working in any field associated with science, engineering 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 3-5 pages, double spaced, 12-point font, 1" margins. Multimedia reports should be between 3-5 minutes in length.

### DIVISION 850 – AEROSPACE / ROCKETRY

#### See General Information Department of Science, Engineering and Technology

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, and
- 4) flight pictures,
- 5) safety. (How did you choose your launch site? Document safe launch, preparation and precautions)
- 6) objectives learned, and
- 7) conclusions.

The flight record should describe engine used, what the rocket did in flight and recovery success. Points will not be deducted for launching, flight or recovery failures described. This includes any damage that may show on the rocket.

**Complete factory-assembled rockets will not be accepted at the State Fair.** Judging is based upon display appearance, rocket appearance, workmanship, design or capabilities for flight, number of times launched and report. Three launches are required to earn the 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 a 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) are 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.

**H850-901 Skill Level 1 Rocket** (County entry only)

**H850-902 Any Other Rocket**

### LIFT OFF - UNIT 2

**H850-001\* Rocket** - Any Skill Level 2 Rocket with wooden fins painted by hand or air brush.

**H850-002\* 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. Include notebook containing terminology (definition) and what was learned. Display can be any size up to 28" by 22".

**H850-003\* Rocket** - Any Skill Level 2 Rocket with wooden fins painted using commercial application example commercial spray paint.

**H850-903 Any Other Rocket**

### REACHING NEW HEIGHTS - UNIT 3

**H850-004\* Rocket** - Any Skill Level 3 Rocket with wooden fins painted by hand or air brush.

**H850-005\* 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". Include notebook containing terminology (definition) and what was learned.

**H850-006\* Rocket** - Any Skill Level 3 rocket with wooden fins painted using commercial application - example commercial spray paint.  
**H850-904 Any Other Rocket**

#### **PILOT IN COMMAND - UNIT 4**

**H850-007\* Rocket** - Any Skill Level 4 Rocket with wooden fins or any self designed rocket.

**H850-008\* 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".

**H850-905 Any Other Rocket**

#### **DIVISION 860 – COMPUTERS**

**H860-901 Exhibit** made in Unit 1 (county only exhibit – not eligible for State Fair)

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

**H860-001\* 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

**H860-002\* Computer Slide Show Presentation** - Using presentation software the 4-H exhibitor develops a slide show about a topic related to youth. All slide shows for state fair should be emailed to Amy Timmerman 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 uploaded.

#### **COMPUTER MYSTERIES - UNIT 3**

**H860-004\* 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.

**H860-005\* How to STEM (Science, Technology, Engineering and Math) 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.

**H860-006\* 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 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.

**H860-007\* 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 on the complexity of the design and shape.

3D Unique Object: 3D objects printed for their own sake. May be an art design, tool or other object. 3D printing will include a notebook with the following:

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

**H860-008\* 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 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.

**H860-009\* 3D Pen Creation** - 3D pens rapidly melt and cool plastic filament allowing the 4-H'er 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:

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