plants or materials with specific features (size, form, color, or texture) could improve the space. Reduce the opaqueness of the images to 50-60 percent and sketch plants, structures, materials, and/or amenities that could improve the overall design over the original images. The poster should include the original image(s) and improved image(s) and include a short explanation of how the landscape design was improved. Display on a poster mat board no larger than 22" x 28".

CLASS 405 **Estimating Dreams Poster -** Select a dream landscape as if money is not a consideration. Develop a plan drawing of the landscape. Draw landscape to scale. Identify the types of plants, structures, and amenities used in the landscape. Research the cost of the plants and amenities and the installation. Include the general cost of grading (if needed) and labor that could be associated with installation. Create a list, noting the plants that are included in the space. The quantities of plants and the structures, materials, or amenities and their cost should be included. Calculate the final total estimate. The poster should include the scale drawing of the landscape, identification of plants, structures and amenities, and cost and labor. Display on a poster mat board no larger than 22" x 28".

CLASS 406 **Site Inventory & Analysis Poster -** Make an unscaled drawing of the landscape you inventoried and analyzed. Develop two drawings: a site inventory and a site analysis. The site inventory and site analysis should be communicated through a combination of written notes, graphics symbols and photographs. Display on a poster mat board no larger than 22" x 28".

CLASS 407 **Community Landscape Poster -** Identify a local community space (park, nursing home, school, county fairgrounds, etc.) that needs some landscape improvements. Work through the design process and develop a detailed plan of your improvements to the space. The plan should include design principles, functional and aesthetic factors, list of plants and materials and their costs, budget for materials, labor you have available for the project, and a timeline. Take photographs of the area and draw over the photos to illustrate your final ideas. Include photographs of the finished landscape if project ideas were carried out. Display on a poster mat board no larger than 22" x 28".

CLASS 408 **Renovate the Outdoors Portfolio -** 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.

SCIENCE, ENGINEERING & TECHNOLOGY

(AEROSPACE, COMPUTERS, ELECTRICITY, LEGOs, ROBOTICS, GEOSPATIAL, WIND ENERGY, WOODWORKING, WELDING, ATV & SMALL ENGINES, & VETERINARY SCIENCE)

GENERAL RULES – SCIENCE, ENGINEERING & TECHNOLOGY

1. **GENERAL RULES –** See GENERAL RULES
2. **ENTRY LIMITS –** Each exhibitor is limited to one entry per class.
3. **DISPLAY BOARDS –** Several classes require a display board which should be a height of 24" and not to exceed ¼" in thickness. A height of 23 7/8" is acceptable to allow for saw kerf (width) if two 24" boards are cut from one end of a 4' x 8' sheet of plywood. Nothing should be mounted within ¾" of the top or bottom of the board.
4. **DEMONSTRATION BOARDS –** Fabricated boards 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. Demonstration boards should include an overall title for the display, plus other necessary labeling.
5. **REPORTS –** All reports should be clearly written or typed and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

AEROSPACE

AEROSPACE RULES

1. **GENERAL RULES –** See GENERAL RULES – SCIENCE, ENGINEERING & TECHNOLOGY
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 ¾" 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 back drops 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 rocket's engine mount to give it added stability.
3. **PREPARATION –** Rockets must be equipped as prepared for launching, with wadding and parachute or other recovery system.
4. **DISQUALIFICATION –** Rockets entered with live engines, wrong base size or sideboards will be disqualified. Complete factory assembled rockets will not be accepted at the State Fair.
5. **REPORTS –** A report, protected in a clear plastic cover, must include: 1) rocket specification, 2) a flight record for each launching (weather, distance, flight height), 3) number of launchings, and 4) 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.
6. **JUDGING –** 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. Only actual launches count, misfires will not count towards one of the three required launches.
7. **SELF DESIGNED ROCKETS –** 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.
8. **LEVELS –** 4-H rocket project levels are not intended to correspond to the National Association of Rocketry model rocket difficulty ratings or levels. Exhibitors may only enter exhibits at one level of competition.
9. **TOP EXHIBIT –** A top exhibit will be selected from those exhibits receiving purple ribbons in the aerospace division.
10. **MANUALS –** Printed materials are available from the Johnson County Extension Office for all currently enrolled 4-H members in Johnson County.

DEPARTMENT H **DIVISION 850** **AEROSPACE**

PREMIUM **Purple** $2.50 **Blue** $2.00 **Red** $1.50 **White** $1.00

CLASS 901 **Level 1 Display –** Display exemplifying one of the principles learned in the Pre-Flight project.

CLASS 1 **Level 2 Rocket –** Any skill level 2 rocket with wooden fins painted by hand or air brush.

CLASS 2 **Level 2 Display –** Display exemplifying one to 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" x 22".

CLASS 3 **Level 2 Rocket –** Any skill level 2 rocket with wooden fins painted using commercial application (example: commercial spray paint).

CLASS 4 **Level 3 Rocket –** Any skill level 3 rocket with wooden fins painted by hand or air brush.

CLASS 5 **Level 3 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" x 22".

CLASS 6 **Level 3 Rocket –** Any skill level 3 rocket with wooden fins painted using commercial application (example: commercial spray paint).

CLASS 7 **Level 4 Rocket –** Any skill level 4 rocket with wooden fins or any self-designed rocket.

CLASS 8 **Level 4 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 up to 28" x 22".

CLASS 9 **Level 5 Drone Poster –** Exhibit must be designed to educate yourself and others on one or more of the following topics: drone technologies, uses 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" x 22".

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 three to five pages, double-spaced, 12-point font, and 1" margins. Multimedia reports should be between three and five minutes in length.

COMPUTERS

COMPUTER RULES

1. **GENERAL RULES –** See GENERAL RULES – SCIENCE, ENGINEERING & TECHNOLOGY
2. **TOP EXHIBIT –** A top exhibit will be selected from those exhibits receiving purple ribbons in the computer division.
3. **MANUALS –** Printed materials are available from the Johnson County Extension Office for all currently enrolled 4-H members in Johnson County.

DEPARTMENT H **DIVISION 860** **COMPUTERS**

PREMIUM **Purple** $2.50 **Blue** $2.00 **Red** $1.50 **White** $1.00

COMPUTER MYSTERIES UNIT 1

CLASS 901 **Computer Hardware Poster –** Should exemplify something learned about computer hardware in Computer Mysteries Unit 1. Poster can be any size up to 28" x 22".

CLASS 902 **Computer Software Poster –** Should exemplify something learned about computer software in Computer Mysteries Unit 1. Poster can be any size up to 28" x 22".

COMPUTER MYSTERIES UNIT 2

CLASS 1 **Computer Application Demonstration –** 4-H exhibitor should use computer applications to create a graphic notebook utilizing computer technology. 4-H'er may create any of the following: greeting cards (five different cards, birthday, wedding, anniversary, sympathy, get well, or other);business cards (three cards for three different individuals/businesses); menu (minimum of two pages including short description of foods and pricing); book layout (I-book); promotional flyer (three flyers promoting three different events); newsletter (minimum two pages); or others (example: precision farming, family business logo, etc.) This exhibit consists of a notebook (8 ½" x 11" which should include: a detailed report describing: the task to be completed, the computer application software necessary to complete the task, specific features of the computer application software necessary for completing the task, and a print out of your project (in color or black and white).

CLASS 2 **Produce a Computer Slideshow Presentation –** Using presentation software. The slideshow should include a minimum of 10 slides and nor 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. The exhibit includes a copy of the presentation saved to a flash drive along with a printout of the notes pages in a clear plastic cover. Slide presentation should relate to one topic.

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 two minutes in length and no more than five 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.

CLASS 5 **How to STEM (Science, Technology, Engineering and Math) Presentation –** Youth design a fully automated two to five minute 4-H "how to" video. Submissions should incorporate a picture or video of the 4-H member, as well as their name (first name only), age (as of January 1st 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 IrfanView or GIMP OR online using a WIKI such as Google Sites. If the web site, blog, or app isn't live include all files comprising the web site 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 Unique Item – 3**D printing uses plastic or other materials to build a three-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 motivation and/or problem identified. For example, 3D object printed as part of the design process for robot or other engineering project or cookie cutter. Must include design notebook with motivation or problem statement the prototype was 3D printing. Notebook will also include: defined motivation/problem statement, software used, document purpose of material and print settings, material choice (PLA, PVA, ABS, etc.), in-fill density, and moving parts.

CLASS 8 **3D Pen Creation –** 3D pens rapidly melt and cool plastic filament allowing the 4-H member 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 creations will include a notebook with the following: copy of the template (if used) and description of any changes created; if no template used – an explanation of how the creation was built; must include a paragraph of what you learned while creating the project (i.e. ways to improve your next creation); and a paragraph on how 3D pens impact science, engineering, and technology.

CLASS 9 **Digital Fabrication –** 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 Corel Draw or Fusion 360 would be an example of an appropriate software used to create your finished project. Projects should include a notebook with the following: what motivated you to create this project, software and equipment used, directions on how to create the project, prototype of plans, cost of creating the project, iterations or modifications made to original plans, and changes you would make if you remade the project.

CLASS 901 **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 three to five pages, double-spaced, 12-point font, and 1" margins. Multimedia reports should be between three to five minutes in length.