

## DEPARTMENT – BUILDING EXHIBITS

### SECTION – STEM - COMPUTERS (Must be enrolled in STEM - Computers)

#### SECTION - 4-H STEM - COMPUTERS

The 4-H computer project teaches concepts related to computers, hardware knowledge, software programming and applications, internet safety, the building, maintenance and repair of computers and future career opportunities. Please note that the actual construction of computer hardware (i.e., building a computer, electronic devices with a mother-board based manipulation) will remain in the Energy Management division.

1. Read General Read ALL General. Violation of any of the following rules may result in disqualification. All decisions will be made by a county agent and their decision is final.
2. Each exhibitor is limited to 1 entry per class. Exhibits must be the result of the current year's project work by 4-H member.
3. Exhibitors name, county, age, and year's in project must be tagged or labeled in a prominent location on all pieces of exhibit including educational display, poster and/or notebook.
4. Team exhibits are defined as developed by two or more 4-H members.
5. The 4-H members must be currently enrolled in the 4-H STEM project to exhibit in this division.
6. See the last section for full details about exhibiting posters, display boards and notebooks.
7. If a safety violation is noted by the judges, superintendent, or other staff, the exhibit will receive a participation ribbon (at the judge's discretion).

#### Computer Systems

The Kansas 4-H STEM Computer Systems portion of the computer project is designed to allow 4-H members to explore how *information* is moved from one part of the computer to the other; how *information* is moved between two or more computer systems (networking); how *information* is stored; or how *information* is acted on (programming).

Any item which IS NOT a notebook, display board, or poster displayed in this class is considered a "computer system" exhibit and MUST follow the rules set forth below.

1. All exhibits must be:
  - a. Self-contained on a USB drive (thumb drive, flash drive, jump drive, or other any other name for a small USB storage device; the rules will use "USB drive"). This means that a judge can plug in the USB drive into a computer and be able to run the exhibit as described below.  
OR
  - b. System-On-A-Chip (SOC) (such as Raspberry Pi) or a Micro-Controller (such as an Arduino or Ozobot) AND is a compact (less than 4-8"X 4-8"X 4-8") system, which can be programmed AND requires minimal assembly to operate (e.g. connecting power, display, and keyboard/mouse cables). Referred to as a "chip system" through the rest of the rules.
2. Physical computers such as tablets, smart phones, laptops, or personal computers (PCs) will not be accepted as an exhibit.
3. "Chip systems" may use/include GPIO bread boards or HATs (Hardware Attached On Top) the size of which is not included in the size of the chip system, however the total size of the chip system and GPIO devices may not exceed 24"X24"X24" including any protective enclosures.
4. Any attached GPIO devices are not judged for electrical construction or quality as this division is focused on the operational aspects of the systems that have automated articulated structures (arms, wheels, grippers, etc.) which the exhibitor constructed, can also be classified as a robot, and the exhibitor must decide which division to exhibit in as the exhibit may not be entered in the both divisions.

5. For chip systems, all electric components of the system must be adequately covered or concealed with a protective enclosure. Paper is NOT considered an adequate enclosure or covering for the electrical components.
6. All revisions of all forms previously released for the STEM division either undated or dated prior to current year are void for use and new forms must be obtained and used that are dated by the Kansas State 4-H Office for the current year. Use of old forms will result in the loss of one ribbon placing for exhibits.
7. For all computer system entries, the following items are required as part of an exhibit packet:
  - a. A manila envelope with the Computer Exhibit Form attached to the front, this form can be downloaded at [www.STEM4KS.com](http://www.STEM4KS.com).
  - b. A USB drive labeled with the 4-Hers name, county/district, and club; in a way that does not prevent it from being plugged into a computer.
  - c. For all exhibits that are entered on a USB drive, at least one (1) graphic (picture, screen shot/capture, slide, etc.) of the project must be printed out on an 8.5" X 11" sheet of standard computer paper, placed in a plastic sheet protector, to allow for proper display and recognition at the Kansas State Fair. The is what will be displayed during the fair, all other materials will be sent back to the county office. On the back side of the graphic the 4-Her's name, county, and club should be listed.
  - d. Instructions to run any part of the exhibit on the USB drive.  
(There should be at least three (3) items in your manila envelope: USB drive, graphic and instructions).
8. Each exhibit must be accompanied by a "4-H Engineer's Journal." The engineer's journal should be typed. It can either be included electronically on the USB drive (preferred) or printed and placed in the manila envelope.
  - a. The "4-H Engineer's Journal" should start with a dated entry describing what the 4-H member is trying to accomplish/build.
  - b. The "4-H Engineer's Journal" should conclude with a dated entry describing what the 4-H member achieved in creating. (The start and end many times will be different. The judges are interested in the journey).
  - c. Additional entries in the "4-H Engineer's Journal" should be made as progress occur describing successes and failures; as well as the steps done and any sources of information including links used.
  - d. Pictures can also be included in the "4-H Engineer's Journal" but should not be more than 50% of the entries.
  - e. The "4-H Engineer's Journal" should contain at least one graphic.
  - f. The "4-H Engineer's Journal" must be at least 3 pages in length.
  - g. An example of a "4-H Engineer's Journal" can be found at [www.KansasSpaceTech.com](http://www.KansasSpaceTech.com).
  - h. The "4-H Engineer's Journal" will comprise 50% of the overall exhibit score. Failure to include a "4-H Engineer's Journal" will result in the exhibit being disqualified.
9. If the exhibit is a program, application, app, web site, or requires any coding, the source code must be included on the USB drive. . Failure to include a copy of the "source code" may result in up to one ribbon place deduction.
10. Diagrams or decision trees showing the logical flow of the system must be included on the USB drive for all exhibits.
11. Since there is no conference judging at the Kansas State Fair, a set of instructions must be provided to run the computer system/application. These instructions should be printed off and included in the exhibit package and a copy should be included on the USB drive.
  - a. FOR COUNTY FAIRS it is recommended that 4-Hers bring a computer that will run their project to the fair for judging as judges typically do not bring computers with them. Operating instructions are still required.
  - b. Instructions should be written as though you were helping a less techy person, (like a grandparent) use the USB drive with a computer similar to what is described in rule 9 below. An example of instructions can be found at [www.KansasSpaceTech.com](http://www.KansasSpaceTech.com).
12. Each exhibit must accomplish a specific automated task using a computer, a chip system, or virtual machine (VM).
13. Kanas State Fair Judge(s) in the computer systems division will have a physical computer with the following minimum configuration to test exhibits with an view files:

- a. Microsoft Windows®10
  - b. Microsoft Office® 365 (Excel, Power Point, & Word)
  - c. Microsoft Vision Studio®
  - d. Microsoft Edge Browser®
  - e. Mozilla Firefox® Browser
  - f. Google Chrome® Browser
  - g. Adobe Acrobat Reader®
  - h. Apache OpenOffice®
  - i. VMware Player Windows 64bit
  - j. Scratch Desktop editor (offline version)
14. 4-Hers should not assume that the computers in rule 9 have Internet connectivity and that any parts of the exhibit that require Internet access will not work. It is strongly recommended that 4-Hers test exhibits on a computer with Internet connectivity disabled.
  15. Kansas 4-H STEM has made available Linux Virtual Machines (VMs) that can be downloaded and used to create projects on such as web servers, networking, and many other projects. For more information on how these VMs can be leveraged or to download them visit [www.STEM4KS.com](http://www.STEM4KS.com). 4-Hers are not required to use the VMs in their projects. They are optional.
  16. All licensing should be adhered to for any software used in the exhibit. Failure to do so will result in a reduction of one ribbon placing and may not be considered for best of show.
  17. The creation of viruses, malware, malicious applications or code, defamatory language or graphics, bullying, or any material that is “mean,” “dangerous,” or harmful according to the judge’s opinion will result in the exhibit being disqualified.
  18. Pictures or still graphics created are not eligible for entry as a project in this division, and should be entered in the appropriate photography division.
  19. Judging will be based on a score sheet which can be found at [www.STEM4KS.com](http://www.STEM4KS.com). There are four (4) areas each exhibit will be judged on. They are:
    - a. 4-H Engineers Journal (what I learned to make it work), 50% overall score
    - b. Instructions (how I help others make it work), 25% overall score
    - c. Functionality (does it work), 12% overall score
    - d. Diagrams (and code if applicable) (how I think it works), 13% overall score

#### **5590: Computer Program**

Application, app, script, or coded system that is new and unique (not merely a file run in program, such as a ‘word document’ or a picture drawn in ‘Microsoft Paint.’)

#### **5591: Computer Presentation**

(power point, web page/site, animated graphics, etc.)

#### **5592: Single Computer System**

(web server, database server, etc.)

#### **5593: Networked System**

Consisting of two or more computers

**5594: Chip System** – a small (8”X8”X8”) programmed physical device that accomplishes a specific task

## **4-H STEM EDUCATIONAL EXHIBITS – POSTERS, NOTEBOOKS AND DISPLAY BOARDS**

Purpose: To allow 4-Hers to explore STEM outside the bounds of traditional projects for rockets, robotics, astronomy, computers and unmanned aerial systems. All posters, notebooks and display boards are listed in this section and have been removed from the individual sections to save space.

1. For notebooks, display boards, and posters, no additional exhibit information is required; no manila envelope is needed for these exhibits.

2. Exhibits in posters, notebooks and display boards must contain substantial supporting educational materials.
4. Educational display boards, posters and notebooks should be creative and showcase details about the knowledge learned in the project during the current 4-H year. Value is placed on youth who can demonstrate how their skills have increased while completing the project. Each exhibit will be judged on uniqueness, creativity, neatness, accuracy of material, knowledge gained, and content. An exhibit judging score sheet will be available at [www.STEM4KS.com](http://www.STEM4KS.com). For example, a rocket that may have crashed may be made into an educational display or poster that tells a great story with many lessons learned.
5. Follow copyright laws, citing all sources of information in a standard notation. Sources of information must be cited on the front of your exhibit, including all posters and educational display boards.
6. Educational displays are not to exceed a standard commercial 3'x 4' tri-fold display board. Card tables for display are not required but can be used at the county only level. Care should be taken to use durable materials that will withstand Fair conditions.
7. "Construction Kits" that are part of Educational displays must be contained in cases (tackle boxes, sealable containers, etc.) that may not be larger than 1' X 2' X 2' and must have a latch which securely keeps all components contained in the "Construction Kits". Other components are to adhere to appropriate dimensions as stated elsewhere.
8. Educational Project notebooks must be organized in a 3-ring binder.
9. Any three dimensional display exhibits may not be thicker than 1".
10. Engines and igniters in rockets ARE NOT permitted with the exhibit and constitute an immediate disqualification. This is for safety reasons and includes both spent and live engines.
11. Exhibitor's name, county or district, age, and year(s) in project must be tagged or labeled in a prominent location on the notebook and/or "Construction Kit." For educational displays and/or posters, the exhibitor's name, county, age, and year(s) in project must be tagged or labels on the back of the exhibit. Failure to label an exhibit may result in one ribbon placing deduction.
12. Exhibits should possess the following qualities (in no particular order):
  - A Central theme
  - What you want others to learn
  - Be designed and constructed in a manner befitting the exhibit
  - Be something you are interested in
  - Be related to Astronomy, Computer Systems, Robotics, Rocketry, or Unmanned Aerial Systems and those characteristics described above
13. If a safety violation is noted by the judge, superintendent, or other staff, the exhibit will receive a participation ribbon (exhibit at the judge's discretion).

### **Computers - Novice – Ages 7-8**

- 5765 Novice Computers Educational Display
- 5769 Novice Computers Educational Notebook
- 5770 Novice Computers Educational Poster

### **Computers - Intermediate Division – Ages 9-13**

- 5771 Intermediate Computer Educational Poster
- 5772 Intermediate Computer Display Board
- 5773 Intermediate Computer Notebook

**Computers - Senior Division – 14 years and older**

5776 Senior Computer Educational Poster

5777 Senior Computer Display Board

5778 Senior Computer Notebook