May 12, 2022

TO: 4-H Members enrolled in STEM & Self-Determined

RE: STEM Project Area Changes

Dear 4-H member;

Last year the State 4-H program added some new project phases to the STEM project area. The STEM area historically has seen lots of class and project guideline changes, so we typically leave these out of the county fair books and do a direct mailing of State Fair rules to members, hence the reason for this letter. The recent project changes discussed in this letter mainly applies to those members enrolled in **STEM - Agriculture Mechanics** (*formally Self-Determined Welding/Metals*) and **STEM - Block Architecture Construction** (*IE: Lego projects formally enrolled in Self-Determined and/or possibly Visual Arts*).

Our hope has been to have communicated the changes for the two project phases mentioned above and hopefully your 4-H Project enrollment reflects them - IF you have a metals or Lego project(s). If this is not the case and you are still enrolled in Self-Determined, our FairEntry system should be set up to allow your entry in fair in the appropriate division. If you run into issues at fair entry time, please reach out to our offices for assistance.

Enclosed are the full rules, project guidelines and classes for your respective State Fair STEM area. Your local Fair Book will not have all this detail, so please reference this - especially if you want to have your exhibit qualify for the State Fair. You will also note that we have county fair only classes in these areas that are NOT State Fair eligible. As an example, Lego kits would not qualify for State Fair. PLEASE REVIEW THE ENCLOSED AND ASK QUESTIONS!!!

One final thought related to Record Books as we look past fair. If your project work has been in Metal related work, you will need to complete the STEM - Agriculture Mechanics record report. If project work is Legos, the appropriate record report would be STEM - Block Architecture Construction.

Again, please be aware of all these project adjustments, review the enclosed information and please let us know what questions you might still have! Good luck on preparing fair exhibits as we move into the summer months.

Sincerely,

Ross E. Mosteller   Cara Robinson, Linda Gantz, Debra Henry
District Extension Agent   4-H Program Managers

STEM AG MECHANICS

The Ag Mechanics project is starting with an emphasis on welding and smithing, it will expand as the project area grows. Please direct project feedback to Shane Potter. This project allows youth to explore areas of ag mechanics and metallurgy from repairing or repurposing items to the fabrication of new items. The intent is for this program start with foundational areas, some of which youth may already have, and allow them to continue to build on this knowledge becoming more experienced.

Rules
1. 4-H members must be currently enrolled in the Kansas 4-H STEM Ag Mechanics (welding) project to exhibit in this division.
2. Each exhibitor may enter one exhibit per class. Exhibits must have been constructed or repaired during the current 4-H year. The exhibit must have been selected at the county level for entry at the State Fair. Counties or districts should select only top blue or purple ribbon Ag Mechanics exhibits which meet State Fair guidelines.
3. Wheeled exhibits must utilize a braking mechanism which prevents the exhibit from freely rolling while on display.
4. Exhibitors are responsible for providing sufficient braking or "chocks" for trailer exhibits to ensure that the exhibits do not move once positioned. If using a wheel "chocking" mechanism, the two individual blocks should be connected together as a pair of chocks, so they do not become separated. At least one pair of chocks should be placed on each side of the trailer to prevent movement.
5. For trailer exhibits the tongue of the trailer should have a locking mechanism (e.g. padlock) to prevent the trailer from being moved by unauthorized individuals while being displayed. A key for the locking mechanism should be left with the superintendent and labeled with the exhibitor's name, county, and phone number.
6. Each exhibit must be free-standing or sufficiently supported by an exhibitor supplied support system that is moveable and is part of the total demission's and weight of the exhibit as described previously. Exhibit boards should have a portable and moveable base. No exhibits may be staked to the ground for display.
7. Top heavy items should be braced or placed in a stand sufficient to prevent it from toppling over while on display.
8. Exhibits may not be bound, affixed, attached to the State Fair buildings, except by the superintendent, State Fair Staff, or State Fair Extension Staff.
9. Painting or spot painting is not allowed on projects after arrival on fairgrounds. If wet paint is detected by judges or superintendents one ribbon placing will be deducted.
10. Repair projects having adequate original finish need not be repainted.
11. Cutting surfaces, such as blades, are to have a protective covering over them to prevent injury. The covering should be easily removed and reinstalled for judging. Foam "pool noodles" and multiple layers of cardboard are acceptable.
12. Display cases for small exhibits are acceptable and must be easily opened so the item can be removed and examined as part of judging.
13. Exhibits that include weaponry of any kind will be disqualified. Weaponry is defined as any instrument, possession, or creation, physical and/or electrical that is intended to be used to inflict damage and/or harm to individuals, animal life, and/or property.
14. Trailers may be displayed outside.
15. If the exhibit is powered by flammable liquids (gas, propane, kerosene, etc.) the fuel tank and lines should be drained and allowed to dry, to avoid spills and

potential fires.

16. Electric powered (battery, corded, solar, or alternative energy) should have a primary shutoff or disconnect switch.

17. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's exhibit, at the judges' discretion, will receive a deduction in ribbon placement or a participation ribbon.

18. The exhibitor's name(s) and county or district must be tagged or labeled in a prominent location on the display.

19. Each exhibit must include an Ag Mechanics information packet. Entry of just a packet without an accompanying exhibit is not a sufficient exhibit.

20. Each exhibitor is required to complete the "4-H STEM Ag Mechanics Exhibit Information Form" which is available through your local K-State Research and Extension office or at www.STEM4KS.com. This form must be attached to the outside of a 10" x 13" manila envelope. Do not tie the envelope to the exhibit. All revisions of all forms previously released for the STEM division dated prior to current year are void for use and new forms must be obtained and used that are dated by the State 4-H Office for the current year.

21. Each exhibit information packet should include the following items:
    a. Bill of materials for the project with associated costs, scrap items used may be listed as having a $0.00 cost.
    b. 1 to 5 pages of photos showing work on the exhibit, preferably from a beginning state to final or completed state.
    c. If appropriate schematics or working drawings relating to the creation or repair, this is not required for display boards.
    d. If appropriate operating instructions.

22. Additionally, exhibitors may create an optional video (not required) about their project showing its operation and the work they have done. This allows judges to get a better understanding of the exhibit and allows the youth the opportunity to fully demonstrate their exhibit. The video should be no longer than 8 minutes and should be placed on a USB drive. These videos may also be considered for inclusion in a running video loop in the STEM area at the state fair after review by judges, superintendent(s), and extension staff. Adult guardians must complete the video release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area at the Kansas State Fair.
    a. FOR COUNTY FAIRS with consultation judging, it is recommended that the video elements be waived in favor of talking with the exhibitor.

23. Ag Mechanics exhibits may be checked out for use in a Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with the superintendent or Shane Potter. The exhibit must be returned to display immediately after the demonstration/illustrated talk, or the exhibit will be disqualified.

Eligibility – Each exhibitor may enter one exhibit per class. Exhibits must have been constructed or repaired during the current 4-H year. The exhibit must have been selected at the county level for entry at the State Fair. Counties or districts should

select only top blue or purple ribbon Ag Mechanics exhibits which meet State Fair guidelines.

Scoresheets, Forms, and Contest Study Materials:
- 4-H STEM Ag Mechanics Exhibit Information Form
- www.STEM4KS.com

Awards/Recognition – Purple, blue, red, white, participant ribbons as well as disqualified, and best in show. Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Introductory – **Level 1 (about 1 - 3 years' experience)**
This level is designed for youth with little to no exposure in the project area so that they can gain an understanding of basic principles and methods in the given area.
5550   Welding Display Board. A 3' x 3' display board with different pieces of metal attached illustrating different types of welds, each weld being labeled.
5551   Level 1 Welding Ag Repair. Repair of ag equipment with welding.
5552   Level 1 Welding Ag Fabrication. Creation of new ag equipment with welding.
5553   Level 1 Welding General Repair. Repair of non-ag equipment with welding.
5554   Level 1 Welding General Fabrication. Creation of non-ag equipment with welding.
5555   Level 1 Welding Artistic Fabrication. Creation of artistic or interpretive pieces with welding.
5556   Level 1 Brazing Repair.
5557   Level 1 Brazing Fabrication.
5558   Smithing Display Board. A 3' x 3' display board with different pieces of forged metal attached illustrating different forms, each form being labeled.
5559   Level 1 Smithing. A design forged with at least **one** formed element (twists or spirals for example).

Experienced – **Level 2 (about 4 - 6 years' experience)**
This level is designed for youth some experience in the project area allowing them to expand on common principles and methods in the given area.
5560   Level 2 Welding Ag Repair. Repair of ag equipment with welding.
5561   Level 2 Welding Ag Fabrication. Creation of new ag equipment with welding.
5562   Level 2 Welding General Repair. Repair of non-ag equipment with welding.
5563   Level 2 Welding General Fabrication. Creation of non-ag equipment with welding.
5564   Level 2 Welding Artistic Fabrication. Creation of artistic or interpretive pieces with welding.
5565   Level 2 Brazing Repair.
5566   Level 2 Brazing Fabrication.
5567   Level 2 Smithing. A design forged with at least **two** different formed elements (twists and spirals for example).

Advanced – **Level 3 (about 7 - 9 years' experience)**
This level is designed for youth with vast experience in the project area allowing them to

master common principles and methods and expand on advanced techniques in the given area.

5570 Level 3 Welding Ag Repair. Repair of ag equipment with welding.
5571 Level 3 Welding Ag Fabrication. Creation of new ag equipment with welding.
5572 Level 3 Welding General Repair. Repair of non-ag equipment with welding.
5573 Level 3 Welding General Fabrication. Creation of non-ag equipment with welding.
5574 Level 3 Welding Artistic Fabrication. Creation of artistic or interpretive pieces with welding.
5575 Level 3 Brazing Repair.
5576 Level 3 Brazing Fabrication.
5577 Level 3 Smithing. A design forged with at least **three** different formed elements (twists, spirals and bulbs for example).

Master – **Level 4 (10 or more years' experience)**
This level is designed for youth substantial experience in the project area allowing them to master advanced techniques in the given area.

5580 Level 4 Welding Ag Repair. Repair of ag equipment with welding.
5581 Level 4 Welding Ag Fabrication. Creation of new ag equipment with welding.
5582 Level 4 Welding General Repair. Repair of non-ag equipment with welding.
5583 Level 4 Welding General Fabrication. Creation of non-ag equipment with welding.
5584 Level 4 Welding Artistic Fabrication. Creation of artistic or interpretive pieces with welding.
5585 Level 4 Brazing Repair.
5586 Level 4 Brazing Fabrication.
5587 Level 4 Smithing. A design forged with at least **four** different elements (twists, spirals and bulbs for example).

Resources
- Project Area – STEM Ag Mechanics

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer
Anastasia Meyer, Marshall County Extension Agent

State Staff Contact
Shane Potter, 4-H Youth Development Specialist

STEM ARCHITECTURAL BLOCK CONSTRUCTION

The STEM ABC exhibit area focuses on using architectural blocks ("Legos") to construct dioramas. This project allows youth to explore architectural design in a three-dimensional space. The intent is for this program start with foundational ideas of architecture, some of which youth may already have, and allow youth to continue to build on this knowledge becoming more and more experienced. This division is not

intended for youth wishing to exhibit constructed kits. Kits and non-diorama displays should be considered an arts and crafts exhibit, they should not be displayed in this division.

Rules
1. 4-H members must be currently enrolled in the Kansas 4-H STEM – Architectural Block Construction project to exhibit in this division.
2. Each exhibitor may enter one exhibit. Exhibits must have been constructed during the current 4-H year. The exhibit must have been selected at the county level for entry at the State Fair. Counties or districts should select only top blue or purple ribbon ABC exhibits which meet State Fair guidelines.
3. Counties are limited to FOUR exhibits to the state fair to insure sufficient space for all exhibitors.
4. Total exhibit dimensions may not exceed 2 feet high, by 2 feet wide, by 2 feet deep.
5. All exhibits should be placed in a sturdy see through enclosure with a top, bottom, and 4 sides. A clear tub turned upside down with the exhibit placed on the lid would be an acceptable enclosure. This is to keep exhibit components from being "scattered to parts unknown" at the fair. The outer dimensions of the enclosure are part of the total exhibit dimensions.
6. All components used in construction should be dust free, clean, free of chips, scuffs, or cracks
7. The primary building component should be interlocking blocks, commonly referred to by the brand name of Lego®
8. Other components can be integrated into dioramas to illustrate architectural aspects that may be difficult to convey with traditional interlocking blocks, for example marbles for small round objects
9. The use of existing "store bought" sets for major elements of the display is not allowed, use of figurines from sets is allowed as are using individual bricks to create something different than the set it came from. "Store bought" sets should be considered an arts and crafts entry. The intent of this is to ensure fairness among exhibitors and encourage maximum creativity instead of just following a set of plans.
10. The design should have a central theme, for example a garage, a house, a shop, this theme should be discussed in the video, this can link back to **architectural elements** in the display, for example: toilets, chairs, sofas, plants, pianos, cars, garage doors, spaceships, animals, food, etc. (architectural elements, components, and features can be thought of as nouns)
11. Displays must have significant **architectural components.** Examples of architectural components include walls, windows, doors, roofs, canopies, flying buttresses, etc.
12. Landscapes are strongly discouraged, however buildings can have a reasonable exterior landscape if it clearly linked to the architecture, for example a bike rack next to a street outside of a bicycle shop
13. Architectural components should have a consistent look, walls and roofs that have no pattern or consistency will be deducted one ribbon placing

14. Gaps or cracks should not be visible between assembled blocks
15. Doors should open and close, large doors can be fixed in either an open or closed position, but it should be obvious that it is a large door, windows can be either fixed or open and close.
16. Vehicles that are intended to stay in a single place should be affixed to base plates with sticky tack, hot glue, or other method
17. You can use a partial wall or no wall, called a reveal, to show what is happening inside of a structure are acceptable, for example only having three walls to allow an unobstructed view into a room.
18. Mechanical enhancements or motion elements that add motion to the diorama are acceptable and encouraged. For example, marry-go-rounds, doors, elevators, gears, marbles going down a channel, flapping wings, animatronics, etc. If included judges should be able to use them and instructions should be provided for operation either in the story or on a separate page.
19. Artistic designs with no architectural design/components are not permitted and two ribbon placings will be deducted, these exhibits should be displayed in arts and crafts
20. The exhibitor's name(s) and county or district must be tagged or labeled in a prominent location on the display, additionally the display case should have the exhibitor's information attached to it as well, as the top part of the case may be separated from the display
21. Each exhibit must include an Architectural Block Construction information packet. Entry of just a packet without an accompanying exhibit is not a sufficient exhibit.
22. Each exhibitor is required to complete the "4-H STEM Architectural Block Construction Exhibit Information Form" which is available through your local K-State Research and Extension office or at www.STEM4KS.com. This form must be attached to the outside of a 10" x 13" manila envelope. Do not tie the envelope to the exhibit. All revisions of forms previously released for the STEM division 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.
23. Each exhibit information packet should include the following items:
    a. At least one drawing of the desired architecture on graph paper, multiple views (top, front, side) are preferred, they do not need to be to scale. Plans encourage organizing the build process so that elements don't get forgotten. For example, a real house doesn't get built without plans. Plans also help if a part comes loose on the way to the fair, so staff can figure out where it goes.
    b. 1 to 5 pages of photos showing work on the exhibit, preferably from a beginning state to final or completed state, these help in determining where a part might go in case something comes loose.
    c. If appropriate operating instructions for mechanical portions of the diorama.
24. Additionally, exhibitors are required to create a video about their project discussing their construction experiences and the architectural elements of the diorama (tell the story of what is happening in their exhibit). This allows judges to

get a better understanding of the exhibit and allows youth the opportunity to fully explain their exhibit. The video should be no longer than 8 minutes and should be placed on a USB drive. These videos may also be considered for inclusion in a running video loop in the STEM area at the state fair after review by judges, superintendent(s), and extension staff. Adult guardians must complete the video release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area at the Kansas State Fair.

   a. FOR COUNTY FAIRS with consultation judging, it is recommended that the video elements be waived in favor of talking with the exhibitor.

25. Architectural Block Construction exhibits may be checked out for use in a Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with the superintendent or Shane Potter. The exhibit must be returned to display immediately after the demonstration/illustrated talk or the exhibit will be disqualified

Eligibility – Each exhibitor may enter one exhibit.

Quota – Counties are limited to FOUR exhibits to the state fair to insure sufficient space for all exhibitors.

Scoresheets, Forms, and Contest Study Materials:
- **Kansas 4-H Architectural Block Construction Exhibit Form**
- **Kansas 4-H Architectural Block Construction Scoresheet**
- www.STEM4KS.com

Awards/Recognition – Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Introductory – **Level 1 (about 1 - 3 years of experience)**
5710   Level 1 Diorama. A diorama illustrating at least 2 architectural features beyond floors, ceilings, and walls.

Experienced – **Level 2 (about 4 - 6 years of experience)**
5711   Level 2 Diorama. A diorama illustrating at least 4 architectural features beyond floors, ceilings, and walls, and includes 1 or more motion elements.

Advanced – **Level 3 (about 7 - 9 years of experience)**
5712   Level 3 Diorama. A diorama illustrating at least 6 architectural features beyond floors, ceilings, and walls, and includes 2 or more motion elements.

Master – **Level 4 (10 or more years experience)**
5713   Level 4 Diorama. A diorama illustrating at least 8 architectural features beyond floors, ceilings, and walls, and includes 3 or more motion elements.

Resources:
- Project Area – STEM Architectural Block Construction

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact
Shane Potter, 4-H Youth Development Specialist

STEM ASTRONOMY

The STEM exhibit area is designed to provide youth the opportunity to explore space through telescopes, research, and observation.

Rules
1. The 4-H member must be currently enrolled in the 4-H STEM - Astronomy project to exhibit in this division.
2. Each exhibitor may enter one exhibit per class. Exhibit must have been completed during the current 4-H year and have been selected at the county level for entry at the State Fair level. Counties or districts should select only top blue or purple ribbon Astronomy exhibits which meet State Fair guidelines.
3. Telescopes entered in this division may be built from a kit or by original design. Pre-finished telescopes, which require no construction or painting are not acceptable exhibits.
4. Telescopes are limited to no more than six feet in length. They must be placed on a stationary stand that does not allow the telescope to roll and/or fall over. The stand cannot extend past two feet in length or width.
5. Each State Fair telescope exhibit must include a "4-H Astronomy Exhibit Information Form," which is available through your local K-State Research and Extension office or at www.STEM4KS.com. This form must be attached to the outside of a 10" x 13" manila envelope. Do not tie the envelope to the exhibit. All revisions of forms previously released for the STEM division 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. You must also include construction plans (or a photocopy) for the telescope and place it inside the manila envelope. For notebooks, display boards, and posters, no additional exhibit information is required; no manila envelope is needed for these exhibits.
6. See the last section for full details about exhibiting posters, display boards and notebooks.
7. Two photographs showing telescope construction and operation are required. Photographs should be mounted on one side of an 8 ½" x 11" page. A brief caption should accompany each photograph. Place photos in the 10" x 13" manila envelope.
8. The telescope must be properly assembled and painted with a smooth and uniform finish.

9. Decals, if used, should be attached smooth and tight.
10. Telescopes designed by the exhibitor must be original, not a modification of an existing kit.
11. Exhibitor's name, county or district, age, and year(s) in project must be tagged or labeled in a prominent location on the telescope.
12. Astronomy exhibits may be checked out for use in a Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with the superintendent(s). The exhibit must be returned to display immediately after the demonstration/illustrated talk or the exhibit will be disqualified
13. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's exhibit, at the judges' discretion, will receive a participation ribbon.
14. Additionally, exhibitors may create an optional video (not required) about their project showing its operation and the work they have done. This allows judges to get a better understanding of the exhibit and allows the youth the opportunity to fully demonstrate their exhibit. The video should be no longer than 8 minutes and should be placed on a USB drive. These videos may also be considered for inclusion in a running video loop in the STEM area at the state fair after review by judges, superintendent(s), and extension staff. Adult guardians must complete the video release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area at the Kansas State Fair.
    a. FOR COUNTY FAIRS with consultation judging, it is recommended that the video elements be waived in favor of talking with the exhibitor.

Scoresheets, Forms, and Contest Study Materials:
- Kansas 4-H Astronomy Exhibit Form
- Kansas 4-H Astronomy Scoresheet
- www.STEM4KS.com

Awards/Recognition – Purple, blue, red, white, participant ribbons as well as disqualified, and best in show. Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
5500   Telescope made from kit.
5501   Telescope made from original design.

Resources:
- Project Area – STEM Astronomy

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact

STEM COMPUTERS

The Kansas 4-H STEM Computer System 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).

Rules
1. Any item which IS NOT a notebook, display board, or poster displayed in this class is considered a "computer system" exhibit and <u>MUST</u> follow the rules set forth below.
2. 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 motherboard-based manipulation) will remain in the Energy Management division.
3. The 4-H members must be currently enrolled in the 4-H STEM – Computers project to exhibit in this division.
4. Each exhibitor may enter one exhibit per class. Exhibits must have been completed during the current 4-H year and have been selected at the county level for entry at the State Fair level. Counties or district should select only top blue or purple ribbon computer exhibits which meet State Fair guidelines.
5. Computer exhibits may be checked out for use in a Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with the superintendent(s). The exhibit must be returned to display immediately after the demonstration/illustrated talk or the exhibit will be disqualified.
6. Exhibitor's name, county or district, 4-H age, and years(s) in project must be tagged or labeled in a prominent location on the exhibit, educational display, notebook, and/or poster.
7. See the last section for full details about exhibiting posters, display boards and notebooks.
8. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's exhibit, at the judges' discretion, will receive a participation ribbon.
9. 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 run the exhibit as described below.
    b. OR 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 8"X 8"X 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.

10. Physical computers such as tablets, smart phones, laptops, or personal computers (PCs) will not be accepted as an exhibit.

11. "Chip system" 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.

12. Any attached GPIO devices are not judged for electrical construction or quality as this division is focused on the operational aspects of the system that have automated articulated structures (arms, wheels, grippers, etc.) <u>which the exhibitor constructed,</u> some of these systems can also be classified as a STEM Robot, and the exhibitor must decide which division to exhibit in as the exhibit may not be entered in both divisions.

13. For chip system, 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.

14. 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. <u>Use of old forms should result in the loss of one ribbon placing for exhibits.</u>

15. 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, which is available through your local K-State Research and Extension office or at www.STEM4KS.com. This form must be attached to the outside of a 10" x 13" manila envelope. Do not tie the envelope to the exhibit.

    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 exhibits that are entered on USB drives, 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. <u>This is what will be displayed during the fair, all other materials will be sent back to the county/district office.</u> On the back side of the graphic the 4-Her's name, county/district, and club should be listed.

    d. Instructions to run any part of the exhibit on the USB drive.
    <u>(There should be at least three (3) items in your manila envelope: USB drive, graphic and instructions).</u>

16. 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.STEM4KS.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.

17. 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.

18. Diagrams or decision trees showing the logical flow of the system must be included on the USB drive for all exhibits.

19. 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.STEM4KS.com.

20. Each exhibit MUST include a video of the youth following their instructions for operation. This allows judges to get a better understanding of the exhibit and allows the youth the opportunity to fully demonstrate their exhibit. The video should be no longer than 8 minutes and should be placed on the USB drive. These videos may also be considered for inclusion in a running video loop in the STEM area at the state fair after review by judges, superintendent(s), and extension staff. Adult guardians must complete the video release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area at the Kansas State Fair.

    a. FOR COUNTY FAIRS with consultation judging, it is recommended that the video elements be waived in favor of talking with the exhibitor.

21. Each exhibit must accomplish a specific automated task using a computer, a chip system, URL, or virtual machine (VM).

22. Kanas State Fair Judge(s) in the computer system division will have a physical computer with the following minimum configuration to test exhibits with and view files:

    a. Microsoft Windows® 10

b. Microsoft Office® 365 (Excel, Power Point, & Word)
c. Microsoft Visual 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)

23. The STEM judges will have internet access at the Kansas State Fair. Internet based content may be included in exhibits. Exhibitors should take great care and only go on-line with their guardian's permission. User names and passwords should not be included in exhibits. If they are required to view the content, a temporary user account and password should be created for judging at the Kansas State Fair, once judging is complete the user name and password should be disabled on the account. If a separate user account is not possible, the content should be included as part of the video. YOU SHOULD NOT SHARE YOUR USER NAME OR PASSWORD WITH OTHERS.

24. 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. 4-Hers are not required to use the VMs in their projects. They are optional.

25. 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.

26. 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.

27. 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.

28. Judging will be based on a score sheet which can be found at 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

Eligibility – Each exhibitor may enter one exhibit per class.

Scoresheets, Forms, and Contest Study Materials:
- Kansas 4-H Computer Systems Exhibit Form
- Kansas 4-H Computer Systems Scoresheet

- www.STEM4KS.com

Awards/Recognition –Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Computer System Division
5590 Computer program, application, app, script, or coded system that is new and unique (not merely a file run in a program, such as a 'word document' or a picture drawn in 'Microsoft Paint').
5591 Computer presentation (power point, web page/site, animated graphics such as gifs, etc.)
5592 Single computer system (web server, database server, etc.) represented as a virtual machine.
5593 Networked system consisting of two or more virtual machines.
5594 Chip system - a small (8"X8"X8") programmed physical device that accomplishes a specific task.

Resources:
- Project Area – STEM Computer Systems

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact
Shane Potter, 4-H Youth Development Specialist

STEM ROBOTICS
The Kansas 4-H STEM Robotics program is designed to allow 4-H members to explore robotics through robots of various designs.

Rules
1. 4-H members must be currently enrolled in the Kansas 4-H STEM - Robotics project to exhibit in this division.
2. Each exhibitor may enter one robot per class. Exhibits must have been constructed and/or completed during the current 4-H year. The robot must have been selected at the county level for entry at the State Fair. Counties or districts should select only top blue or purple ribbon robot exhibits which meet State Fair guidelines.
3. Each robot must be free-standing, without the need for additional supports in order to be moved or exhibited. Each exhibit must include a robot, information

packets are not a sufficient exhibit.

4. Robots must have automated articulated structures (arms, wheels, grippers, etc.). Game consoles that display on a screen are not considered robots and should either be entered in computer system division or energy management project. Robots requiring no assembly, just programming, such as Ozobots, are considered computer system projects as the skill is focused on the programming not on the construction of the robot.

5. Robot dimensions should not exceed 2 feet high, by 2 feet wide, by 2 feet deep. Weight may not exceed 15 pounds. If displayed in a case (not required or encouraged for the state fair, but strongly encouraged for county fairs) the outside case dimensions may not be more than 26 inches in height, width, or depth.

6. Materials including but not limited to obstacles, spare batteries, and mats for testing the robot may be placed in a separate container, which is not included in the robots' dimensions, that container may not be larger than 576 cubic inches as measured along the outside of the container (Examples: 4" x 4" x 36" or 4" x 8" x 18" or 6" x 6" x 16"). The container, if used, and/or any large objects (such as mats or obstacles) should be labeled with the exhibitor's name(s) and county or district.

7. All electric components of the robot must be adequately covered or concealed with a protective enclosure. Paper is NOT considered an adequate enclosure or covering for electrical components.

8. Robots may be powered by an electrical, battery, water, air, or solar source only. Junk drawer robots may be powered by a non-traditional power source. Robots powered by fossil fuels/flammable liquids will be disqualified. Robots that include weaponry of any kind will be disqualified. Weaponry is defined as any instrument, possession, or creation, physical and/or electrical that is intended to inflict damage and/or harm to individuals, animal life, and/or property.

9. Remote controlled robots are allowed under certain conditions provided that the robot is not drivable. Robotic arms (hydraulic or electric) are allowed. A remote is allowed, provided more than a single action happens when a single button is pressed on the remote, for example "a motor spins for 3 seconds, at which point an actuator is triggered, then the motor spins for 3 more seconds." Remote controlled cars, boats, planes and/or action figures, etc. are not allowed.

10. Each robot must be in working condition. The judges will operate each robot to evaluate its workmanship and its ability to complete its intended task. In the event the robot uses a phone, tablet, or similar device for both programming AND control of the robot a video will be used to evaluate the working condition of the robot.

11. Each exhibitor is required to complete the "4-H STEM Robotics Exhibit Information Form" which is available through your local K-State Research and Extension office or at www.STEM4KS.com. This form must be attached to the outside of a 10" x 13" manila envelope. 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 State 4-H Office for the current year. Use of old forms should result in the loss of

one ribbon placing for exhibits.

12. The exhibit must include written instructions for operation (the instructions should be written as if they were to tell a grandparent or elderly person how to operate the robot), construction plans, and one to three pages of project photographs. In addition, a 5-minute video presentation placed on a CD, DVD, USB drive, or similar removable storage device, if applicable. For robots that can be programmed, robot programming information must be included, this information should be placed inside the 10" x 13" manila envelope mentioned above. Robot programming information can be, but not limited to, source code, block diagrams, screen captures of the coding window, and other images that show the programming logic used. The exhibitor may enter their electronic project listed under the energy management program if the exhibitor so chooses. No exhibitor will be allowed to set up their robot in person.

13. In the event that the robot uses a device like a phone, iPad, or tablet for programming AND operation, DO NOT include the device (phone, tablet, etc.). The device's safety cannot be insured. Instead record a video demonstrating the instructions included for your robot. It should show, setting up the robot, starting the robot, the robot executing its task, and powering off the robot, just like the instructions are written.

14. Each exhibit MUST include a video of the youth following their instructions for operation. This allows judges to get a better understanding of the exhibit and allows the youth the opportunity to fully demonstrate their exhibit. The video should be no longer than 8 minutes and should be placed on the CD, DVD, USB drive, or similar. These videos may also be considered for inclusion in a running video loop in the STEM area at the state fair after review by judges, superintendent(s), and extension staff. Adult guardians must complete the video release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area at the Kansas State Fair.

15. FOR COUNTY FAIRS with consultation judging, it is recommended that the video elements be waived in favor of talking with the exhibitor Creativity, workmanship, and functionality will be strong criteria in judging the "Robot designed by Exhibitor" classes. All robots should have a purpose or intended function, examples include, but are not limited to following a line, sweeping the floor, solving a Rubix Cube, sorting colors, or climbing stairs.

16. Exhibitor's name(s) and county or district must be tagged or labeled on the robot such as on the bottom of the robot, exhibit cards are not an acceptable form of labeling

17. There are no county or district boundaries that must be adhered to in order to form a Kansas 4-HSTEM Robotics team. However, as mentioned in #1, each team member must be currently enrolled in the Kansas 4-H STEM project.

18. Robotics exhibits may be checked out for use in a Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with superintendent(s). The exhibit must be returned to display immediately after the demonstration/illustrated talk or the exhibit will be disqualified.

19. See the last section for full details about exhibiting posters, display boards and

notebooks.

Scoresheets, Forms, and Contest Study Materials:
- [Kansas 4-H STEM Robotics Exhibit Form](#)
- [Kansas 4-H STEM Robotics Scoresheet](#)
- [www.STEM4KS.com](#)

Awards/Recognition –Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Intermediate Division (Ages 9 – 13 years)
5509   Robot made from a commercial (purchased) kit (no programming, just assembly).
5510   Robot designed by exhibitor. The robot must not be a mere modification of an existing robot kit or plan.
5511   Programmable robot made from a commercial (purchased) kit.
5546   Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote-controlled device.
5544   Junk Drawer Robotics.

Senior Division (Age 14 years and older)
5313   Robot made from a commercial (purchased) kit (no programming just assembly).
5514   Robot designed by exhibitor. The robot must not be a mere modification of an existing robot kit or plan.
5515   Programmable robot made from a commercial (purchased) kit.
5547   Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote-controlled device.
5545   Junk Drawer Robotics.

Division D – Team Robotics Project
5517   Robot designed and constructed by two or more 4-H STEM project members. The robot must not be a mere modification of an existing robot kit or plan. The robot may be a programmable type that is made from a commercial (purchased) kit. This division is designed to encourage teamwork and cooperation among fellow 4-HSTEM members. As with many high-tech projects today, no one person designs and builds a robot alone. It takes the brainstorming, planning, problem solving, and cooperation of an entire team to complete a given robotics project.

Resources:
- Project Area – [STEM Robotics](#)

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact
Shane Potter, 4-H Youth Development Specialist

STEM ROCKETRY

The Kansas 4-H STEM Rocketry program is designed to allow 4-H members to explore aerospace through rockets of various sizes. Kansas 4-H has adopted the National Association of Rocketry's rules, regulations, and safety guidelines.

Rules
A. Exhibit Information for ALL rocketry categories
1. 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 State 4-H Office for the current year. Use of old forms should result in the loss of one ribbon placing for exhibits.
2. Relevant documents may be obtained from County Extension Offices or from www.STEM4KS.com
3. Rocketry exhibits may be checked out for use in the Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with the chair or Shane Potter. The exhibit must be returned to display immediately after the demonstration/illustrated talk or the exhibit will be disqualified.
4. NAR refers to the National Association of Rocketry and its governing board.
5. Tripoli refers to the Tripoli Rocketry Association and governing board.
6. All NAR documents, with the exception of the "pink book," referenced herein can be found at http://www.nar.org.
7. If a fire burn ban is in effect for any county in Kansas, exhibitors in any Kansas County are not required to launch their rocket(s). All requirements for the launching of rockets for the state fair and the documenting of the launching are suspended for the duration of the ban.
8. Exhibitors may create an **optional** video (not required) about their project and the work they have done. The video should be no longer than 8 minutes and should be placed on a USB drive. These videos may also be considered for inclusion in a running video loop in the STEM area at the state fair after review by judges, superintendent(s), and extension staff. Adult guardians must complete the video release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area at the Kansas State Fair.
   a. FOR COUNTY FAIRS with consultation judging, it is recommended that the video elements be waived in favor of talking with the exhibitor.
9. See the last section for full details about exhibiting posters, display boards and notebooks.

B. Exhibit Definitions for ALL rocketry categories

1. As defined by the National Association of Rocketry (NAR), a scale model is "any model rocket that is a true scale model of an existing or historical guided missile, rocket vehicle, or space vehicle." The intent of scale modeling is, according to the NAR, "to produce an accurate, flying replica of a real rocket vehicle that exhibits maximum craftsmanship in construction, finish, and flight performance." (NAR "Pink Book" 50.1 4-1)
2. Adult supervision is defined as being under the direct supervision of someone 18 years of age or older.
3. For the purposes of Kansas 4-H STEM a <u>mid-powered</u> rocket is defined as a rocket that uses an 'E', 'F', 'G', or equivalent engine for launch. In addition, rockets also qualify for mid-power if they meet any of the following criteria:
    a. Is 2 inches or greater in diameter (not including fins) <u>and</u> taller than 3 feet (36 inches including fins) and do not use an engine(s) exciding 160.01 Newton seconds of total impulse (an 'H' engine equivalent or above).
    b. The total impulse of all engines used in the rocket is greater than 20.01 Newton-seconds and less than 160.01 Newton-seconds.
4. For the purposes of Kansas 4-H STEM a high-powered rocket is defined as a rocket that meets any of the following criteria:
    a. Weighs more than 3.3125 pounds (53 ounces or 1500 grams) at the time of launch;
    b. Uses a 'H' engine or larger to launch
    c. The total impulse of all engines used in the rocket is greater than 160.01 Newton-seconds of thrust.
    d. Includes any airframes parts of ductile, metal, though, the use of ductile metal is strongly discouraged.
    e. Models powered by rocket motors not classified as model rocket motors per NFPA 1122, e.g.:
        i. Average thrust in excess of 80.01 Newtons
        ii. Contains in excess of 125 grams of propellant and are limited to only H and I motors.
        iii. Uses a hybrid motor or a motor designed to emit sparks
5. High power certification is defined as having successfully completed a certification program for high-powered rocketry through the NAR or Tripoli and maintaining that certification. This applies to all membership levels in the NAR and Tripoli. Specifically, the "Formal Participation Procedure" for the "Junior HPR Level 1 Participation Program" as outlined by the NAR and the "Tripoli Mentoring Program (TMP) as outlined by Tripoli.
6. NAR rules for launching and construction of all rockets are assumed to be used by all 4-H STEM exhibitors and will be considered during judging.
7. For the purposes of Kansas 4-H STEM, NO rocket may be launched using engines totaling more than an 'I' impulse engine or 640 Newton-seconds of total thrust.

C. Exhibit Rules for ALL rocketry categories

These rules apply to how rockets are to be displayed at the fair and what those displays should and should not contain. These rules apply to all rockets displayed in the STEM

division.
1. 4-H members must be currently enrolled in the 4-H STEM-Rocketry program to exhibit in this division.
2. Entries must have been selected at the county level for entry at the State Fair. Counties/Districts should select top blue or purple ribbon rocketry exhibits which meet Kansas State Fair guidelines.
3. Each exhibitor may enter up to two rocket exhibits that have been constructed during the current year. If two rockets are entered, one rocket must be a "model rocket kit" or the second may be entered into any other applicable class. An exhibitor may not enter two rockets in the same class.
4. The report that accompanies the rocket must be limited to the 4-H STEM Rocket Exhibit Information Form which is affixed to a 10" x 13" envelope. This envelope should NOT be attached to the rocket stand or rocket. The information form should be signed by the exhibitor. This may be downloaded from www.STEM4KS.com Any rocket exhibit not including this completed envelope will receive an automatic participation ribbon.
5. Plans (or a photocopy) must be placed inside the envelope:
    a. This includes original design rockets.
    b. If a rocket kit has been modified structurally (Which must provide all necessary details to construct an original design rocket.), notations need to be given indicating the changes made, either by notations on the Rocket Exhibit Information Form or by placing notes in the plans. Such modifications require the rocket to be swing tested and documented to show a stable flight.
6. One or more photographs of the rocket during construction and at the launch site are required:
    a. Photographs showing the rocket at the moment of ignition are preferred.
    b. Photographs must be mounted on one side of 8 ½" x 11" page(s).
    c. There must be at least 1 page of photos and no more than 5 pages of photos.
    d. Include at least one photo showing rocket construction, preferably with the exhibitor included.
    e. Do not include photos of members catching their rockets as they return to earth. This is an unsafe practice, and we do not recommend or condone this practice.
    f. Pictures at the launch site are not required in the event of a burn ban.
7. To exhibit in this division:
    a. The rocket must have been flown unless a burn ban is in effect.
    b. Support rods must not extend past the tip of the highest nosecone on the model.
    c. Support rods must remain in the upright position, 90 degrees to the display base, do not angle. If support rods are not perpendicular to the base, the judge should deduct two ribbon placings.
    d. No model may be submitted on a launch pad
8. Launches should not be conducted in winds above 20 mph and will constitute a disqualification of rocket exhibit.

9. All rockets must have a safe method of recovery, e.g., parachute, streamer or tumble recovery. Any rocket without a recovery system will be disqualified.
10. The altitude achieved by the rocket is to be determined using a method other than estimation. Examples of accepted methods include altimeter, computer software, range finders, etc. If additional space is needed to show calculations of how the altitude was achieved one additional page may be added to the rocketry information pack.
11. Flight damage is to be documented by the participant on either the construction plans, an additional sheet of paper titled "flight damage" or the 4-H STEM Rocket Exhibit Information Form.
12. The judging of flight damage is to be secondary to all other aspects of the model and only then may it even be considered. However, under no circumstance may flight damage be grounds for disqualification.
13. Engines and igniters, under any circumstance, ARE NOT permitted with the exhibit and constitute an **immediate** disqualification.
14. If an engine becomes stuck, jammed, wedged, or in any other way permanently affixed in or to a rocket and cannot be removed from the rocket, the rocket will be subject to immediate disqualification. This is because it is not possible to make a full and immediate assessment of the safety of the rocket when it is being judged and safety is paramount.
15. Engines may not be used as display stands hollowed out or otherwise. Engines used as a display stand will cause the exhibit to be subject to immediate disqualification.
16. Rocket engines should not be used to join multi-stage rockets together.
    a. Multi-stage rockets can be displayed without having the stages connected together. In that case the final stage (the one with the nose cone) should be placed on the display stand, and other stages with a loop of string to the display stand.
    b. The different stages must be included to complete the rocketry exhibit, incomplete exhibits will be deducted at least one ribbon placing.
    c. Use of any engines to join the stages together will be subject to immediate disqualification.
17. Multi-stage rockets can be flown using just the final stage and be considered fully flown.
18. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's rocket, at the judges' discretion, will receive a participation ribbon. All information necessary will be given to the NAR and/or TRIPOLI for investigation and possible revocation of membership.

D. Construction Rules for ALL Rockets
These rules apply to how rockets are to be displayed at the fair and what those displays should and should not contain. These rules apply to all rockets displayed in the STEM division.
1. Rockets are to be properly assembled according to the assembly instructions.
2. Beginner kits with prefabricated fin assemblies and pre-finished rockets requiring no painting are not acceptable and will be disqualified.

3. Plastic snap together fins and prefabricated fin assemblies that **do not** require fin alignment are not acceptable and will be disqualified.
   a. This rule does not apply to plastic fins that must be manually aligned and do not utilize a fin alignment mechanism, including, but not limited to fin alignment rings or spacing blocks.
   b. This rule does not apply to fiberglass, Kevlar, extruded foam, composite, or wood fins; especially when used for "through-the-wall" fin attachment techniques that are common in larger rockets.
   c. In addition, plastic parts for decorative and mechanical purposes (i.e. decorative nozzles and moving landing struts) are not considered fins and can consist of plastic. Decorative nozzles, etc. need to be securely fastened and not pose a safety hazard.
   d. Fin assemblies that are printed using a 3D printer are excluded from this rule. Though detailed instructions on the creation of the fin assemblies must be provided and an additional page of photos may be included to show the creation/printing of fin assemblies
4. Angles of fins must fall within a plus or minus 2 degree variation using an approved fin alignment guide (such as KSSTAC10). An official fin guide is available from www.STEM4KS.com
5. Fins should be rounded or streamlined according to instructions. If the other edges are rounded to reduce drag on all exposed sides, there should be no ribbon deduction, unless instructions indicate to leave flat, or instructions say to round and rounding was not done.
6. Fins and body tubes are to be sealed with sanding sealer and/or primer to eliminate the appearance of body grooves and wood grain.
7. Fins and launch lugs are to be filleted to reduce drag and properly secure them to the model.
8. Engine mounts are to be securely attached to the body tube.
9. Any seams on plastic parts are to be sanded smooth.
10. Body tubes/airframes/engine mounts can be made from suitable materials, including, but not limited to: reinforced paper, cardboard, phenolic resin, specialized polymer resins, fiberglass, Kevlar, or other suitable structural materials. However, foam my not be used for external body or other external rocket parts.
11. The nose cone is to fit snugly but still allow for easy removal.
12. Exhibits must be uniformly painted and smoothly finished or finished as per rocket instructions, and have decals applied smoothly.
13. Non-standard surfacing (such as textured paint) may be used if directed by the instructions, this includes scratch-built rockets.
14. Models may not be judged based on their plaint scheme (colors and placement on the rocket), with the exception of rockets that fit the definition of a 'scale model.' All other rockets do not have to follow the suggested paint scheme, allowing the 4-H'er to display maximum creativity in the finishing of their rocket. Under no circumstances is the weight given to the paint scheme to be sufficient enough, by itself, to move a non-scale model from one ribbon placing to another.
15. "Scale models" may be judged based on their paint scheme. The judge may

deduct up to one ribbon placing for not following the paint scheme.
16. Scale Model Rockets are to be finished and completed with a majority (greater than 70%) of decals.
17. If a modification is made to the rocket, for example, adding a fin, a swing test must be conducted on the rocket, and the documentation provided. Failure to test and document flight stability following modifications will result in <u>two ribbon placing deductions.</u>

E. Model Rocketry Specific Guidelines (Ages 9 and older)
Model rockets are generally small-to-medium sized rockets that can be purchased at hobby stores that an individual(s) builds from parts similar to those found in model rocket kits.
1. Rockets classified as high or mid powered may not be entered in this category.
2. Each rocket must be able to stand freely by itself or be supported by a solid base, not to exceed 4-1/4" (four and one quarter inch) thick and 8" square. The exhibitor's name, county or district, and age must be labeled on the base. Rod materials should be sturdy, and not made of flimsy materials, such as coat hangers.
3. If the model rocket is greater than 4 feet tall it can be displayed without a base or displayed parallel to the ground with up to 3 notched blocks not to exceed 4" in height width and depth. The exhibitor's name, county or district, and age must be labeled on the base(s).
4. All exhibitors must comply with the NAR Model Rocket Safety Code that is in effect as of October 1st of the current 4-H year. However, in the event that there is a modification in this code, the STEM Action Team may review and implement the modified code.

F. Original Design Specific Rocket Guidelines (Ages 11 and older)
To allow for youth to develop their own rockets (model, mid, and high powered) in a safe manner that displays maximum craftsmanship.
1. Original design rockets cannot be a modification of a pre-existing kit and must be of original design.
2. Original design rockets must be designed by the exhibitor(s).
3. Original design rockets must include detailed instructions, so that someone could construct the original designed rocket just like a kit purchased at a store. Instructions can be as many pages as needed to convey full and complete construction techniques.
4. Original design rocket instructions should not include copies of instructions in part or in whole from existing kits.
5. For a rocket entered in the original design classes, describe in the summary how the rocket was tested for stability prior to flying. <u>Swing testing of the rocket is required</u>. Other tests and calculations are encouraged. Exhibitors must include documentation of the swing test. Failure to swing test a rocket will result in a <u>deduction of TWO ribbon placings.</u>
6. A minimum of one additional page must be added to the rocketry information pack detailing the test(s) performed to insure stability. 4-Her's are strongly encouraged to provide as much detail as possible. Failure to provide adequate

written documentation will result in a disqualification.

Scoresheets, Forms, and Contest Study Materials:
- [Kansas 4-H STEM Rocketry Information Form](#)
- [Kansas 4-H STEM Rocketry Scoresheet](#)
- [High Powered & Mid Powered Rocket Form & Information](#)
- [Rocket Fin Guide – Up to 8 Fins](#)
- [Rocket Fin Guide – 3 Wings](#)
- [Rocket Fin Guide – 5 Wings](#)
- [www.STEM4KS.com](#)

Awards/Recognition –Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Division A (Ages 9 – 13 years)
5520   Rocket made from kit. Include plans.
5537   Scale Model Rocket. Made from kit, includes plans.

Division B (Ages 11 – 13 years) 9 and 10-year-olds may not enter this class.
5521   Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans.
5538   Scale Model Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans and stability testing.

Division C (Ages 14 years and older)
5525   Rocket made from kit. Include plans.
5526   Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans.
5527   Rocket designed by exhibitor: that uses alternative skins; not merely a modification of an existing kit. Include original plans.
5539   Scale Model Rocket made from kid. Include plans.
5540   Scale Model Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans and stability testing.

Division D (Ages 11 years and older)
This class is designed to encourage teamwork among individuals and clubs to work on a rocket from the initial design to the finished product.
5530   Rocket designed by 2 or more exhibitors: not merely a modification of an existing kit. Include original plans.

Mid-power Rocketry (2x'D' to 'G' Engines) Guidelines:
Purpose: To allow for improved safety and judging of rockets that meet the requirements of 4-H mid-power rockets.
1. Exhibitors must be at least 14 years of age by January 1 of the current year.

2. The rules for ALL categories apply.
3. In addition to the information packet completed for all rockets, a high/mid power information form is to be completed and placed inside of the information packet. This may be downloaded from http://www.kansas4-H.org/. Click on KSF Packet link.
4. Exhibitors in this division must hold memberships in either NAR or Tripoli organizations.
5. The NAR Model Rocket Safety code applies to the construction and launching of all rockets displayed in this division. As such all exhibitors must comply with the NAR Model Rocket Safety Code that is in effect as of October 1st of the current year. However, in the event that there is a modification in this code the STEM Action Team may review and implement the modified code.
6. All rockets in this division are to be launched under adult supervision by the 4-H member who constructed the rocket.
7. High power rockets as defined above ('H' or 'I' engines) may not be launched in this division.
8. If according to Federal Aviation Regulations Part 101, a waiver is required to fly the rocket, a copy of that waiver is to be attached to the High-Power Information Form. In the case where the launch was a public event a substitute to a copy of the waiver is the Range Safety Officers (RSO's) contact information.
9. Mid- Power rockets may be displayed without a supporting stand. If a supporting stand is used, it is not to exceed 4-1/4" (four and one-quarter inch) thick and 8" square. The exhibitor's name, county or district, and age must be labeled on the base.

Division E (Ages 14 years and older)
5536   Mid-power rocket made from kit or original design.

High Power Rocketry ('H' or 'I' engines) Guidelines
To allow for improved safety and judging of rockets that meet the requirements of 4-H high power rockets.
1. Exhibitors must be at least 14 years of age by January 1 of the current year.
2. The rules for ALL categories apply.
3. In addition to the information packet completed for all rockets, a high-power information form is to be completed and placed inside of the information packet. This may be downloaded from www.STEM4KS.com.
4. Exhibitors in this division must hold memberships in either NAR or Tripoli organizations.
5. The NAR High Power Rocket Safety Code applies to the construction and launching of all rockets displayed in this division. As such all exhibitors must comply with the NAR High Power Rocket Safety Code that is in effect as of October 1st of the current 4-H year. However, in the event that there is a modification in this code the STEM Action Team may review and implement the modified code.
6. All rockets in this division are to be launched under adult supervision by the 4-H member who constructed the rocket.

7. For rockets launched using an engine(s) that have160.1 ('H' engine or equivalent amount of smaller engines) Newton's-seconds or larger, adult supervision must be provided by an individual having at least a level 1 high power certification. The 4-H member should also hold or be attempting to attain their level 1 high power certification, and should include supporting documentation of such (a copy of Level 1 card is sufficient).
8. If according to Federal Aviation Regulations Part 101, a waiver is required to fly the rocket, a copy of that waiver is to be attached to the High-Power Information Form. In the case where the launch was a public event a substitute to a copy of the waiver is the Range Safety Officers (RSO's) contact information.
9. High Power Rockets may be displayed without a supporting stand. If a supporting stand is used, it is not to exceed 4-1/4" (four and one-quarter inch) thick and 8" square. The exhibitor's name, county or district, and age must be labeled on the base.

Division F (Ages 14 years and older)
5535 High power rocket made from kit or original design.

Recommended County Fair rules for Rocketry
This is a reduced set of rules for use at county fairs. The use of these rules is optional and left to the discretion of the county fairs. These are more simplistic rules that cover the most common scenarios that are likely to appear at county fairs. Youth who are eligible for the Kansas State Fair should read the Kansas State Fair rules for this division as the State Fair rules expect more from youth and set a higher bar as it is a state-wide event exhibiting the best from across the State of Kansas.
1. 4-H members must be currently enrolled in the 4-H Rocketry program to exhibit in this division.
2. All rockets displayed in this division must be constructed during the current 4-H year
3. If a rocket qualified for the Kansas State Fair, exhibitors should read the State Fair rules for the Rocketry division as they may be different from those at the county fair.
4. Each exhibitor may enter up to two rocket exhibits that have been constructed during the current year. If two rockets are entered, one rocket must be a "model rocket kit", the second may be entered into any other applicable class. An exhibitor may not enter two rockets in the same class.
5. 4-Hers are to complete and sign the rocketry information form, available from www.STEM4KS.com or your local extension office and attach it to a 10" x 13" "manila" envelope. The envelope should contain:
   a. Instructions on how to construct the rocket
   b. Up to 5 pages of pictures from both construction and launch
   c. Documentation of any flight damage that occurred
   d. Any modifications made to the rocket
   e. An additional page for altitude calculations if the space on the form is not enough.
   f. Additionally, for original design rockets, also known as "scratch built"

rockets:
- g. 5 additional pages of photos are allowed
- h. Documentation of how the rocket was tested for stability

6. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's rocket, at the judges' discretion, <u>will receive a participation ribbon.</u>
7. Rockets are to be displayed upright on a display stand with a sturdy rod that does not extend past the top of the rocket or stand unassisted, unless the rocket is taller than 4 feet in which case no display stand is required and the rocket may be displayed on its side, <u>rockets are not to be displayed on launch pads</u> to save space and prevent someone from being poked in the eye.
8. Rockets ARE NOT to be displayed with used or unused rocket engines either in the rocket or as part of the stand, if rocket engines are included in the exhibit the judge may disqualify the exhibit.
9. Rockets should be flown unless there is an active burn ban in the county or conditions are too dangerous to safely launch the rocket. Just flying the last stage (the part with the nose cone) of a multi-stage rocket is acceptable.
10. Rockets, except those in the JR division, are not to be "beginner kits" or use prefabricated fin assemblies or pre-finished rockets requiring no painting, these are not acceptable outside the JR division, and <u>should be disqualified</u>
11. Angles of fins must fall within a plus or minus 2-degree variation using an approved fin alignment guide (such as KSSTAC10). An official fin guide is available from <u>www.STEM4KS.com.</u>
12. Fins and body tubes, except those in the introductory division, are to be filled and sealed with sanding sealer and/or primer or other suitable filler to eliminate the appearance of body grooves and wood grain.
13. Fins and launch lugs are to be filleted to reduce drag and properly secure them to the model.
14. Engine mounts are to be securely attached to the body tube.
15. Any seams on plastic parts are to be sanded smooth.
16. The recovery system (typically a parachute or streamer) should be attached according to the instructions
17. The nose cone is to fit snugly but still allow for easy removal.
18. Exhibits must be uniformly painted and smoothly finished or finished as per rocket instructions (for example, no painting required), and decals, if used, are applied smoothly.
19. Models may not be judged based on their plaint scheme (colors and placement on the rocket), except for rockets that fit the definition of a 'scale model*'and are entered in the scale model class. All other rockets do not have to follow the suggested paint scheme, allowing the 4-H'er to display maximum creativity in the finishing of their rocket. Under no circumstances is the weight given to the paint scheme to be sufficient enough, by itself, to move the non-scale model from one ribbon placing to another.
20. "Scale models*" entered in the scale model class may be judged based on their paint scheme. The judge may deduct up to one ribbon placing for not following the paint scheme.
21. "Scale Models*" displayed in the scale model class are to be finished and

completed with a majority (greater than 70%) of decals. For all other rockets the use of decals is optional.

22. Original design rockets cannot be a modification of a pre-existing kit and must be of original design.
23. Original design rockets must be designed by the exhibitor(s).
24. Exhibitor(s) must be 11 years of age (4-H age) or older to enter an original design rocket.
25. Original design rockets must include detailed instructions, so that someone could construct the original designed rocket just like a kit purchased at a store. Instructions can be as many pages as needed to convey full and complete construction techniques.
26. For a rocket entered in the original design classes, describe in the summary how the rocket was tested for stability prior to flying. Swing testing of the rocket is required. Other tests and calculations are encouraged. Exhibitors must include documentation of the swing test. Failure to swing test a rocket will result in a deduction of TWO ribbon placings.
27. A minimum of one additional page must be added to the rocketry information pack detailing the test(s) performed to insure stability. 4-Her's are strongly encouraged to provide as much detail as possible. Failure to provide adequate written documentation will result in a disqualification.
28. Rockets that use more than one 'D' engine or equivalent are consider mid or high-power rockets in 4-H.
29. Mid and High-Power exhibitors must be at least 14 years of age by January 1 of the current year.
30. In addition to the information packet completed for all rockets, a high-power information form is to be completed and placed inside of the information packet. This may be downloaded from www.STEM4KS.com
31. Exhibitors in the mid and high-power divisions must hold memberships in either NAR or Tripoli organizations.
32. The NAR High Power Rocket Safety Code applies to the construction and launching of all rockets displayed in this division. As such all mid and high-power rocketry exhibitors must comply with the NAR High Power Rocket Safety Code that is in effect as of October 1st of the current 4-H year.
33. All rockets in the mid and high-power divisions are to be launched under adult supervision by the 4-H member who constructed the rocket.
34. For rockets launched using an engine(s) that have160.1 ('H' engine or equivalent amount of smaller engines) Newton's-seconds or larger, adult supervision must be provided by an individual having at least a level 1 high power certification. The 4-H member should also hold or be attempting to attain their level 1 high power certification if launching on this large of an engine.

As defined by the National Association of Rocketry (NAR), a scale model is "any model rocket that is a true scale model of an existing or historical guided missile, rocket vehicle, or space vehicle." The intent of scale modeling is, according to the NAR, "to produce an accurate, flying replica of a real rocket vehicle that exhibits maximum craftsmanship in construction, finish, and flight performance."

(NAR "Pink Book" 50.1 4-1)

<u>**COUNTY ONLY CLASS**</u>
Division JR (Ages 7 – 8 years)
##20a Rocket made from kit, without pre-assembled fin units. Include plans.
##20b Rocket made from "beginners kit." Include plans. Rockets in this class may have pre-assembled fin units. (This class is for first and second year 4-H members to explore the rocketry project).
##37a Scale Model Rocket made from kit, include plans.

Division A (Ages 9 – 13 years)
5520   Rocket made from kit. Include plans.
5537   Scale Model Rocket made from kit. Include plans.
Division B (Ages 11 – 13 years) 9 and 10 year olds may not enter this class.
5521   Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans.
5538   Scale Model Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans and stability testing.

Division C (Ages 14 years and older)
5525   Rocket made from kit. Include plans.
5526   Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans.
5539   Scale Model Rocket made from kit. Include plans.
5540   Scale Model Rocket designed by exhibitor: not merely a modification of an existing kit. Include original plans and stability testing.

Division D (Ages 11 years and older)
This class is designed to encourage teamwork among individuals and clubs to work on a rocket from the initial design to the finished product.
5530   Rocket designed by 2 or more exhibitors: not merely a modification of an existing kit. Include original plans.

Division E (Ages 14 years and older)
5536   Mid or high-power rocket made from kit or original design.

Resources:
   • Project Area – STEM Rocketry

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact
Shane Potter, 4-H Youth Development Specialist

STEM UNMANNED AERIAL SYSTEM

The 4-H unmanned aerial system or UAS project explores the world from above the trees and discovers new frontiers with UASs. UASs are commonly known as Unmanned Aerial Vehicles (UAVs) or drones. Members explore the uses and applications of unmanned aerial system including how UASs link to other projects such as geology, robotics, electronics, crop science and many more.

Rules
1. The 4-H members must be currently enrolled in the 4-H STEM project to exhibit in this division.
2. Each exhibitor may enter one exhibit per class. Exhibit must have been completed during the current 4-H year and have been selected at the county level for entry at the State Fair level. Counties or district should select only top blue or purple ribbon exhibits which meet State Fair guidelines.
3. The information that accompanies the UAS must be limited to the 4-H STEM Exhibit Information Form which is affixed to a 10" x 13" envelope. This envelope should NOT be attached to the UAS. This may be downloaded from www.STEM4KS.com . Any UAS exhibit not including this completed envelope will receive an automatic participation ribbon. All revisions of forms previously released for the STEM division 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.
4. Each exhibit MUST include a video of the youth operating their UAS. This allows judges to get a better understanding of the exhibit and allows the youth the opportunity to fully demonstrate their exhibit. The video should be no longer than 8 minutes and should be placed on the CD, DVD, USB drive, or similar. These videos may also be considered for inclusion in a running video loop in the STEM area at the State Fair after review by judges, chair(s) and extension staff. Adult guardians must complete Video Release included with the exhibit form. If the release is not completed the video will not be included in the video loop on display in the STEM area of the Kansas State Fair.
5. Unmanned aerial system exhibits may be checked out for use in a Kansas State Fair 4-H demonstration or 4-H illustrated talk with prior permission. For permission, check with the superintendent. The exhibit must be returned to display immediately after the demonstration/illustrated talk or the exhibit will be disqualified.
6. Exhibitor's name, county or district, age, and years(s) in project must be tagged or labeled in a prominent location on the exhibit, educational display, notebook, and/or poster.
7. Unmanned Aerial System that include or depict weaponry of any kind will be disqualified.
8. See the last section for full details about exhibiting posters, display boards and notebooks.
9. If modifications are made to the exhibit a page should be attached noting those

modifications.
10. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's exhibit, at the judges' discretion, will receive a participation ribbon.

Scoresheets, Forms, and Contest Study Materials:
- Kansas 4-H Unmanned Aerial Systems (UAS) Exhibit Form
- Kansas 4-H Unmanned Aerial Systems (UAS) Scoresheet
- www.STEM4KS.com

Awards/Recognition –Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Intermediate Division (Ages 9 – 13 years)
5701 Unmanned Aerial System designed and constructed by exhibitor that is operated by a remote-controlled device. The UAS must not be a mere modification of an existing kit or plan. You may not exhibit a UAS that is purchased off the shelf in this class.
5702 Practical application of an Unmanned Aerial System constructed from a commercial (purchased) kit. This includes the UAS, plus one or more of the following: video, notebook, poster, display board, etc. This class is separate from educational exhibits. A tangible use would be mapping Russian olive trees, eroded soils, and bindweed in fields, etc. There are also many other non-agricultural UAS uses that would be appropriate for this class.

Senior Division (Ages 14 and older)
5706 Unmanned Aerial System designed and constructed by exhibitor that is operated by a remote-controlled device. The UAS must not be a mere modification of an existing kit or plan. You may not exhibit a UAS that is purchased off the shelf in this class.
5707 Practical application of an Unmanned Aerial System constructed from a commercial (purchased) kit. This includes the UAS, plus one or more of the following: video, notebook, poster, display board, etc. This class is separate from educational exhibits. A tangible use would be mapping Russian olive trees, eroded soils, and bindweed in fields, etc. There are also many other non-agricultural UAS uses that would be appropriate for this class.

Resources:
- Project Area – STEM UAS

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact
Shane Potter, 4-H Youth Development Specialist

STEM EDUCATIONAL EXHIBITS
(Posters, Notebooks, and Display Boards)

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

Rules
1. The General Exhibit rules for ALL categories apply.
2. Entries must have been selected at the county level for entry at the Kansas State Fair. Counties/Districts should select top blue or purple ribbon Educational Rocketry Exhibits which meet State Fair guidelines.
3. For notebooks, display boards, and posters, no additional exhibit information is required; no manila envelope is needed for these exhibits.
4. Exhibits are to have a **clear link to the STEM areas** of astronomy, computers, rocketry, robotics, or unmanned aerial systems, educational exhibits outside of these STEM areas should be displayed in the other program areas
5. Exhibits in posters, notebooks and display boards must contain substantial supporting educational materials.
6. 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 available at www.STEM4KS.com.   For example, a rocket that may have crashed and/or is highly damaged may be made into an educational display or poster that tells a great story with many lessons learned.
7. 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.
8. Educational displays are not to exceed a standard commercial 3' x 4' tri-fold display board. No card table exhibits will be allowed. Care should be taken to use durable materials that will withstand Kansas State Fair conditions.
9. "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.
10. Educational Project notebooks must be organized in a 3-ring binder.
11. Any three-dimensional poster or display board exhibits may not be thicker than 2 inches.
12. Engines and igniters for rockets ARE NOT permitted with the exhibit and

constitute an immediate disqualification. This is for safety reasons and includes both spent and live engines.

13. 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 education displays and/or posters the exhibitor's name, county, or district, age, and year(s) in project must be tagged or labeled on the back of the exhibit. Exhibit cards are not sufficient as they may be removed or repositioned for display. Failure to label an exhibit may result in one ribbon placing deduction.

14. Exhibits should possess the following qualities (in no particular order):
    a. A Central theme
    b. What you want others to learn
    c. Be designed and constructed in a manner befitting the exhibit
    d. Be something you are interested in
    e. Be related to Astronomy. Computer System, Robotics, Rocketry, or Unmanned Aerial System
    f. As well as those characteristics described above.

15. If a safety violation is noted by the judges, superintendent, or other staff, the exhibitor's exhibit, at the judge's discretion, will receive a participation ribbon.

16. Posters, Notebooks, and Display Boards may be checked out for use in a Kansas State Fair 4-H demonstration or illustrated talk with prior permission. For permission, check with the superintendent(s). The exhibit must be returned to display immediately after the demonstration/illustrated talk, or the exhibit will be disqualified.

Eligibility - Exhibits must have been constructed and/or completed during the current 4-H year. The exhibit must have been selected at the county level for entry at the State Fair. Counties or districts should select only top blue or purple ribbon robot exhibits which meet State Fair guidelines.

Scoresheets, Forms, and Contest Study Materials:
- [Kansas 4-H STEM Educational Exhibit Scoresheet](#)
- [www.STEM4KS.com](#)

Awards/Recognition – Purple, blue, red, white, participant ribbons as well as disqualified, and best in show. Best in show is applied across all STEM exhibit areas and may not be awarded.

Classes
Astronomy – Intermediate Division (Ages 9 – 13)
5731   Junior Astronomy Educational Display
5732   Junior Astronomy Educational Notebook
5733   Junior Astronomy Educational Poster

Astronomy – Senior Division (Ages 14 years and older)
5736   Senior Astronomy Educational Display

5737   Senior Astronomy Educational Notebook
3738   Senior Astronomy Educational Poster

Rocketry – Intermediate Division (Ages 9 – 13)
5741   Rocketry Educational Display
5742   Rocketry Notebook
5743   Rocketry Poster Board

Rocketry – Senior Division (Ages 14 years and older)
5746   Rocketry Educational Display
5747   Rocketry Notebook
5748   Rocketry Poster Board

Robotics – Intermediate Division (Ages 9 – 13)
5756   Robotics Educational Display
5757   Robotics Educational Notebook
5758   Robotics Educational Poster

Robotics – Senior Division (Ages 14 years and older)
5761   Robotics Educational Display
5762   Robotics Educational Notebook
5763   Robotics Educational Poster

Robotics Team Robotics Project
5766   Team Robotics Educational Display
5767   Team Robotics Educational Notebook
5768   Team Robotics Educational Poster

Computers – Intermediate Division (Ages 9 – 13)
5771   Junior Computer Educational Poster
5772   Junior Computer Display Board
5773   Junior Computer Notebook

Computers – Senior Division (Ages 14 years and older)
5776   Senior Computer Educational Poster
5777   Senior Computer Display Board
5778   Senior Computer Notebook

Unmanned Aerial System – Intermediate Division (Ages 9 – 13)
5781   Junior Unmanned Aerial System Educational Poster
5782   Junior Unmanned Aerial System Display Board
5783   Junior Unmanned Aerial System Notebook

Unmanned Aerial System – Senior Division (Ages 14 years and older)
5786   Senior Unmanned Aerial System Educational Poster
5787   Senior Unmanned Aerial System Display Board

5788   Senior Unmanned Aerial System Notebook

Superintendent(s)
Tony Foster, Central Kansas District and Wabaunsee County Volunteer

State Staff Contact
Shane Potter, 4-H Youth Development Specialist