# 4-H SPACE TECH

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**The 4-H SpaceTech project consists of 5 different divisions:**
1. Astronomy
2. Computers
3. Robotics
4. Rocketry
5. Unmanned Aerial Systems (UAS)

## AWARDS:
**Overall Grand Champion SpaceTech Trophy -**
Sponsored by Miller Spraying, LLC—Macksville, Ks.

**Overall Reserve Grand Champion Space Tech Trophy-**
Sponsored by Miller Spraying, LLC—Macksville, Ks.

## 4-H SpaceTech — ASTRONOMY

1. Read General Rules & Regulations.

2. Must be currently enrolled in the 4-H SpaceTech project to exhibit in this division.

3. Each exhibitor may enter one exhibit per class. Exhibit must be the work of the exhibitor in the current year.

4. Telescopes are 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.

5. 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.

6. Each telescope exhibit must include a "4-H Astronomy Exhibit Information Form," which should be attached to the outside of a 10" x 13" manila envelope. You must also include construction plans (or a photocopy) of 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.

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. Decals, if used, should be attached smooth and tight.

9. Telescopes designed by the exhibitor must be original, not a modification of an existing kit.

10. Exhibitor's name, club, age and year in project must be tagged or labeled in a prominent location on the telescope stand, educational display, notebook, and/or poster.

**CLASS**
**1500– Telescope made from a kit**
**1501– Telescope made from original design**

## 4-H SpaceTech — COMPUTERS

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

1. Read General Rules & Regulations

2. The 4-H member must be currently enrolled in the 4-H SpaceTech project to exhibit in this division.

3. Each exhibitor may enter one exhibit per class. Exhibit must have been completed during the current 4-H year.

4. Exhibitor's name, club, 4-H age, and years in project must be tagged or labeled in a prominent location on the exhibit, educational display, notebook, and/or poster.

5. See the 4-H SpaceTech Educational Displays, Posters, Notebooks, and Display Section for more details on exhibiting posters, display boards, and notebooks.

6. If the notebook illustrates the creation, talks about, or shows the result of an app, application, executable, program, or other compiled/interpreted "source code", a copy of the source code should be included. (In other words, if you created an app for a smart phone and you're illustrating that app, you should include the code you used to build the app). Failure to include a copy of the "source code" may result in a deduction in ribbon placing.

# Computer Systems:

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

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

1. All exhibits must be self-contained on a USB drive (thumb drive, flash drive, jump drive or any other name for a small USB storage device; the rules will use "USB drive"). This means that a judge can plug in the USB drive into a computer and be able to run the exhibit as described below. Physical computers as an exhibit will not be accepted.

2. All revisions of all forms previously released for the SpaceTech division either undated or dated prior to the current year are void for use and new forms must be obtained and used that are dated by the Kansas State 4-H Office for the current year. Use of old forms will result in the loss of one ribbon placing for exhibits

3. For all computer system entries (those entries not covered by the rules above) the following items are required as part of an exhibit packet:
    A. A manila envelope with the Computer Exhibit Form attached to the front, this form can be downloaded at www.KansasSpaceTech.com
    B. A USB drive labeled with the 4-H members name, and club; in a way that does not prevent it from being plugged into a computer.
    C. 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 fair. On the back side of the graphic the 4-H members name, and club should be listed.
    D. Instructions to run any part of the exhibit on the USB drive. (There should be at least three (3) items in your manila envelope: USB drive, graphic and instructions.)

4. Each exhibit must be accompanied by a "4-H Engineer's Journal". The engineer's journal should be typed. It can either be included electronically on the USB drive (preferred) or printed and placed in the manila envelope.

    A. The "4-H Engineer's Journal" should start with a dated entry describing what the 4-H member is trying to accomplish/build.
    B. The "4-H Engineer's Journal" should conclude with a dated entry describing what the 4-H member achieved in creating. (The start and end many times will be different. The judges are interested in the journey).
    C. Additional entries in the ""4-H Engineer's Journal" should be made as progress occur describing successes and failures; as well as the steps done and any sources of information including links used.
    D. Pictures can also be included in the "4-H Engineer's Journal" but should not be more than 50% of the entries.
    E. The "4-H Engineer's Journal" should contain at least one graphic.
    F. The "4-H Engineer's Journal" must be at least 3 pages in length.
    G. An example of a "4-H Engineer's Journal" can be found at www.kansasspacetech.com
    F. 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.

5. If the exhibit is a program, application, app, web site, or requires any coding, the source code must be included on the USB drive.

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

7. 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. It is recommended that 4-H members bring a computer to the fair that will run the project for judging as judges typically do not bring computers with them. Operating instructions are still required.
    B. Instructions should be written as though you were helping a less techy person, (like a grandparent) use the USB drive with a computer similar to what is described in rule 9 below. An example of instructions can be found at www.KansasSpaceTech.com

8. Each exhibit must accomplish a specific automated task using a computer or virtual machine (VM)

9. Stafford County Fair Judges in the computer systems division will have a physical computer with the following minimum configuration:
    A. Microsoft Windows 7 - 64 bit
    B. Microsoft Office Home 2010 (Excel, Power Point & Word)
    C. Microsoft Internet Explorer
    D. Mozilla Firefox Browser
    E. Google Chrome Browser
    F. Java for Windowsb
    G. Adobe Acrobat Reader
    H. Apache OpenOffice
    I. VMware Player 7.0.0 Windows 64 bit

10. 4-H members should not assume that the computers in rule 9 have Internet connectivity and that any parts of the exhibit that require internet access will not work. It is strongly recommended that 4-H members test exhibits on a computer with Internet connectivity disabled.

11. Kansas 4-H SpaceTech has made available Linux Virtual Machines (VMs) that can be downloaded and used to create projects on web servers, networking, and many other projects. For more information on how these VMs can be leveraged or to download them visit www.KansasSpaceTech.com 4-H members are not required to use the VMs in their projects. They are optional.

12. 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.

13. 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.

14. 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.

15. Judging will be based on a score sheet which can be found at www.kansasspacetech.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

**1511— 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'.)**

**1512— Computer presentation (power point, web page/site, animated graphics, etc.)**

**1513— Single computer system (web server, database server, etc.)**

**1514— Networked system consisting of two or more computers**

# 4-H SpaceTech—ROBOTICS

1. READ GENERAL RULES AND REGULATIONS

2. Must be currently enrolled in the 4-H SpaceTech project to exhibit in this division.

3. Each exhibitor may enter one robot per class. Exhibit must be the work of the exhibitor in the current year.

4. Each robot must be free-standing, without the need for additional supports in order to be moved or exhibited.

5. Robot dimensions should not exceed 2' high by 2' wide by 2' deep. Weight may not exceed 15 pounds.

6. 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.

7. Robots may be powered by an electrical, battery, water, 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 could be used to inflict damage and/or harm to individuals, animal life, and/or property.

8. Remote controlled robots are allowed under certain conditions provided that the robot is not drivable. Remote controlled cars, boats, planes, and/or action figures, etc. are not allowed.

9. Each robot must be in operable working condition. The judges will operate each robot to evaluate its workmanship and its ability to complete the required tasks for this current 4-H year.

10. Each exhibitor is required to complete the "4-H Space Tech Robotics Exhibit Information form", which should be attached to the outside of a 10" x 13" manila envelope. For notebooks, display boards, and posters, no additional exhibit information is required; no manila envelope is needed for these exhibits.

11. The exhibit must include written instructions for operation, construction plans, 1 - 3 pages of project photographs or a 5 minute CD, DVD, or video presentation, and robot programming information, if applicable. Even though the exhibitor will be allowed to set up their robot in person, this information should be placed inside the 10" x 13" manila envelope mentioned above.

12. Creativity, workmanship, and functionality will be strong criteria in judging the "Robot designed by Exhibitor" classes.

13. Exhibitor's name, club, age, and year(s) in project must be tagged or labeled in a prominent location on the robot, educational display, and/or notebook. Sources of scientific information must be cited on the front of your exhibits, including all posters and educational display boards.

14. Team project notebooks must be organized in a 3-ring binder and should highlight information/roles of each team member, drawings, charts, photographs, goals and objectives of your robotics project, and all robotic competitions your team has competed in during the current 4-H year.

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

16. See the 4-H SpaceTech Educational Displays, Posters, Notebooks, and Display Section for more details on exhibiting posters, display boards, and notebooks.

## Division A - Novice -
### 7-9 Years Old

**CLASS**
**1520—Robot made from a commercial (purchased) kit.**
**1521— Robot designed and constructed by exhibitor.**
The build must not be a mere modification of an existing robot kit or plan.
**1522 —Programmable robot made from a commercial (purchased) kit.**
**1523— Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote controlled device**
**1524 —Junk Drawer Robotics-based curriculum robot**

## Division B - Intermediate -
### 10-13 Years Old

**CLASS**
**1530—Robot made from a commercial (purchased) kit.**
**1531—Robot designed and constructed by exhibitor.**
The robot must not be a mere modification of an existing robot kit or plan.
**1532 —Programmable robot made from a commercial (purchased) kit.**
**1533 —Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote controlled device**
**1534—Junk Drawer Robotics-based curriculum robot**

## Division C - Professional -
### 14 Years Old and Up

**CLASS**
**1540 —Robot made from a commercial (purchased) kit.**
**1541 — Robot designed and constructed by exhibitor.**
The robot must not be a mere modification of an existing robot kit or plan.
**1542 — Programmable robot made from a commercial (purchased) kit.**
**1543 —Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote controlled device.**
**1544 — Junk Drawer Robotics-based curriculum robot**

## Division D - Team Robotics Project

**CLASS**
**1550— Robot designed and constructed by 2 or more 4-H SpaceTech 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-H Space Tech 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.

# 4-H SpaceTech - ROCKETRY

## General Rules:
1. READ GENERAL RULES AND REGULATIONS

2. 4-H Members must be currently enrolled in the 4-H SpaceTech -Rocketry Program

3. All revisions of all forms previously released for the SpaceTech division either undated or dated prior to the 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 will result in the loss of one ribbon placing for exhibits.

4. Relevant documents may be obtained from the Extension Office or from www.KansasSpaceTech.com

5. NAR refers to the National Association of Rocketry and its governing board.

6. All NAR documents, with the exception of the "pink book," referenced herein can be found at www.nar.org

7. If a fire burn ban is in effect, exhibitors are not required to launch their rocket(s). All requirements of the launching of rockets for the fair and documenting of the launching are suspended for the duration of the ban.

8. See the 4-H SpaceTech Educational Displays, Posters, Notebooks, and Display Section for more details on exhibiting posters, display boards, and notebooks.

9. 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)

10. Adult supervision is defined as being under the direct supervision of someone 18 years of age or older.

11. For the purpose of Kansas 4-H SpaceTech a high powered rocket is defied as a rocket that meets any of the following criteria:
    A. Is 2 inches or greater in diameter (not including fins) and taller than 3 feet (36 inches including fins)
    B. Weighs more than 3.3125 pounds (53 ounces or 1500 grams) at the time of launch
    C. Uses 'E' engine or larger to launch (2D's, 4C's. 8B's, etc.)
    D. The total impulse of all engines used in the rocket is greater than 20.01 Newton-seconds of thrust.
    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 2.2 ounces (62.5 grams) of propellant and are limited to only 'H' and 'I' motors

12. High power certification is defined as having successfully completed a certification program for high-powered rocketry through the NAR and maintain that certification. This applies to all membership levels in the NAR. Specifically the "Formal Participation Procedure" for the "Junior HPR Level 1 Participation Program" as outlined by the NAR.

13. NAR rules of launching and construction all rockets are assumed to be used by all 4-H SpaceTech exhibitors and will be considered during judging.

14. For the purposes of Kansas 4-H SpaceTech, NO rocket may be launched using engines totaling more than an 'I' impulse engine or 640 Newton-seconds of total thrust.

15. 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 either a "kit" or a "rocketry educational exhibit" and the second may be entered into any other applicable class. An exhibitor may not enter two rockets in the same class.

16. The report that accompanies the rocket must be limited the 4-H SpaceTech Rocket Exhibit Information Form which is affixed to a 10" x 13" envelope. This envelope should NOT be attached to the rock state or the rocket. This may be downloaded from www.KansasSpaceTech.com

17. 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, 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.

18. One or more photographs of the rocket at the launch site are required.
    A. Photographs showing the rocket at the moment of ignition are preferred.
    B. Photographs must be attached to one side of an 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.

19. To exhibit in this division:
    A. The rocket must have been flown.
    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.

20. Launches should not be conducted in winds above 20mph, and will constitute a disqualification of rocket exhibit.

21. 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.

22. 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.

23. Flight damage is to be documented by the participant on either the construction plans or the 4-H SpaceTech Rocket Exhibit Information Form.

24. 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.

25. Engines and igniters, under any circumstance, ARE NOT permitted with the exhibit and constitute an immediate disqualification

26. If an engine becomes stuck, jammed, or 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.

27. Engines may not be used as display stands hollowed out or otherwise. This is a significant change from previous year's rules. Engines used as a display stand will be subject to immediate disqualification.

28. 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
    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.

29. Multi-stage rockets can be flown using just the final sage and be considered fully flown.

30. 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 TRIPOLI for investigation and possible revocation of membership.

## Construction Guidelines for All Rockets

1. Rockets must 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. 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. Does not apply to fiberglass, Kevlar, extruded foam, composite, or wood fins; especially when used for "through-the-wall" fin attached techniques that are common in larger rockets.
    C. 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.

4. Angles of fins must fall within plus or minus 2 degree variation using an approved fin alignment guide. An official fin guide is available from www.KansasSpaceTech.com

5. Fins should be rounded or streamlined to reduce drag on all exposed sides unless instructions indicate otherwise.

6. Fins and body tubes should 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. Any seams on plastic parts are to be sanded smooth.

9. 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.

10. Nose cone is to fit snugly but still allow for easy removal.

11. Exhibits must be uniformly painted and smoothly finished or finished as per rocket instructions, and have decals applied smoothly.

12. Non-standard surfacing (such as textured paint) may be used if directed by the instructions, this includes scratch built rockets.

13. Models may not be judged based on their paint scheme (colors and placement on the rocket), with the exception of rockets that fit the definition of "scale model." All other rockets do not have to follow the suggested paint scheme, allowing the 4-Her to display maximum creativity in the finishing of their rocket.
    A. Under no circumstances is the weight given to the paint scheme to be sufficient enough, by itself, to move the model from one ribbon placing to another.

14. "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.

15. Scale Model Rockets are to be finished and completed with a majority (greater than 70%) of decals.

## Original Design Rocket Guidelines

Purpose: To allow for youth to develop their own model rockets in a safe manner that displays maximum craftsmanship. Model rockets are generally small-to-medium sized rockets that can be purchased at hobby stores or are small-to-medium sized model rockets that an individual(s) build from parts similar to those found in model rocket kits.

1. 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, club, and age must be labeled on the top of the base.
2. 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 club, and age must be labeled on the top of the base.
3. 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 to this code, the SpaceTech Action Team may review and implement the modified code.
4. 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.
6. Up to 4 additional pages can 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.

## Alternative Skins Guidelines

1. Alternative skins are an advanced construction technique that allows the builders of model rockets to display maximum design and creativity in their models. Alternative skins are thin covering over a supporting skeleton that serves as the finish of a rocket as opposed to painting.
2. The General exhibit rules for ALL categories apply.
3. Use of Alternative Skins used for model aircraft is permitted on rockets of original design provided adequate provisions are made to prevent the rocket from catching fire during all phases of flight.
4. When used in construction these alternative skins should not be used as primary structure for the rocket. The rocket should still be of sound design and construction to insure safety for personnel performing launch activities as well as others who are in the nearby area.
5. Types of coverings acceptable as Alternative Skins
   A. Plastic shrink type coatings used for radio control model aircraft are permitted. These can be obtained from various manufacturers and hobby suppliers.
   B. Other types of fabric coverings such as cloth types using coatings for stiffness are permitted as long as all other rules are met.
6. Quality of Finish: when the above finishes are used the following judging criteria will apply in addition to those judging other rocketry divisions.
   A. Seams and transition areas will be uniform and even when they are needed in the construction

B. Gaps and holes are not permitted in the covering especially where the fins or other stabilizing devices meet the main body of the rocket.
C. Omission of these skins from the bottom of the rocket is permissible. Paints and other types of coatings currently used for rocketry may be substituted in these areas.
D. Alternative skins in this section may also be used in conjunction with paints on the rocket. However, care shall be taken to insure that edges of the alternative skins will not peel off in flight.

## Division A- Juniors (Exhibitors 7-9 years of age)
**1556—**Rocket made from a kit-
**1557—** Rocket designed by exhibitor

## Division B– Intermediate (Exhibitors 10-13 years of age)
**1561—** Rocket made from a kit-
**1562—** Rocket designed by exhibitor

## Division C- Advanced (Exhibitors 14 years of age and Older)
**1566—** Rocket made from a kit
**1567—**Rocket designed by exhibitor
**1568—**Rocket designed by exhibitor that uses Alternative Skins

## Division D- Team Built Rocket & Design (Exhibitors 7 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.

**1570- Rocket designed by 2 or more exhibitors: not merely a modification of an existing kit. Include original plans.**

## High Power Rocketry Guidelines

1. To allow for improved safety and judging of rockets that meet he requirements of 4-H high power rockets.
2. Exhibitors must be at least 14 years of age by January 1 of the current year.
3. The rules for ALL categories apply.
4. 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 obtained from the Extension Office or downloaded from www.Kansas4-H.org. Click on KSF Packet Link.
5. The NAR High Power 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 SpaceTech Action Team may review and implement 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. If a rocket is launched using an engine(s) that has 160.1 ('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, club, and age must be labeled on the base.

### Division E- Advanced (Exhibitors 14 years of age and Older)
**1575– High Power Rocket made from kit or original design**

# 4-H SpaceTech - UNMANNED AREIAL SYSTEMS

The 4-H unmanned aerial systems or UAS project explores the world from above the trees and discovers ne w frontiers with UASs. Members explore the uses and applications of unmanned aerial systems and how UASs link to other projects such as geology, robotics, electronics, crop science, and many more.

1. READ GENERAL RULES AND REGULATIONS
2. 4-H Member must be currently enrolled in the 4-H SpaceTech project to exhibit in this division.
3. For 2017, display boards, posters, and notebooks are the only unmanned aerial systems exhibits being accepted. In 2018, more classes will be added for UASs.
4. Exhibitor's name, club, age, and year(s) in project must be tagged or labeled in a prominent location on the exhibit, educational display, notebook, and/or poster.
5. Unmanned Aerial Systems that include or depict weaponry of any kind will be disqualified.
6. See the 4-H SpaceTech Educational Displays, Posters, Notebooks, and Display Section for more details on exhibiting posters, display boards, and notebooks.

# 4-H SpaceTech - EDUCATIONAL EXHIBITS– POSTERS, NOTEBOOKS, AND EDUCATIONAL DISPLAYS

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

1. The General Exhibit rules for ALL categories apply.
2. Fore notebooks, educational displays, and posters, no additional exhibit information is required; no manila envelope is needed for these exhibits.
3. Exhibits in posters, notebooks, and educational displays may not be just a static project, but must contain substantial supporting educational materials in the form of posters, notebooks, or display boards, etc.
4. Educational Displays, posters, and notebooks should be creative and showcase details about knowledge learned in the project during the current 4-H year. Value is place on youth who can demonstrate how their skills have increased while completing the project. Each exhibit will be judged on uniqueness, creativity, neatness, accuracy of material, knowledge gained, and content. An exhibit judging score sheet will be available at www.kansasspacetech.com. For example, a rocket may have crashed and/or is highly damaged that can't be launched again may be made into an educational display or poster that tells a great story with many lessons learned.
5. Follow copyright laws, citing all sources of information in a standard notation on the "4-H Educational Rocketry Exhibit Information Form." Additional pages can be added inside the Information Packet and should be labeled "Citations." Sources of scientific information must be cited on the front of your exhibit, including all posters and educational displays.
6. Educational displays are not to exceed a standard commercial 3'x4' tri-fold display board. No card board table exhibits will be allowed. Care should be taken to use durable materials that will withstand fair conditions.
7. "Construction Kits" that are part of Educational Displays must be contained in cases (tackle boxes, sealable containers, etc.) that may not be larger than 1'x2'x2' and must have a latch which securely keeps all components contained in the "Construction Kits." Other components are to adhere to appropriate dimensions as stated elsewhere.
8. Educational Project Notebooks must be organized in a 3-ring-binder
9. Educational Posters must be no larger than a 20"x30" Poster board. Exhibitors are encouraged to laminate all posters and diagrams or cover them with clear plastic film. Any three dimensional display exhibits may not be thicker than 1".
10. Engines and igniters in rockets ARE NOT permitted with the exhibit and constitute an immediate disqualification. This is for safety reasons and includes both spend and live engines.
11. Exhibitor's name, club, age, and year(s) in project must be tagged or labeled in a prominent location on the Educational Display, Notebook, "Construction Kit", and/or Poster.
12. 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 model or high power rocketry
    - F. And those characteristics described in that section

# Rocketry

**Division A- Juniors (Exhibitors 7-9 years of age)**
   **1580—** Rocketry Educational Display
   **1581—** Rocketry Notebook
   **1582—** Rocketry Poster

**Division B– Intermediate (Exhibitors 10-13 years of age)**
   **1583—** Rocketry Educational Display
   **1584—** Rocketry Notebook
   **1585—** Rocketry Poster

**Division C- Advanced (Exhibitors 14 years of age and Older)**
   **1586—** Rocketry Educational Display
   **1587—** Rocketry Notebook
   **1588—** Rocketry Poster

# Robotics

**Division A– Novice (Exhibitors 7-9 years of age)**
   **1590—** Robotics Educational Display
   **1591—** Robotics Notebook
   **1592—** Robotics Poster

**Division B– Intermediate (Exhibitors 10-13 years of age)**
   **1593—** Robotics Educational Display
   **1594—** Robotics Notebook
   **1595—** Robotics Poster

**Division C– Professional (Exhibitors 14 years of age and Older)**
   **1596—** Robotics Educational Display
   **1597—** Robotics Notebook
   **1598—** Robotics Poster

**Division D– Team Robotics Project**
   **1599—** Team Robotics Educational Display
   **1600—** Robotics Notebook
   **1601—** Robotics Poster

# Computers

**Division A- Juniors (Exhibitors 7-9 years of age)**
   **1610—** Computers Educational Display
   **1611—** Computers Notebook
   **1612—** Computers Poster

**Division B– Intermediate (Exhibitors 10-13 years of age)**
   **1613—** Computers Educational Display
   **1614—** Computers Notebook
   **1615—** Computers Poster

**Division C- Advanced (Exhibitors 14 years of age and Older)**
   **1616—** Computers Educational Display
   **1617—** Computers Notebook
   **1618—** Computers Poster

# Unmanned Aerial Systems

**Division A- Juniors (Exhibitors 7-9 years of age)**
   **1630—** UAS Educational Display
   **1631—** UAS Notebook
   **1632—** UAS Poster

**Division B– Intermediate (Exhibitors 10-13 years of age)**
   **1633—** UAS Educational Display
   **1634—** UAS Notebook
   **1635—** UAS Poster

**Division C- Advanced (Exhibitors 14 years of age and Older)**
   **1636—** UAS Educational Display
   **1637—** UAS Notebook
   **1640—** UAS Poster