

# ROCKETRY and STEM

## Dept. RO

4-H members must be currently enrolled in the Kansas 4-H STEM project to exhibit in this department. Exhibits must have been completed during the current 4-H year.

### ASTRONOMY

1. Each exhibitor may enter one exhibit per class.
2. 4-H members enrolled in 4-H STEM-Astronomy for updated County and State Fair guidelines please contact the extension office.

**5500** - Telescope made from kit.

**5501** - Telescope made from original design.

**Champion and Reserve Champion for each class.**

**Grand Champion and Reserve Champion Astronomy**

### COMPUTERS

1. Each exhibitor may enter one exhibit per class.
2. 4-H members enrolled in 4-H STEM-Computers for updated County and State Fair guidelines please contact the extension office.

#### Division A - Computer Systems

**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, etc.)

**5592** - Single computer system (web server, database server, etc.)

**5593** - Networked system consisting of two or more computers

**5594** - Chip system - a small (4"x4"x4") programmed physical device that accomplishes a specific task.

### ROBOTICS

1. Each exhibitor may enter one robot per class.
2. 4-H members enrolled in 4-H STEM-Robotics for updated County and State Fair guidelines please contact the extension office.

#### JR Division—7 and 8 year olds

**5505** - Robot made from a commercial (purchased) kit.

**5506** - Robot designed and constructed by exhibitor. The robot must not be a mere modification of an existing robot kit or plan.

**5507** - Programmable robot made from a commercial (purchased) kit.

**5519** - Robot designed and constructed by exhibitor or from a commercial kit, that is operated by a remote controlled device

**5543** - Junk Drawer Robotics-based curriculum robot

#### Intermediate Division - 9 to 13 years old

**5509** - Robot made from a commercial (purchased) kit.

**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-based curriculum robot.

#### Senior Division- 14 years and up

**5513** - Robot made from a commercial (purchased) kit

**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-based curriculum robot

### **Team Robotics Project**

**5517** - Robot designed and constructed by two or more 4-H Robotics 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 Robotics 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.

### **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.

#### **Exhibit Information for ALL rocketry categories:**

1. Consultation/interview judging will be held Thursday.
2. 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 will result in the loss of one ribbon placing for exhibits.
3. Relevant documents may be obtained from County Extension Offices or from [www.STEM4KS.com](http://www.STEM4KS.com)
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](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.

#### **Exhibit Definitions for ALL rocketry categories:**

1. 4-H members enrolled in Rocketry for updated County and State Fair definitions please contact the extension office.

#### **Exhibit Rules for ALL rocketry categories:**

Purpose: 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 enrolled in Rocketry for updated County and State Fair exhibit rules please contact the extension office.

#### **Construction Rules for All Rockets**

Purpose: These rules apply to the construction of all rockets displayed in the STEM division.

1. 4-H members enrolled in Rocketry for updated County and State Fair guidelines for construction rules please contact the extension office.

#### **Model Rocketry Guidelines (ages 9 and up):**

Purpose: 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. 4-H members enrolled in Rocketry for updated County and State Fair guidelines for ages 9 and up please contact the extension office.

#### **Original Design Rocket Guidelines (ages 11 and up):**

Purpose: To allow for youth to develop their own rockets (model, mid and high powered) in a safe manner that displays maximum craftsmanship.

1. 4-H members enrolled in Rocketry for updated County and State Fair guidelines for ages 11 and up please contact the extension office.

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#### **Division JR - Exhibitors 7 and 8 years old**

**2601** - Rockets made from a kit, **without** pre-assembled fin units. Include plans.

**2602** - Rocket made from "beginner's 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.)

#### **Division A - Exhibitors 9 through 13 years old**

**5520** - Rocket made from kit. Include plans.

**5537** - Scale Model Rocket made from kit. Include plans.

#### **Division B - Exhibitors 11 through 13 years old** **(9-10 year olds may not enter in 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 - Exhibitors 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 - Exhibitors 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 or High power Rocketry (2x'D' to 'G') Engine Guidelines:**

Purpose: To allow for improved safety and judging of rockets that meet the requirements of 4-H mid-power rockets.

1. 4-H members enrolled in Rocketry for updated County and State Fair guidelines for Mid or High power Engines please contact the extension office.

#### **Division E—Exhibitors 14 years and older**

**5536** - Mid or high power rocket made from kit or original design.

### **UNMANNED AERIAL SYSTEMS**

Purpose: The 4-H unmanned aerial systems or UAS project explores the world from above the trees and discovers new frontiers with UAS's. UAS's are commonly known as Unmanned Aerial Vehicles (UAV's) or drones. Members explore uses and applications of unmanned aerial systems including how UAS's: link to other projects such as geology, robotics, electronics, crop science and many more. Each exhibitor may enter one exhibit per class.

1. 4-H members enrolled in 4-H STEM Unmanned Aerial Systems for updated County and State Fair guidelines for ages 11 and up please contact the extension office.

#### **Junior Division A - 7 and 8 years old**

**5700** - Unmanned Aerial System "designed and constructed by exhibitor" that is operated by a remote controlled device.

#### **Intermediate Division - 9-13 years old**

**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.

#### **Division B - Senior, 14 years and older**

**5706** - Unmanned Aerial Systems 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.

### **ARCHITECTURAL BLOCK CONSTRUCTION**

Purpose: To allow 4-Hers to start with an emphasis on using architectural blocks (“Legos”) to construct dioramas. It allows youth to explore architectural design in a three dimensional space. The intent of this program is to start with foundational ideas of architecture and to continue building on this knowledge.

1. Each exhibitor may enter one exhibit per class.
2. 4-H members enrolled in 4-H STEM-ABC for updated County and State Fair guidelines please contact the extension office.

#### **Introductory - Level 1 classes (about 1- 3 yrs. experience)**

**5710** - Diorama illustrating at least 2 architectural features beyond floors, ceilings, and walls.

#### **Experienced - Level 2 classes (about 4-6 yrs. experience)**

**5711** - Diorama illustrating at least 4 architectural features beyond floors, ceilings, walls, and includes 1 or more motion elements.

#### **Advanced - Level 3 classes (about 7-9 yrs. experience)**

**5712** - Diorama illustrating at least 6 architectural features beyond floors, ceilings, walls, and includes 2 or more motion elements.

#### **Master - Level 4 classes (10 or more years of experience)**

**5713** - Diorama illustrating at least 8 architectural features beyond floors, ceilings, walls, and includes 3 or more motion elements.

### **STEM EDUCATIONAL EXHIBITS POSTERS, NOTEBOOKS AND DISPLAY BOARDS**

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

1. The General Exhibit rules for ALL categories apply.
2. 4-H members enrolled in Rocketry and STEM for updated County and State Fair guidelines for posters, notebooks and display boards please contact the extension office.

#### **STEM - Junior Division - 7-8 years old**

**5728** - Educational Display  
**5729** - Educational Notebook  
**5730** - Educational Poster

#### **STEM- Intermediate Division - 9-10 years old**

**5731** - Educational Display  
**5732** - Educational Notebook  
**5733** - Educational Poster

#### **STEM - Senior Division - 14 years and older**

**5736** - Educational Display  
**5737** - Educational Notebook  
**5738** - Educational Poster  
**5773** - Junior Computer Notebook