

# Department 124 – Mechanical Projects

Face-to-Face Judging on Tuesday Noon – 6 PM

## Entry Information

- Open to youth enrolled in 4-H Mechanical Sciences project or youth of other groups doing equivalent work.
- No more than 25 entries per exhibitor. 1 per lot.

## Exhibit Information

- See poster rules, if applicable.
- Displays and panels must not exceed 36" x 48".
- Unless otherwise noted, "exhibit" may be a display, poster, panel, article, or notebook.
- Premiums: \$2.50 - \$2.25 - \$2.00 - \$1.75

## **CLASS A – Aerospace**



### Lot Numbers

1. Educational poster on parts of a helicopter and their purposes
  2. Educational poster on parts of a hot air balloon and their purposes
  3. Educational poster on parts of an airplane and their purposes
  4. Exhibit comparing 2 or more airplane navigation systems
  5. Exhibit on careers in aviation
  6. Exhibit related to meteorology and aviation
  7. Exhibit related to aerospace or aeronautics
  8. Exhibit relating to airplanes or airplane pilots
  9. Homemade kite
  10. Homemade paper airplanes (3) with report on 3 or more flights each
  11. Lesson plan to teach an aspect of the aerospace project
  12. Poster or display of a flight plan from takeoff to touchdown
  13. Poster or scrapbook showing types of aircraft with description
  14. Scrapbook related to member's model rocket/airplane experiences over the past year
  15. Any other aerospace exhibit
  16. Any other aerospace exhibit
- ### **MODEL AIRPLANES**
17. Diorama related to aerospace with written explanation (maximum size 24" x 24")
  18. Exhibit with photos showing how to build an RC airplane
  19. Large model of airplane, made from kit, made to fly, over 18" in length

20. Large model of airplane, made from kit, not made to fly, over 18" in length
21. Poster showing parts of a remote-control airplane and transmitter and their function
22. RC or U-controlled model, painted/covered by member
23. Small model of airplane, made from kit, made to fly, 18" in length or less
24. Small model of airplane, made from kit, not made to fly, 18" in length or less
25. Small model of airplane, made to fly (no kits permitted)
26. Small model of airplane, not made to fly (no kits permitted)
27. Any other model airplane exhibit

### **ROCKETRY**

28. Altitude tracker – attach a note card explaining how you use it
29. Homemade electric/electronic rocket launcher
30. Homemade pneumatic rocket – made to fly
31. Homemade rocket launch pad
32. Educational poster on parts of a rocket and their purposes
33. Homemade rocket of exotic design, not made to fly
34. Homemade rocket which uses a propellant such as baking soda or Alka-Seltzer
35. Multi-stage rocket (2 or 3 stage) – painted by member, no plastic fins
36. Poster showing stages of rocket launch
37. Single stage rocket – painted by member, no plastic fins
38. Single stage rocket – plastic fins only (grades 3-5)
39. Launched rocket - with report on 3 or more launches including photos, lessons learned, recovery system performance and accuracy to planned landing location
40. Any other rocketry exhibit



## **CLASS B – Automotive**

### Lot numbers

51. Exhibit of 4 worn out or damaged auto parts with an explanation of cause of wear or damage
52. Exhibit on auto maintenance
53. Exhibit on auto mechanics



54. Exhibit on auto safety
55. Exhibit pertaining to a career in the automotive industry (describe the education, training, and experience required for this profession)
56. Exhibit related to buying a car
57. Exhibit with information on car costs (such as gasoline consumption, tire service records, seasonal service, etc.)
58. Educational exhibit related to automotive
59. Educational exhibit related to automotive

### **CLASS C – Geospatial**

Lot numbers

70. Educational exhibit explaining different kinds of maps and their uses
71. Educational exhibit related to geographic tools
72. Exhibit explaining GIS and how it is used
73. Exhibit explaining how to use GPS
74. Exhibit explaining the difference between a compass and GPS
75. Exhibit explaining what GPS is
76. Exhibit illustrating careers that use GPS and GIS technology
77. Exhibit on an activity/event using a GPS unit (a geocache search, hunting, trail walk, etc.)
78. Map made of Outagamie County 4-H club meeting locations
79. Map made using GPS and GIS technology
80. Poster on any geospatial activity
81. Any other exhibit pertaining to the geospatial project
82. Any other exhibit pertaining to the geospatial project

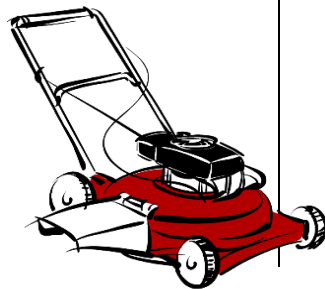


### **CLASS D – Handyman**

Attach a statement of work done and method used. Include “before” and “after” pictures.

Lot numbers

90. Repaired or refinished article
91. Repaired or refinished article
92. Repaired or refinished article
93. Repaired or refinished article



### **CLASS E – Scale Models**

- Legos, K-nex, etc. may only be used in Lot 116
- Model/exhibits can be any scale, not to exceed 22” in any direction.

Lot numbers

100. Collection of 2 or more related models
101. Educational poster related to the scale model project
102. Mechanical scale model from a kit (steam engine, hit and miss engine, equipment, etc.)
103. Mechanical scale model, not from a kit
104. Motorized scale model from a kit
105. Motorized scale model, not from a kit
106. Original scale model from any material (plastic, wood, metal, etc.)
107. Scale model farm or other landscape model – no larger than 22” x 22”
108. Scale model from a kit, glued and painted by member
109. Scale model from a kit, glued and painted by member
110. Scale model from a kit, glued and painted by member
111. Scale model from a kit, glued and painted by member
112. Scale model placed in a setting (diorama) – No larger than 22” x 22” – include a 3x5 card with explanation
113. Snap fit scale model made from a kit (grades 3-5 only)
114. Any other exhibit related to scale models
115. Any other exhibit related to scale models
116. Model built using Lego, K-nex, etc.

### **CLASS F – Small Engines**

Lot numbers

120. Display panel of small engine fuel injection system with explanation of function of parts
121. Display panel of small engine parts with identification of parts (mount on plywood or pressed board)
122. Display panel showing worn or faulty engine parts with explanation of the cause and prevention of the problem (mount on plywood or pressed board)
123. Exhibit detailing the small engine maintenance topic of your choice
124. Exhibit of basic or specialized tools used for maintenance and repair of small engines with an explanation of their proper use

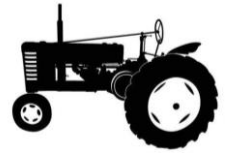
Department 124 – Mechanical Projects

125. Exhibit on engine rebuilt by member with pictures and explanation of steps accomplished
126. Exhibit related to a career in small engines
127. Exhibit related to members own invention or customization of part or process related to small engines
128. Exhibit relating to spark plug diagnosis
129. Exhibit used for teaching other youth about small engines (include written explanation of how the exhibit was used)
130. Homemade testing equipment
131. Poster illustrating steps in small engine service or starting difficulties (fuel mixture, compression, ignition, etc.)
132. Poster or display comparing the different types of engines
133. Poster or display on proper selection and identification of spark plugs
134. Poster or display on the different types of engine, fuels, or fuel delivery systems
135. Poster on parts of a spark plug
136. Poster on safety – any small engine equipment or vehicle
137. Poster or display demonstrating the proper procedures for tearing down and reassembling a small engine (air and fuel system or electrical system or engine block)
138. Poster or display of checklist used any time before operating a small engine
139. Poster or display on the 3 things a small engine requires: air, fuel, and ignition source
140. Poster or display showing the events in a small engine with a brief explanation (4-cycle, 2-cycle, or other)
141. Poster showing and describing basic engine parts
142. Poster showing correct steps in preparing a small engine for off-season storage
143. Poster showing how a carburetor functions
144. Poster showing how to change the oil in a small engine
145. Scrapbook of things you learned and did related to small engines over the past year
146. Troubleshooting chart for small engines developed by project member
147. Any other small engine exhibit not listed above
148. Any other small engine exhibit not listed above

**CLASS G – Tractor**

Lot number

160. Exhibit displaying tractor service and cost records
161. Educational game teaching facts about tractors or machinery safety
162. Educational exhibit on tractor safety
163. Exhibit on tractor parts
164. Exhibit on safety hazards when operating a tractor
165. Exhibit on PTO safety
166. Exhibit on hydraulic systems compared
167. Exhibit on types of air filters
168. Exhibit on basics of the tractor engine
169. Exhibit on cleaning and maintaining a radiator
170. Any other exhibit relating to tractors
171. Any other exhibit relating to tractors
172. Any other exhibit relating to tractors



**CLASS H – Welding**

Lot number

180. Educational exhibit showing at least 3 welding processes and the advantages/limitations of each process
181. Educational exhibit showing different types of welding equipment
182. Educational exhibit showing different types of safety gear needed
183. Sample demonstrating 3 beads welded side-by-side
184. Sample showing 2 plates tacked together in a square groove butt joint
185. Sample showing 2 plates welded in a T-joint
186. Sample showing 2 plates welded together in a lap joint
187. A useful article for use in farm or home workshop that has been welded
188. Article for use out-of-doors that has been welded
189. Article for use in storage that has been welded
190. Repaired article
191. Any other welded exhibit not listed above
192. Any other welded exhibit not listed above
193. Any other welded exhibit not listed above



**CLASS I – Any Mechanical Science** topic not already listed (example: Power of Wind)

Lot number

- 200. Any educational exhibit relating to Mechanical Sciences
- 201. Any educational exhibit relating to Mechanical Sciences
- 202. Any educational exhibit relating to Mechanical Sciences

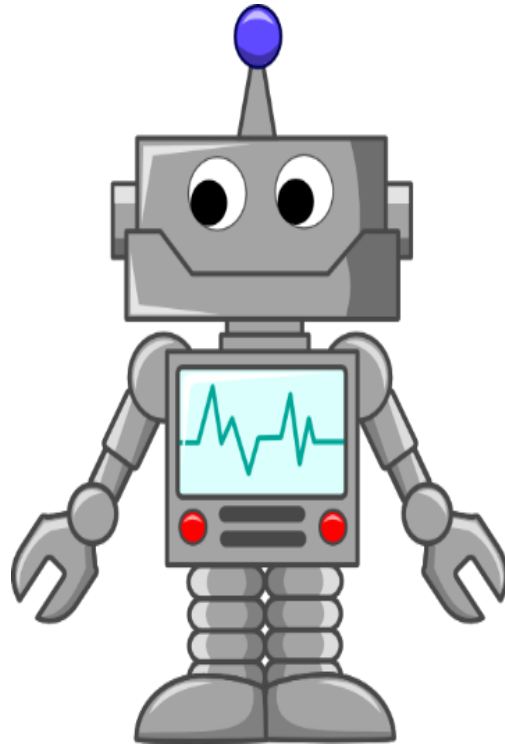
**CLASS J – Robotics**

- Open to youth enrolled in 4-H robotics project or youth of other groups doing equivalent work.
- No more than 5 entries. 1 per lot.
- Displays must not exceed 36" x 48".
- ALL programs entries must include a print out of your program.
- Any program entries that require a course or props must be created or provided by the member and brought to judging with the robot.
- Robotics entries will be in a locked cabinet until project pick up. (no larger than 20" x 20")

Premiums: \$2.50 - \$2.25 - \$2.00 - \$1.75

- 300. Robotics exhibit 1
- 301. Robotics exhibit 2
- 302. Robotics exhibit 3
- 303. Robotics exhibit 4
- 304. Robotics exhibit 5

# Mechanical Sciences



**Ideas for Robotic Exhibits:**

- Programming
  - ✓ Robot turns left 3 different ways
  - ✓ Using a loop block or sensors
  - ✓ Doing multiple tasks
  - ✓ Etc.
- Robotic terms or careers
- Robot you made
- Programming language
- Parts of a robot
- Types of gears
- Etc.