

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

41. Exhibit of 4 worn out or damaged auto parts with an explanation of cause of wear or damage
42. Exhibit on auto maintenance
43. Exhibit on auto mechanics



44. Exhibit on auto safety
45. Exhibit pertaining to a career in the automotive industry (describe the education, training, and experience required for this profession)
46. Exhibit related to buying a car
47. Exhibit with information on car costs (such as gasoline consumption, tire service records, seasonal service, etc.)
48. Educational exhibit related to automotive
49. Educational exhibit related to automotive

CLASS C – Geospatial

Lot numbers

50. Educational exhibit explaining different kinds of maps and their uses
51. Educational exhibit related to geographic tools
52. Exhibit explaining GIS and how it is used
53. Exhibit explaining how to use GPS
54. Exhibit explaining the difference between a compass and GPS
55. Exhibit explaining what GPS is
56. Exhibit illustrating careers that use GPS and GIS technology
57. Exhibit on an activity/event using a GPS unit (a geocache search, hunting, trail walk, etc.)
58. Map made of Outagamie County 4-H club meeting locations
59. Map made using GPS and GIS technology
60. Poster on any geospatial activity
61. Any other exhibit pertaining to the geospatial project
62. 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

63. Repaired or refinished article
64. Repaired or refinished article
65. Repaired or refinished article
66. Repaired or refinished article

CLASS E – Scale Models

- Legos, K-nex, etc. may only be used in Lot 83
- Model/exhibits can be any scale, not to exceed 22” in any direction.

Lot numbers

67. Collection of 2 or more related models
68. Educational poster related to the scale model project
69. Mechanical scale model from a kit (steam engine, hit and miss engine, equipment, etc.)
70. Mechanical scale model, not from a kit
71. Motorized scale model from a kit
72. Motorized scale model, not from a kit
73. Original scale model from any material (plastic, wood, metal, etc.)
74. Scale model farm or other landscape model – no larger than 22” x 22”
75. Scale model from a kit, glued and painted by member
76. Scale model from a kit, glued and painted by member
77. Scale model from a kit, glued and painted by member
78. Scale model from a kit, glued and painted by member
79. Scale model placed in a setting (diorama) – No larger than 22” x 22” – include a 3x5 card with explanation
80. Snap fit scale model made from a kit (grades 3-5 only)
81. Any other exhibit related to scale models
82. Any other exhibit related to scale models
83. Model built using Lego, K-nex, etc.

CLASS F – Small Engines

Lot numbers

84. Display panel of small engine fuel injection system with explanation of function of parts
85. Display panel of small engine parts with identification of parts (mount on plywood or pressed board)
86. Display panel showing worn or faulty engine parts with explanation of the cause and prevention of the problem (mount on plywood or pressed board)
87. Exhibit detailing the small engine maintenance topic of your choice
88. Exhibit of basic or specialized tools used for maintenance and repair of small engines with an explanation of their proper use
89. Exhibit on engine rebuilt by member with pictures and explanation of steps accomplished
90. Exhibit related to a career in small engines



91. Exhibit related to members own invention or customization of part or process related to small engines
92. Exhibit relating to spark plug diagnosis
93. Exhibit used for teaching other youth about small engines (include written explanation of how the exhibit was used)
94. Homemade testing equipment
95. Poster illustrating steps in small engine service or starting difficulties (fuel mixture, compression, ignition, etc.)
96. Poster or display comparing the different types of engines
97. Poster or display on proper selection and identification of spark plugs
98. Poster or display on the different types of engine, fuels, or fuel delivery systems
99. Poster on parts of a spark plug
100. Poster on safety – any small engine equipment or vehicle
101. 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)
102. Poster or display of checklist used any time before operating a small engine
103. Poster or display on the 3 things a small engine requires: air, fuel, and ignition source
104. Poster or display showing the events in a small engine with a brief explanation (4-cycle, 2-cycle, or other)
105. Poster showing and describing basic engine parts
106. Poster showing correct steps in preparing a small engine for off-season storage
107. Poster showing how a carburetor functions
108. Poster showing how to change the oil in a small engine
109. Scrapbook of things you learned and did related to small engines over the past year
110. Troubleshooting chart for small engines developed by project member
111. Any other small engine exhibit not listed above
112. Any other small engine exhibit not listed above

CLASS G – Tractor

Lot number

113. Exhibit displaying tractor service and cost records
114. Educational game teaching facts about tractors or machinery safety
115. Educational exhibit on tractor safety



116. Exhibit on tractor parts
117. Exhibit on safety hazards when operating a tractor
118. Exhibit on PTO safety
119. Exhibit on hydraulic systems compared
120. Exhibit on types of air filters
121. Exhibit on basics of the tractor engine
122. Exhibit on cleaning and maintaining a radiator
123. Any other exhibit relating to tractors
124. Any other exhibit relating to tractors
125. Any other exhibit relating to tractors

CLASS H – Welding

Lot number

126. Educational exhibit showing at least 3 welding processes and the advantages/limitations of each process
127. Educational exhibit showing different types of welding equipment
128. Educational exhibit showing different types of safety gear needed
129. Sample demonstrating 3 beads welded side-by-side
130. Sample showing 2 plates tacked together in a square groove butt joint
131. Sample showing 2 plates welded in a T-joint
132. Sample showing 2 plates welded together in a lap joint
133. A useful article for use in farm or home workshop that has been welded
134. Article for use out-of-doors that has been welded
135. Article for use in storage that has been welded
136. Repaired article
137. Any other welded exhibit not listed above
138. Any other welded exhibit not listed above
139. Any other welded exhibit not listed above



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

Lot number

140. Any educational exhibit relating to Mechanical Sciences
141. Any educational exhibit relating to Mechanical Sciences
142. 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

200. Chart of 20 robotic terms and their definitions
201. Exhibit about possible careers in robotics
202. Exhibit comparing point turns, non-point turns, and reverse non-point turns
203. Exhibit on 10 different tasks robots can accomplish
204. Exhibit on forks in programming
205. Exhibit on how robots influence our lives
206. Exhibit on measured turns
207. Exhibit on programming language
208. Exhibit on programming sensors
209. Exhibit or timeline illustrating past and future robots
210. Poster explaining the differences among machines, computers, and robots
211. Poster on the parts of a robot
212. Poster on types of gears
213. Poster showing activities and involvement in robotics project from the current year
214. Program: demonstrate how to change the speed of the robot by changing the motor power level and changing the motor-to-wheel gear ratio
215. Program: robot completes challenge course or maze
216. Program: robot does multiple tasks at the same time
217. Program: robot follows a line, using loops
218. Program: robot goes completely around a container without touching it
219. Program: robot goes forward and backward
220. Program: robot grips soda can and returns it to starting point
221. Program: robot stops – using a light sensor
222. Program: robot stops – using a touch sensor

223. Program: robot that goes forward for 4 seconds
224. Program: robot to stop when it nears an object or wall using the ultrasonic sensor
225. Program: robot turns left 3 different ways
226. Program: use a loop block to continuously have a robot start and stop using a sensor of choice
227. Report on how gear ratio affects distance traveled
228. Report on how gear ratio affects travel speed
229. Robot you made – attach card explaining how robot was designed and built
230. Robotic gripper that you built – attach card describing how you built it
231. Any other robotic exhibit

