



Department 24 - Mechanical Science

ATCP 160.70

REGISTRATION DATE: APRIL 20 TO MAY 20, 2024

CHECK-IN: SATURDAY, JULY 13, 2024 @ 9 AM TO 1:30 PM

JUDGING: SATURDAY, JULY 13, 2024 @ 9 AM TO 2:00 PM

JUDGING STYLE: FACE-TO-FACE

Lead Superintendents: Owen Johnson, owen.johnson.1986@gmail.com or

Christina Johnson, christinakayjohnson08@gmail.com

Rules and Instructions

- a) Read the **General Fair Rules & Instructions** document!!!
- b) Exhibitors are responsible for securing to the display or exhibit all loose pieces of the entry (i.e. wire, zip ties, string, or glue).
- c) Posters can be no larger than 14"x22", and displays can be no larger than 28"x40".
- d) Exhibitors must enter in their grade division.
- e) Posters must consist of at least 50% to 75% original work.
- f) Rockets must be displayed on stands.
- g) All engines must be removed from all model rockets before entry.
- h) All fuel must be removed from engines before entry.
- i) Each entry should have a 3"x5" card which describes:
 - a. Exhibitor grade and number of years in department
 - b. Steps taken to complete this exhibit.
 - c. What have you learned or practiced in completing this exhibit?
- j) Classes A-P - All items and pieces of exhibit must be firmly in place and secure.

TRACTOR MAINTENANCE

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

CLASS A – Gr. 3-5

Lot

- 1. Exhibit: parts of a tractor
- 2. Exhibit: tractor safety features
- 3. Exhibit: how to start and stop a tractor
- 4. Exhibit: safety hazards when operating a tractor
- 5. Exhibit: role of ROPS (rollover protective structures)
- 6. Exhibit: commonly used hand signals with tractors
- 7. Exhibit: machine hazards
- 8. Exhibit: types of fire extinguishers and how they are used
- 9. Exhibit: proper clothing worn while working around tractors/machinery
- 10. Any other exhibit

CLASS B – Gr. 6-9

Lot

- 15. Exhibit: general farm safety rules
- 16. Exhibit: PTO (power-take-off) safety
- 17. Exhibit: causes of tractor rollovers
- 18. Exhibit: how to prevent tractor rollovers

- 19. Exhibit: maintenance checks before operating a tractor
- 20. Exhibit: types of tractor fuel
- 21. Exhibit: recycling tractor batteries and oil
- 22. Exhibit of nuts, bolts, screws and other fasteners used on the farm
- 23. Exhibit charting the operating costs and maintenance of a typical piece of farm equipment
- 24. Any other exhibit

CLASS C – Gr. 10 & up

Lot

- 30. Exhibit: flowing grain hazards
- 31. Exhibit showing proper lawn mower safety
- 32. Exhibit: how to use conveyors and augers safely
- 33. Exhibit: cooling system safety
- 34. Exhibit: hydraulic system and fuel safety
- 35. Exhibit: tractor maintenance log
- 36. Exhibit: servicing oil fuel and hydraulic filters
- 37. Exhibit: engine air requirements
- 38. Exhibit: types of air filters
- 39. Any other exhibit

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CLASS D – FARM DISPLAY

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

45. Gr. 3-7 Model Farm – 2'x3' farm scene on plywood using model buildings, animals and equipment showing seasonal farm operations (include a description of the activity depicted in the farm scene)
46. Gr. 8 and up, Model Farm – 2'x3' farm scene on plywood using model buildings, animals and equipment showing seasonal farm operations (include a description of the activity depicted in the farm scene)

MODELS PROJECTS

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

- a) Exhibits must be the result of the exhibitor's efforts since the previous year's fair.
- b) Lots 50-54 & Lots 60-65 are single items, not dioramas or scenes.
- c) All models should be securely mounted on a base no larger than 2'x3'. All bases must be solid (no flimsy bases such as cardboard or paper).

CLASS E – Gr. 3-7

Lot

50. Model of member's original design made from snap together components such as Legos, Erector or K'nex
51. Models made from a kit, using snap together components such as Legos, Erector or K'nex – include you are encouraged to have instructions.
52. Model made from a kit, assembled with glue, following you are encouraged to have kit instructions (no snap together components)
53. Modified or customized model made from one or more kits, assembled with glue (no snap together components)
54. Scratch built model – not a kit
55. Diorama or panorama exhibit (not model farm)
56. Poster with 5 photos of your model railroad setup
57. Any other exhibit related to models

CLASS F – Gr. 8 and up

Lot

60. Model of member's original design made from snap together components such as Legos, Erector or K'nex
61. Models made from a kit, using snap together components such as Legos, Erector or K'nex – include you are encouraged to have instructions.
62. Model made from a kit, assembled with glue, following you are encouraged to have kit instructions
63. Modified or customized model made from one or more kits, assembled with glue (no snap together components)
64. Scratch built model – not a kit
65. Action model featuring lights, sounds, motors, or substantial moving parts
66. Diorama or panorama exhibit (not model farm)
67. Poster with 5 photos of your model railroad setup
68. Photo story on the construction of a scale model
69. Any other exhibit related to models

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SMALL ENGINES

CLASS G – Gr. 3-7

Premiums: \$2.00 \$1.75 \$1.50 \$1.25

Lot

- 75. Rebuilt engine or machine part for 2 or 4 cycle engine
- 76. Any exhibit showing a two-cycle or four-cycle engine
- 77. Exhibit showing correct steps in preparing a small engine
- 78. Exhibit illustrating steps in a small engine service job
- 79. Any other exhibit related to engines

CLASS H – Gr. 8 and up

Premiums: \$2.50 \$1.75 \$1.50 \$1.25

Lot

- 85. Rebuilt engine or machine part for 2 or 4 cycle engine
- 86. Any exhibit showing a two-cycle or four-cycle engine
- 87. Exhibit showing correct steps in preparing a small engine for off season storage
- 88. Exhibit illustrating steps in a small engine service job
- 89. Any other exhibit related to engines

CLASS I – BICYCLE

Premiums: \$2.00 \$1.75 \$1.50 \$1.25

Lot

- 95. Rebuilt or refinished bicycle
- 96. Any exhibit about bicycle parts
- 97. Any exhibit about bicycle safety, rules of the road
- 98. Exhibit on bicycle maintenance
- 99. Any other exhibit related to bicycles



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AEROSPACE

Premiums: \$2.00 \$1.75 \$1.50 \$1.25

CLASS J – Gr. 3-5

Lot

105. Small model of homemade airplane or rocket (not a kit)
106. Small model of homemade airplane or rocket (kit)
107. Exhibit of parts of an aircraft or rocket
108. Exhibit of how weather affects flying
109. Exhibit on any other related phase of the project
110. Launched rocket – including a card describing the results of the rocket flight (rocket not exhibited at a previous fair)

CLASS K – Gr. 6-8

Lot

115. Model rocket built by member – not kit – include explanation of finishing involved, launching system, tracking system, and any flight results
116. Model rocket built by member – from kit – include explanation of finishing involved, launching system, tracking system, and any flight results
117. Model airplane built by member – from a kit
118. Exhibit of rocket parts and their function
119. Exhibit matching parts and functions of remote control
120. Exhibit on any other related phase of the project
121. Launched rocket – including a card describing the results of the rocket flight (rocket not exhibited at a previous fair)

CLASS L – Gr. 9 and up

Lot

125. Model rocket built by member – not a kit – include explanation of finishing involved, launching system, tracking system, and any flight results
126. Model rocket built by member – from a kit – include explanation of finishing involved, launching system, tracking system, and any flight results
127. Model airplane built by member – from a kit
128. Exhibit of flat-style box kite (see page 20 of State 4-H Curriculum)
129. Exhibit explaining aircraft navigation
130. Exhibit on any other related phase of the project
131. Launched rocket – including a card describing the results of the rocket flight (rocket not exhibited at a previous fair)
132. Drone built by member – include explanation of the operation system, registration process and any flight results.

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GEOSPATIAL

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

CLASS M – Gr. 3-7

CLASS N – Gr. 8 and up

Lot

- 140. Any exhibit related to maps/map-making
- 141. Any exhibit related to GPS/geocaching

Lot

- 150. Any exhibit related to maps/map-making
- 151. Any exhibit related to GPS/geocaching

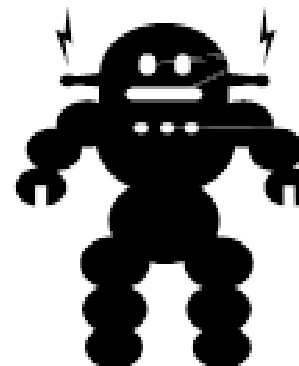
ROBOTICS

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

CLASS O – Gr. 3-7

Lot

- 170. Basic LEGO tankbot that I designed and built
- 171. Exhibit: differences among machines, computers, and robots
- 172. Exhibit: parts of an RCX (robot's brain)
- 173. Program: tankbot goes forward for 4 seconds
- 174. Program: tankbot turns left 3 different ways
- 175. Program: tankbot navigates a maze
- 176. Program: tankbot travels around square race track
- 177. Program: tankbot stops, using a touch sensor
- 178. Program: tankbot follows a path
- 179. Any other exhibit



CLASS P – Gr. 8 and up

Lot

- 185. Robot that I designed and built
- 186. Program: robot goes forward and backward
- 187. Program: robot determines distance, using rotational sensor
- 188. Program: robot controls turns, using rotational sensor
- 189. Exhibit: types of gears
- 190. Compound gear train
- 191. Program: robot goes forward then backward, using containers (variables)
- 192. Robotic gripper that I built
- 193. Program: robot grips soda can and returns to starting point
- 194. Any other exhibit