



DEPARTMENT 24

MECHANICAL SCIENCE

**Please see the Judging
Schedule for date and time.**

ALL lots will be judged Face-to-Face

Adult Superintendent: Owen & Christina Johnson

Mechanical Science Rules and Instructions

- a) Exhibitors and their families are responsible for reading and complying with the Junior Fair General Rules & Instructions.
- b) The Fair Association is not responsible for articles lost/stolen during the fair.
- c) Exhibitors are responsible for securing to the display or exhibit all loose pieces of the entry (i.e. wire, zip ties, string, or glue).
- d) Posters can be no larger than 14"x22", and displays can be no larger than 28"x40".
- e) Exhibitors must enter in their grade division.
- f) Work must have been made since the previous county fair.
- g) Posters must consist of at least 50% to 75% original work.
- h) Rockets must be displayed on stands.
- i) All engines must be removed from all model rockets before entry.
- j) All fuel must be removed from engines before entry.
- k) Each entry should have a 3"x5" card which describes:
 - a. Exhibitor grade and number of years in project
 - b. Steps taken to complete this exhibit.
 - c. What have you learned or practiced in completing this exhibit?
- l) Classes A-P - All items and pieces of exhibit must be firmly in place and secure.

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

CLASS A – TRACTOR MAINTENANCE, 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 – TRACTOR MAINTENANCE, 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 – TRACTOR MAINTENANCE, 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

CLASS D – FARM DISPLAY

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)

CLASS E – MODELS PROJECT, Gr. 3-7

- a) Exhibits must be the result of the exhibitor's efforts since the previous year's fair.
- b) Lots 50-54 are single items, not dioramas or scenes.
- c) All models should be securely mounted on a base or platform no larger than 2'x3'.

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 – MODELS PROJECT, Gr. 8 and up

- a) Exhibits must be the result of the exhibitor's efforts since the previous year's fair.
- b) Lots 60-65 are single items, not dioramas or scenes.
- c) All models should be securely mounted on base or platform no larger than 2'x3'.

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. Acton 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

CLASS G – SMALL ENGINES, 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 – SMALL ENGINES, Gr. 8 and up

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

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



CLASS J – AEROSPACE, Gr. 3-5

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

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 – AEROSPACE, 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 – AEROSPACE, 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.

CLASS M – GEOSPATIAL, Gr. 3-7

Lot

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

CLASS N – GEOSPATIAL, Gr. 8 and up

Lot

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



CLASS O – ROBOTICS, 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 – ROBOTICS, 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