ATCP 160.70 – MECHANICAL SCIENCE – DEPARTMENT 24

Judging: Friday, 9:00 a.m. – Exhibition Hall

Adult Superintendent: Owen Johnson

<u>Mechanical Science Rules and Instructions</u>

a) Exhibitors and their families are responsible for reading and complying with the Junior Fair General Rules & Instructions.
b) Fair Association is not responsible for articles lost/stolen during 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) All exhibitors are encouraged to be present for judging.
e) Posters can be no larger than 14″x22″, and displays can be no larger than 22″x28″.
f) Exhibitors must enter in their grade division.
g) Work must have been made since September 1 of last year.
h) Posters must consist of at least 50% to 75% original work.
i) Rockets must be displayed on stands.
j) All engines must be removed from all model rockets before entry.
k) All fuel must be removed from engines before entry.
l) All exhibits should include identification of grade and number of years in project.

CLASS A – TRACTOR MAINTENANCE

Premiums $ 2.50 $ 2.25 $ 2.00 $ 1.75

Lot   **Open to Members Grades 3-5**

<mark>Conference Judging</mark>

1. Display: parts of a tractor
2. Poster: tractor safety features
3. Poster: how to start and stop a tractor
4. Poster: safety hazards when operating a tractor
5. Display: role of ROPS (rollover protective structures)

6. Poster: showing commonly used hand signals with tractors
7. Poster: machine hazards
8. Poster: types of fire extinguishers and how they are used
9. Poster: highlighting proper clothing worn while working around tractors/machinery
10. Any other poster or display

Lot   **Open to Members Grades 6-9**

15. Poster: general farm safety rules
16. Poster: PTO (power-take-off) safety
17. Display: causes of tractor rollovers
18. Display: how to prevent tractor rollovers
19. Display: maintenance checks before operating a tractor
20. Poster: types of tractor fuel
21. Poster: recycling tractor batteries and oil
22. Display of nuts, bolts, screws and other fasteners used on the farm
23. Poster charting the operating costs and maintenance of a typical piece of farm equipment
24. Any other poster or display

Lot   **Open to Members Grades 10 and Up**

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

CLASS B – FARM DISPLAY

<mark>Conference Judging</mark>

1. 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)

2. Gr. 8+ 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 C – MODELS PROJECT

a) Exhibits must be the result of the exhibitor's efforts since the previous year's fair.

Maximum size of any Models exhibit is 14″x22″.

Premiums $ 2.50 $ 2.25 $ 2.00 $ 1.75

Lot   Members Grades 3-7   <mark>Conference Judging</mark>

1. Model of member's original design made from snap together components such as Legos, Erector or K'nex Gr. 3-7
2. Model made from a kit, using snap together components such as Legos, Erector or K'nex – include instructions. Gr. 3-7
3. Plastic model made from a kit, assembled with glue, following kit instructions (no snap together components) Gr. 3-7
4. Modified or customized model made from one or more kits, assembled with glue (no snap together components) Gr. 3-7
5. Scratch built model – not a kit Gr. 3-7
6. Diorama or panorama display (not model farm) Gr. 3-7
7. Poster with 5 photos of your model railroad setup Gr. 3-7

Members Grades 8+

9. Model of member's original design made from snap together components such as Legos, Erector or K'nex Gr. 8 & up
10. Model made from a kit, using snap together components such as Legos, Erector or K'nex – include instructions. Gr. 8 & up
11. Plastic model made from a kit, assembled with glue, following kit instructions Gr. 8 & up

12. Modified or customized model made from one or more kits, assembled with glue (no snap together components) Gr. 8 & up
13. Scratch built model – not a kit Gr. 8 & up
14. Acton model featuring lights, sounds, motors, or substantial moving parts Gr. 8 & up
15. Diorama or panorama display (not model farm) Gr. 8 & up
16. Poster with 5 photos of your model railroad setup Gr. 8 & up
17. Photo story on the construction of a scale model Gr. 8 & up

CLASS D – SMALL ENGINES TWO AND FOUR CYCLE ENGINES

Premiums $ 2.00 $ 1.75 $ 1.50 $ 1.25

Lot

Members Grades 3-7

1. Rebuilt engine or machine part for 2 or 4 cycle engine Gr. 3-7
2. Any poster or exhibit showing a two-cycle or four-cycle engine Gr. 3-7
3. Poster showing correct steps in preparing a small engine Gr. 3-7
4. Poster illustrating steps in a small engine service job Gr. 3-7
5. Any other poster/exhibit related to engines Gr. 3-7

Premiums $ 2.50 $ 2.25 $ 2.00 $ 1.75

Members Grades 8 & Up <mark>Conference Judging</mark>

10. Rebuilt engine or machine part for 2 or 4 cycle engine Gr. 8 & up
11. Any poster or exhibit showing a two-cycle or four-cycle engine Gr. 8 & up
12. Poster showing correct steps in preparing a small engine for off season storage Gr. 8 & up
13. Poster illustrating steps in a small engine service job Gr. 8 & up
14. Any other poster/exhibit related to engines Gr. 8 & up

CLASS E - BICYCLE

Premiums $ 2.00 $ 1.75 $ 1.50 $ 1.25

Lot

1. Rebuilt or refinished bicycle
2. Any poster or exhibit about bicycle parts
3. Any poster or exhibit about bicycle safety, rules of the road
4. Poster or exhibit on bicycle maintenance
5. Any other poster or exhibit related to bicycles

CLASS F – AEROSPACE

Premiums $ 2.00 $ 1.75 $ 1.50 $ 1.25

Lot **Members Grades 3-5**

1. Small model of homemade airplane or rocket (not a kit) Gr. 3-5
2. Small model of homemade airplane or rocket (kit) Gr. 3-5
3. Poster or display of parts of an aircraft or rocket Gr. 3-5
4. Display of how weather affects flying Gr. 3-5
5. Poster or exhibit on any other related phase of the project Gr. 3-5
6. Launched rocket – including a card describing the results of the rocket flight (rocket not exhibited at a previous fair) Gr. 3-5

Lot **Members Grades 6-8**   Conference Judging

10. Model rocket built by member – not kit – include explanation of finishing involved, launching system, tracking system, and any flight results Gr. 6-8

11. Model rocket built by member – from kit – include explanation of finishing involved, launching system, tracking system, and any flight results Gr. 6-8
12. Model airplane built by member – from a kit Gr. 6-8
13. Poster of rocket parts and their function Gr. 6-8
14. Exhibit/poster matching parts and functions of remote control Gr. 6-8
15. Poster or exhibit on any other related phase of the project Gr. 6-8
16. Launched rocket – including a card describing the results of the rocket flight (rocket not exhibited at a previous fair) Gr. 6-8
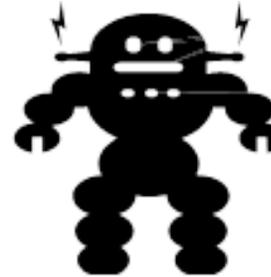
Lot **Members Grades 9+**

20. Model rocket built by member – not a kit – include explanation of finishing involved, launching system, tracking system, and any flight results Gr. 9 & up
21. Model rocket built by member – from a kit – include explanation of finishing involved, launching system, tracking system, and any flight results Gr. 9 & up
22. Model airplane built by member – from a kit Gr. 9 & up
23. Exhibit of flat-style box kite (see page 20 of State 4-H Curriculum) Gr. 9 & up
24. Exhibit explaining aircraft navigation Gr. 9 & up
25. Poster/exhibit on any other related phase of the project Gr. 9 & up
26. Launched rocket – including a card describing the results of the rocket flight (rocket not exhibited at a previous fair) Gr. 9 & up
27. Drone built by member – include explanation of operation system, registration process and any flight results. Gr. 9 & up

CLASS G – GEOSPATIAL

Lot   Members Grades 3-6

1. Display: essential geographical tools
2. Poster: types of geographical tools
3. Poster: uses of geographical tools
4. Poster: coordinate-grid reference system
5. Display: types and uses of maps
6. Map of my neighborhood with list of features
7. Map with selected route

Lot   Members Grades 7-9

15. Poster: differences between geographic and geospatial data
16. Display: differences between population and road maps
17. Display: pros and cons of geographic and geospatial tools
18. Poster: comparison of thematic and general purpose maps
19. Display: my thematic map
20. Display: my general purpose map

Lot   Members Grades 10+

31. Display: brochure about my favorite place
32. Display: map of my favorite place
33. Poster: why some G2 data is hard to collect
34. Display: types of G2 data about my community
35. Exhibit: how to solve a community problem using G2 data
36. Display: map of my community with several data layers
37. Exhibit: my map gallery
38. Exhibit: my sustainable development project

CLASS H – ROBOTICS

Lot   Members Grades 3-8

1. Basic LEGO tankbot that I designed and built
2. Poster: differences among machines, computers, and robots
3. Poster: parts of an RCX (robot's brain)
4. Program: tankbot goes forward for 4 seconds
5. Program: tankbot turns left 3 different ways
6. Program: tankbot navigates a maze
7. Program: tankbot travels around square race track
8. Program: tankbot stops, using a touch sensor
9. Program: tankbot follows a path
10. Any other exhibit

Lot   Members Grades 9-13

20. Robot that I designed and built
21. Program: robot goes forward and backward
22. Program: robot determines distance, using rotational sensor
23. Program: robot controls turns, using rotational sensor
24. Poster: types of gears
25. Compound gear train
26. Program: robot goes forward then backward, using containers (variables)
27. Robotic gripper that I built
28. Program: robot grips soda can and returns to starting point
29. Any other exhibit