

**ATCP 160.70 – MECHANICAL SCIENCE –
DEPARTMENT 24**

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

Mechanical Science Rules and Instructions

1. Fair Association is not responsible for articles lost/stolen during fair.
2. Posters and charts 14"x22" unless otherwise stated.
3. An exhibitor must enter under the Unit in which enrolled.
4. Work must have been made since September 1 of last year.
5. Posters must consist of at least 50% to 75% original work.
6. Rockets must be displayed on stands.
7. All engines must be removed from all model rockets before entry.
8. All fuel must be removed from engines before entry.
9. All exhibits should include identification of age/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 **F-T-F**
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 member 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 or air filters
 39. Any other poster or display

**CLASS B – FARM DISPLAYS
Grades 3-7**

1. 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)

Grades 8 and up

2. 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)

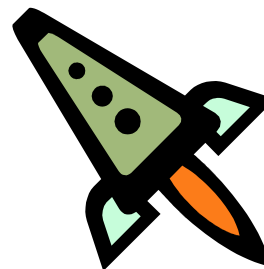
CLASS C – MODELS PROJECT

(No models made from snap together components will be allowed in classes open to members Grades 8 and up)

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

- Lot Open to members grades 3-7 **F-T-F**
1. Model of member's original design made from snap together components such as Legos, Erector or K'nex
 2. Plastic model made from a kit following kit instructions (No Legos or K'nex)
 3. Kit based modified or customized model
 4. Scratch built model – not a kit
 5. Diorama or panorama display (not a model farm)
 6. Poster with 5 photos of your model railroad setup
- Open to members grades 8 and up **F-T-F**
10. Plastic model made from a kit following kit instructions
 11. Kit based modified or customized model
 12. Scratch built model – not a kit
 13. Action model featuring lights, sounds, motors, or substantial moving parts
 14. Diorama or panorama display (not a model farm)
 15. Poster with 5 photos of your model railroad setup
 16. Photo story on the construction of a scale model

CLASS D – SMALL ENGINES
TWO AND FOUR CYCLE ENGINES



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

Open to members grades 3-7

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

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

Open to members grades 8 and up

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

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

UNIT I – LIFT OFF

Open to members grades 3-5

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

UNIT II – REACHING NEW HEIGHTS

Open to members grades 6-8

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

UNIT III – PILOT IN COMMAND

Open to members grades 9 and up

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

CLASS G – GEOSPATIAL

Level 1 – Beginner – Setting Out

Open to members grades 3-6

1. Display: essential geographical data on my house
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

Level 2 – Intermediate – On The Trail

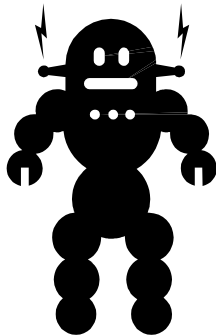
Open to members grades 7-9

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

Level 3 – Advanced – Reaching Your Destination

Open to members grades 10-13

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

Level 1 – Robotics Explorer

Open to 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

Level 2 – Robotics Probe

Open to 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