

## DEPARTMENT 124 – MECHANICAL PROJECTS

Please see the judging schedule for dates and times if you would like to do face to face judging.

### CLASS A – AEROSPACE

All posters and charts are 14" x 22" or 28" x 22". Exhibits can be in a low cut box or tray.

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

#### Open to members enrolled in "Pre-flight"

1. An edible rocket
2. Display showing comparison of birds and airplanes
3. A homemade space helmet
4. Poster or display identifying parts of a rocket
5. Poster or display of different types of aerospace careers
6. A chart identifying cloud types

#### Open to members enrolled in "Lift-off"

7. A straw rocket
8. A paper airplane
9. Photos of types of aircraft with descriptions
10. A homemade diamond kite
11. Hot air balloon model with parts identified
12. Homemade paper helicopter

#### Open to members enrolled in "Reaching new heights"

13. A straw and balloon rocket
14. A flight simulator
15. A feather wing glider
16. A "shuttle on a string"
17. Nagasaki hata fighter kite
18. Match parts and functions of a remote control
19. Homemade hang glider

#### Open to members enrolled in "Pilot In Command"

20. A model rocket
21. An altitude tracker
22. Evaluation of navigation systems display
23. Homemade flat-style box kite

### CLASS C – BICYCLE PROJECT

Open to members enrolled in Mechanical Sciences – Bicycling Projects. Members enrolled in Adventure Project – Bicycling must exhibit in 116, L. All posters and charts are 14" x 22" or 28" x 22".

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

1. A chart or display board showing the basic parts of a bicycle
2. A chart of bicycle laws
3. A chart of labeled traffic control signs
4. Bicycle safety poster

5. A poster on bicycle care and maintenance
6. A bicycle repair and maintenance kit
7. A picture story of a bike trip

**CLASS D – SMALL ENGINES** (Lawnmowers, go-karts, snow blower, etc.)

**Unit 1 – Crank It Up!**

All posters and charts are 14" x 22" or 28" x 22".

Group "A"	Group "B"	Group "C"	Group "D"
\$1.75	\$1.50	\$1.25	\$1.00

1. Small engine safety poster
2. Display or exhibit of basic tools used for small engine repair and maintenance
3. Display or poster of parts found in a small engine

**Unit 2– Warm It Up!**

All posters and charts are 14" x 22" or 28" x 22".

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

4. Poster showing events in a two-stroke and four-stroke engine with a brief explanation
5. A display of internal parts or pictures of parts – labeled
6. Poster showing correct steps in preparing a small engine for off season storage
7. A display of different types of oil illustrating viscosity and service classifications
8. A poster or display of specialty tools used in the maintenance or repair of small engines

**Unit 3 – Tune It Up!**

All posters and charts are 14" x 22" or 28" x 22".

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

9. Safety poster on chain saw use, outboard motors, motorcycles, or dirt bikes
10. Panel exhibit showing diagram of ignition systems, fuel systems, or lubrication systems (actual parts may be used to diagram)
11. Panel showing worn or faulty engine parts with a statement as to cause and prevention
12. Poster or display on comparison shopping of engines, parts, and tools

**CLASS E – GEOSPATIAL**

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

**Unit 1 – Getting Out**

1. Exhibit of a map you designed using GIS/GPS to introduce someone to your community
2. Exhibit on history/development of compasses, globes, maps, or GIS/GPS
3. Report on why we still need to know about compasses, globes, and paper maps
4. Exhibit on how using maps can help solve community problems
5. Exhibit on what can affect a GIS/GPS receiver's ability to maintain connection to satellites
6. Chart about the main pages and sub pages of a GIS/GPS receiver
7. Poster about the control buttons and other external features of a GIS/GPS
8. Exhibit on how to use a GIS/GPS to create a treasure hunt

9. Exhibit on how to hold a GIS/GPS skillathon
10. Exhibit on consumer choices when buying GIS/GPS equipment

### Unit 2 – On The Trail

11. Exhibit on careers that use GIS/GPS skills and knowledge
12. Example of map layering using transparencies
13. Exhibit on remote sensing, aerial photography, or satellite imaging as related to GIS/GPS
14. Exhibit on the differences between geographic data and geospatial data – include examples from newspapers
15. Exhibit about using plant life, the stars or sun, or sextants to find your way
16. Report on a famous cartographer
17. Exhibit about letterboxing
18. Exhibit on how to use GIS/GPS to make a history or nature trail
19. Report on the differences between stationary and movement data
20. Exhibit about satellites as related to GIS/GPS
21. Exhibit on how GIS/GPS is used in everyday life

### Unit 3 – Reaching your destination

22. Report on how GIS/GPS can be used for sustainable development solutions
23. Exhibit showing the importance of cardinal points, grid, title, symbols, and labels in making maps
24. Exhibit showing two maps comparing their audiences, information, and presentation
25. Report from interviewing a geographer or city planner about how he/she uses GIS/GPS and map layers at work
26. Collage showing as many types and sources of data (including GIS/GPS data) as you can find related to dealing with a specific community issue like traffic flow, development, etc.
27. Exhibit on how to determine accuracy and reliability of data
28. Exhibit on geocaching and rules
29. Exhibit on how GIS/GPS is used for search and rescue operations
30. Report on effects of GIS/GPS on society
31. Report on ethics related to GIS/GPS usage

### CLASS F – TRACTOR

All posters and charts are 14" x 22" or 28" x 22".

Group "A"	Group "B"	Group "C"	Group "D"
\$2.50	\$2.25	\$2.00	\$1.50

1. Poster or log about tractor maintenance
2. Poster emphasizing tractor safety
3. Display about tractor parts
4. Exhibit about ways tractors are used
5. Exhibit about purchasing decisions on tractors
6. Photographs and documentation of the steps you took in restoring, reconditioning, or rebuilding the tractor

## **CLASS G – SCALE MODELS**

Open to members enrolled in the scale model project – models for display only

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

### **Open to members - grades 3-8**

1. Car, from a kit
2. Car, original design, not from a kit
3. Ship, from a kit
4. Ship, original design, not from a kit
5. Tank, from a kit
6. Tank, original design, not from a kit
7. Train, from a kit
8. Train, original design, not from a kit
9. Model made from wood
10. Spaceship, from a kit
11. Spaceship, original design, not from a kit
12. Doll house
13. Doll house furniture
14. Horse drawn vehicle
15. Scale model diorama (include card indicating scale)
16. Model not listed above

### **Open to members - grades 9 and above**

17. Car, from a kit
18. Car, original design, not from a kit
19. Ship, from a kit
20. Ship, original design, not from a kit
21. Tank, from a kit
22. Tank, original design, not from a kit
23. Train, from a kit
24. Train, original design, not from a kit
25. Model made from wood
26. Spaceship, from a kit
27. Spaceship, original design, not from a kit
28. Doll house
29. Doll house furniture
30. Horse drawn vehicle
31. Scale model diorama (include card indicating scale)
32. Model not listed above

## **CLASS H – ROBOTICS**

Group "A"	Group "B"	Group "C"	Group "D"
\$2.00	\$1.75	\$1.50	\$1.25

### **Robotics Explorer**

1. Exhibit on differences between machines, computers, and robots
2. Exhibit on programming sensors

3. Exhibit on programming language
4. Exhibit on forks in programming
5. Exhibit on three different types of robots or ten robot trading cards you created
6. Chart of 20 robotic terms and their definitions
7. Exhibit about aspects of setting up a robotics skillathon
8. Exhibit comparing point turns, non-point turns, and reverse non-point turns
9. Exhibit or timeline illustrating past and future robots
10. Exhibit about how robots influence our lives
11. Exhibit showing the parts of a robot
12. Exhibit of newspaper clippings about robots
13. Scrapbook about your robotics project
14. Exhibit about where you can find robotic supplies to purchase

### **Robotics Probe**

15. Exhibit on using a rotational sensor
16. Exhibit on measured turns
17. Exhibit on pulleys and belts
18. Exhibit on programming with subroutines
19. Exhibit on loop programming
20. Exhibit on electrical circuitry or battery power and robotics
21. Exhibit on helpful approaches to use in figuring out complicated directions
22. Exhibit on cryptology and the use of codes in robotics
23. Exhibit about possible careers as a roboticist
24. Exhibit on 10 different tasks robots can accomplish
25. Exhibit on gears and ratios and the effects on distance traveled and travel speed
26. Exhibit on types of wheels robots use and their effects
27. Exhibit about robots used either in space, underwater, or in the military
28. Exhibit about how robots are used to assist people with disabilities
29. Your robotics sketchbook