

## Department 24 – Mechanical Projects

502, 503, 504, 551, 552, 553, 561, 571, 572, 573, 574

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### Requirements:

1. Youth eligible to exhibit in this department are those enrolled in a 4-H aerospace, small engine or tractor project, or other youth groups carrying a similar program as their supervised project. **Note:** Bicycling found under Dept. 16-Natural Resources.
2. Posters must be 14" x 22".
3. Scrapbooks will be 8 ½" x 11" x 12" x 12". The scrapbook should describe the work done in the project. Pictures and sketches are encouraged.
4. Exhibits may be removed after 8:00 p.m. on Sunday.

<b>PREMIUMS</b>	<b><u>1st</u></b>	<b><u>2nd</u></b>	<b><u>3rd</u></b>	<b><u>4th</u></b>
<b>Class A, D</b>	2.00	1.75	1.50	1.25
<b>Class B, E,G, H</b>	2.50	2.25	2.00	1.75
<b>Class C, F, I</b>	3.00	2.75	2.50	2.25

### **CLASS A—AEROSPACE LIFT-OFF- Grades 3-5 - Project Code 502**

Lot Nos.

1. Drinking straw rocket
2. Single stage rocket (2 or 4 fin model) parts labeled
3. Poster on basic parts of model rocket with their functions
4. Poster on basic parts of model airplane with their functions
5. Display of different types of aircraft
6. Poster on how weather affects flying
7. Homemade diamond kite
8. Model airplane - not made to fly
9. Model airplane - made to fly
10. Panorama display, include airplane or rocket in authentic 3D setting
11. Safety exhibit—on model airplanes, model rockets or remote control airplanes
12. Rocket that has been fired - include photo of launch, and recent distance, launch success, failure, accuracy of distance

### **CLASS B-REACHING NEW HEIGHTS- Grades 6-8 - Project Code 503**

13. Model airplane - not made to fly
14. Model airplane - made to fly
15. Remote airplane - model
16. Single stage model rocket with parts labeled and functions (2 or 4 fin model)
17. Multi-stage rocket (2 or 3 fin model)
18. Paper glider with controls or feather wing glider
19. Nagasaki Hata fighter kite
20. Poster identifying parts and functions of helicopters
21. Poster identifying parts and functions of model rocket
22. Model of a paper flight simulator identifying gauges and functions
23. Poster identifying parts and functions of model airplanes
24. Poster identifying parts and functions of model remote control airplane
25. Rocket that has been fired-include photo of launch and report of distance, launch success, failure, accuracy of distance.

**CLASS C-PILOT IN COMMAND- Grades 9 & up - Project Code 504**

26. Multi-stage rocket (2 to 3 fin model) with parts and functions labeled
27. Model airplane - made to fly
28. Model airplane - not made to fly
29. Model airplane - with remote control
30. Panorama display - include airplane or rocket in authentic 3D setting
31. Safety exhibit—model airplane, model rocket or remote control airplane
32. Poster or display of different types of navigation methods.
33. Homemade box kite
34. Rocket that has been fired- include photo of launch and report of distance, launch success, failure, accuracy of distance

**CLASS D--SMALL ENGINES - Grades 3-5 - Project Code 551**

1. Poster showing external parts of a lawn mower
2. Poster on safety when starting a small engine
3. Panel exhibit showing types of starters. (Actual parts may be used)  
(2-cycle or 4-cycle)
4. Poster on correct tools needed to repair or maintain small engines
5. Panel exhibit showing different types of oil and their functions
6. Panel exhibit showing types of air cleaners. Explain how each works and maintenance required for each
7. Poster of parts of a spark plug, label parts and explain use of spark plug
8. Poster on safety for small engines
9. Scrapbook showing comparison of different brands of lawn mowers, snowblowers, chain saws, etc.
10. Any other exhibit on small engines

**CLASS E--SMALL ENGINES - Grades 6-8 - Project Code 552**

11. Poster explaining different types of engines and examples of what they are used for.
12. Panel exhibit of internal engine parts with identification and function (2-cycle or 4-cycle)
13. Poster of specialty tools used for maintenance and repair of small engines. Identify and state function of each tool.
14. Poster explaining the compression ratio of diesel and gasoline engines.
15. Panel exhibit of carburetor parts with explanation of parts and parts labeled.
16. Poster showing the steps to ready your small engine for storage
17. Poster on safety when using small engines
18. Panel showing worn or faulty engine parts with a statement as to cause or prevention
19. Panel exhibit of small engine parts with identification of parts
20. Any other exhibit on small engines (2-cycle or 4-cycle)

**CLASS F--SMALL ENGINES - Grades 9 & up - Project Code 553**

21. Poster explaining special Diagnostic Tools used to maintain or repair small engines: Identify and state functions.
22. Panel exhibit explaining fuel and air systems of small engines (2-cycle or 4-cycle)  
Actual parts may be used
23. Panel exhibit explaining the electrical system of a small engine (2-cycle or 4-cycle)  
Actual parts may be used
24. Panel exhibit showing most frequently replaced internal engine parts with cause and preventive measure. (2-cycle or 4-cycle)

25. Panel exhibit or poster showing steps to sharpen lawn mower blades
26. Poster or panel exhibit on small engine safety
27. Construct a go-cart, log splitter or another piece of equipment and explanation of why you selected that engine type (Explanation on 3x5 card)
28. Scrapbook of costs and investments made to start your own business.
29. Any other exhibit on small engines (2-cycle or 4-cycle)

**CLASS G-SCALE MODELS - Cars, Boats, Trucks, etc.- Code 561**

1. Small model of homemade model, made with no kit, but with balsa wood, paper, cardboard, etc.
2. Small model, made from kit, with explanation of parts
3. Model, made from kit, remote control
4. Model, any other
5. Poster of basic parts of any model

**CLASS H-TRACTOR 1, Getting Acquainted With Your Tractor - Code 571**

1. Diagram of an instrument panel of a tractor
2. Exhibit explaining maintenance of a tractor
3. Exhibit explaining what makes the engine run
4. Exhibit outlining safety precautions dealing with tractors
5. Cutaway view diagram of a four-cycle engine
6. Any other project display

**CLASS I--TRACTOR 2, Assuring Safe & Efficient Tractor Op - Code 572**

7. Exhibit explaining battery service and functions
8. Exhibit explaining lubrication
9. Diagram of cooling system
10. Exhibit outlining safety precautions
11. Exhibit relating to care of tires
12. An exhibit showing potential hazards on the highway
13. Exhibit of PTO and hydraulic controls
14. Diagram of braking systems
15. Exhibit of records and ownership cost
16. Exhibit relating to winter care
17. Any other project display

**CLASS J—GEOSPATIAL – Codes 537A, 537B, 537C**

**Beginner – Setting Out**

Lot Nos.

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
8. Completed Geospatial “Setting Out” activities (BU8358)

**Intermediate – On The Trail**

9. Poster: differences between geographic and geospatial data
10. Display: differences between population and road maps
11. Display: pros and cons of geographic and geospatial tools
12. Poster: comparison of thematic and general purpose maps
13. Display: my thematic map
14. Display: my general purpose map
15. Completed Geospatial “On the Trail” activities (BU8358)

### **Advanced – Reaching For Your Destination**

16. Display: brochure about my favorite place
17. Display: map of my favorite place
18. Poster: why some G2 data is hard to collect
19. Display: types of G2 data about my community
20. Exhibit: how to solve a community problem using G2 data
21. Display: map of my community with several data layers
22. Exhibit: my map gallery
23. Exhibit: my sustainable development project
24. Completed Geospatial “Reaching for Your Destination” activities (BU8358)

### **CLASS K—ROBOTICS – Codes 538A, 538B**

#### **Robotics Explorer**

Lot Nos

1. Basic LEGO tankbot that I designed and built
2. Poster: differences among machines, computers, & 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 stops, using a light sensor
10. Program: tankbot goes forward for 4 seconds without using wait-for icon
11. Program: tankbot follows a path
12. Program: tankbot follows a path for a length of time
13. Program: tankbot stops, using both touch & light sensors
14. Program: tankbot completes challenge course
15. Completed member guide (BU8364)

#### **Robotics Probe**

16. Robot that I designed and built
17. Program: robot goes forward & backward
18. Program: robot determines distance, using rotational sensor
19. Program: robot controls turns, using rotational sensor
20. Poster: types of gears
21. Compound gear train
22. Report: how gear ratio affects distance traveled
23. Report: how pulley size affects distance traveled
24. Report: how gear ratio affects travel speed
25. Program: robot goes forward then backward, using containers (variables)
26. Robotic gripper that I built

27. Program: robot grips soda can and returns to starting point
28. Program: robot does multiple tasks at same time
29. Program: robot travels around square race track, using subroutines
30. Program: robot navigates a maze, using Sub-VI's
31. Program: robot follows a line, using loops
- 32.** Completed member guide (BU8365)