Department 24 – Mechanical Projects

Superintendents:

Entry/Judging Day – 1 p.m. – 8 p.m. Tuesday of the fair
Entry/Judging Time – 1 p.m.- 8 p.m., Tuesday face to face judging only
Location – Exhibit Building
Check Out – Exhibits will be released between 3:00 pm to 6:00 pm on Sunday of the fair

Requirements:
- Youth eligible to exhibit in this department are those enrolled in a 4-H aerospace, small engine or tractor project, scale models, geospatial, robotics, or other youth groups carrying a similar program as their supervised project. **Note:** Bicycling is found under Dept. 16 - Natural Resources.
- Posters must be 14" x 22".
- 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.

PREMIUMS	**1st**	**2nd**	**3rd**	**4th**
Classes A – G	2.50	2.25	2.00	1.75

CLASS A–AEROSPACE - PROJECT CODE- 50001, 50002, 50003, 50004
Lot Numbers
1. Display of different types of aircraft
2. Panorama display, include airplane or rocket in authentic 3D setting
3. Poster on basic parts of model airplane with their functions described
4. Model airplane - not made to fly
5. Model airplane - made to fly
6. Model airplane - with remote control
7. Drinking straw rocket
8. Single stage model rocket (2 or 4 fin) parts labeled and function described
9. Multi-stage model rocket (2 or 3 fin) parts labeled and function described
10. Rocket that has been fired - include photo of launch, and report on recent distance, launch success, failure, accuracy of distance
11. Homemade box kite
12. Homemade diamond kite
13. Nagasaki Hata fighter kite
14. Paper glider with controls or feather wing glider
15. Model of a flight simulator identifying gauges and functions
16. Safety exhibit–model airplane, model rocket or remote control airplane
17. Poster on how weather affects flying
18. Poster identifying parts and functions of model airplanes
19. Poster identifying parts and functions of model remote control airplane
20. Poster identifying parts and functions of helicopters
21. Poster identifying parts and functions of model rocket
22. Poster or display of different types of navigation methods

CLASS B--SMALL ENGINES - PROJECT CODE- 50501, 50502, 50503
Lot Numbers
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)
4. (2-cycle or 4-cycle)
5. Poster on correct tools needed to repair or maintain small engines
6. Panel exhibit showing different types of oil and their functions
7. Panel exhibit showing types of air cleaners. Explain how each works and maintenance required for each
8. Poster of parts of a spark plug, label parts and explain use of spark plug
9. Poster on safety for small engines
10. Scrapbook showing comparison of different brands of lawn mowers, snowblowers, chain saws, etc.
11. Any other exhibit on small engines
12. Poster explaining different types of engines and examples of what they are used for
13. Panel exhibit of internal engine parts with identification and function (2-cycle or 4-cycle)

14. Poster of specialty tools used for maintenance and repair of small engines. Identify and state function of each tool
15. Poster explaining the compression ratio of diesel and gasoline engines
16. Panel exhibit of carburetor parts with explanation of parts and parts labeled
17. Poster showing the steps to ready your small engine for storage
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)
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 C - SCALE MODELS - Cars, Boats, Trucks, etc. - PROJECT CODE- 50601
Lot Numbers
1. Small homemade model, not from kit
2. Small model, made from kit, <u>with explanation of parts</u>
3. Model, made from kit, remote control
4. Model, any other
5. Poster of basic parts of any model

CLASS D-TRACTOR 1 - PROJECT CODE 50701
Lot Numbers
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 E--TRACTOR 2 - PROJECT CODE 50703, 50704
Lot Numbers
1. Exhibit explaining battery service and functions
2. Exhibit explaining lubrication
3. Diagram of cooling system
4. Exhibit outlining safety precautions
5. Exhibit relating to care of tires
6. An exhibit showing potential hazards on the highway
7. Exhibit of PTO and hydraulic controls
8. Diagram of braking systems
9. Exhibit of records and ownership cost
10. Exhibit relating to winter care
11. Any other project display

CLASS F—GEOSPATIAL – PROJECT CODE – 50371, 50372, 50373
Lot Numbers
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)
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)
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)
25. Any other geospatial exhibit

CLASS G—ROBOTICS – PROJECT CODE – 50381, 50382
Lot Numbers
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)
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)

CLASS H - LEGOS AND K'NEX - PROJECT CODE –50421

NOTE: Programmed LEGO Robots should be entered in Department 24, Class G.

Lot Numbers
1. Lego vehicle <u>from kit</u> (car, plane, boat, etc) Size limit 14" X 22"
2. Lego structure <u>from kit</u> (house, bridge, etc) Size limit 14" X 22"
3. Lego non-motorized robot <u>from kit</u> --Size limit 14" X 22"
4. Lego mechanical <u>from kit</u> (w/motor and must move) Size limit 14" X 22"
5. Lego animal -- Size limit 14" X 22"

6. Lego vehicle -- Size limit 14" X 22"
7. Lego structure -- Size limit 14" X 22"
8. Lego non-motorized robot -- Size limit 14" X 22"
9. Any other Lego model not listed above
10. K'Nex vehicle (car, plane, boat, etc) Size limit 14" X 22"
11. K'Nex animal -- Size limit 14" X 22"
12. K'nex robot-- Size limit 14" X 22"
13. K'nex mechanical (w/motor and must move) --Size limit 14" X 22"
14. K'nex any other not listed above -- Size limit 14" X 22"
15. Photo journal of Lego projects, with specific goals labeled (i.e. Legos as Art, Legos in Unexpected Places)

CLASS I – MECHANICAL SCIENCES SELF-DETERMINED - Project Code 191
Self-determined project exhibits are records of projects not listed in the premium list or an expansion of a traditional project beyond limits of the project or in greater depth than the project outlines.
● Posters MUST be 14" x 22".
● Scrapbooks MUST be 8 ½"x 11" or 12" x 12".

PREMIUMS	**1st**	**2nd**	**3rd**	**4th**
	2.50	2.25	2.00	1.75

Lot Numbers:
1. A poster promoting your self-determined project
2. An article made during the current year with a 3 x 5 inch card attached identifying resources. The article should be of reasonable size to exhibit in the Expo building
3. A collection made during current year with a 3 x 5 inch card identifying work done
4. A scrapbook with story or essay, drawings, and photos of project work done during the current enrollment year.
5. Any other self-determined project not listed above.