

## **JUNIOR MECHANICAL SCIENCE - 124**

**JUDGING DAY: FRIDAY of Pre-Fair Judging Week, 12:00 -6:00pm**

### **RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Additional rules for specific divisions are listed.
2. Grand and Reserve award for each division will be awarded.
3. For general regulations please refer to page 84.

**PREMIUMS: 1<sup>st</sup> - \$2.25 2<sup>nd</sup> - \$2.00 3<sup>rd</sup> - \$1.75 4<sup>th</sup> - \$1.50**

**Division Letter: A. Tractor**

**Class #:**

1. **Tractor, Grades 3-4:** – Display or poster that illustrates one of the following topics: tractor safety; care and maintenance; or the tractor as a valuable farm machine.
2. **Tractor, Grades 5-6** – Display or poster that illustrates one of the following topics: cause and prevention of rollovers; diagram of how an air cleaner works; diagram of an engine cooling system; or regulations for battery and oil disposal.
3. **Tractor, Grades 7-9** – Display or poster that illustrates one of the following topics: wagon and bin hazards; open and closed hydraulic systems; mower types and safety features; or conveyor types and features.
4. **Tractor, Grades 10-13** – Display or poster that illustrates one of the following topics: method of winterizing a tractor; chemical uses and required safety equipment; parts and process of internal combustion engines; procedures for cleaning and flushing a tractor radiator.
5. Any other Tractor Exhibit (any grade).

**Division Letter: B. Small Engines, Grades 3-5**

**C. Small Engines, Grades 6-8**

**D. Small Engines, Grades 9-13**

**Class #:**

1. Poster, display, slideshow, fact sheet, flash card set, video, or brochure to identify and describe the purposes of at least eight engine parts.
2. Poster, display, slideshow, fact sheet, key, video, or other tool focused on one or more aspects of proper engine maintenance or safety measures.
3. Poster, display, slideshow, fact sheet, video, or other tool describing one or more careers or trends in the small engine industry.
4. "How-to" guide related to some aspect of small engines (e.g. how to properly change oil; how to rebuild an engine; how to decide which small engine best suits your needs, etc).
5. Photo journal, slideshow, video, or display highlighting a comprehensive small engine-related effort you completed since last year's fair (rebuilding an engine, seasoning an engine, etc.).
6. Any other Small Engines exhibit

**Division Letter: E. Bicycle**

**Class #:**

1. Poster, display, video, slideshow, fact sheet, or brochure to explain "how-to" perform one or more aspects of bicycle maintenance.
2. Poster, display, video, slideshow, fact sheet, or brochure to describe the joys, challenges, or skills involved with a particular type of biking (BMX, Mountain, Street, Long-Distance, etc.)
3. Photo journal, video, slideshow, poster, or other type of display to highlight your own biking activities since last August; tell how you've grown as a result of this experience.
4. Poster, display, captioned photo story, slide show, or video describing a bike trip, bike-a-thon, or other biking event that you planned and conducted.
5. Poster, display, fact sheet, or brochure focused on one or more aspects of bicycle safety
6. Any other bicycle exhibit

## **JUNIOR MODEL RAILROADING – DEPARTMENT 124**

**KEY LEADER – Damian Daniels, 262-745-7233**

### **RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Department 124 rules (p.105) and general regulations (p.84) apply.
2. Entries for classes' #1-#4 shall be of a static display mounted on boards either 2' x 4' or 2' x 6' in size and following NMRA guidelines for building a display. Trains should be able to run on the display.
3. Posters must be 14" x 22". Maximum display size is 20" x 22".
4. Depending on the number of entries, the number of train exhibits which may be displayed in the Youth Building during Fair Week may be limited. This will be discussed at the time of judging.

**Division Letter: F. Model Railroading**

**Class #:**

1. Model Railroading, Grades 3-4
2. Model Railroading, Grades 5-6
3. Model Railroading, Grades 7-9
4. Model Railroading, Grades 10 – 13
5. Poster, display, or illustration featuring some aspect of Model Railroading (any grade)

## **JUNIOR ROBOTICS – DEPARTMENT 124**

**KEY LEADER – Damian Daniels, 262-745-7233**

### **RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Department 124 rules (p.105) and general regulations (p.84) apply.
2. Exhibitors may bring their own laptops for demonstration purposes if needed during judging. Neither computers nor internet connections will be provided. Plan to use your own hotspot if needed.
3. If robots are to be displayed, the exhibitor leaves the robot at his/her own risk. Robots should be housed in a protective display case. As an alternative, exhibitors wishing to display their robot are encouraged to consider displaying a photo or drawing of their robot.

#### **Division Letter: G. Robotics, Grades 3-6**

##### **Class #:**

1. Exhibit a display or poster describing the parts of a robot you built, programmed, or researched. Fully explain the function of each part.
2. Exhibit a display, poster, or booklet featuring one or more real world robots and the ways in which each is being used.
3. Exhibit a poster or display describing one or more ways that robotics technology is improving humankind's quality or length of life.
4. Exhibit a poster or display showing the programming guides you used to make your Lego, Vex, or similar robot perform three different programs – each using at least one sensor. Include a statement describing your goal for each program and barriers you had to overcome to get your robot to perform as desired.
5. Any other robotics exhibit.

#### **Division Letter: H. Robotics, Grades 7-13**

##### **Class #:**

1. Exhibit a display or poster explaining a complex function of a programmable Lego, Vex, or similar robot. Examples: calibration, calculating turns or travel distance, etc.
2. Exhibit a display, poster, or booklet featuring one or more real world robots and the ways in which each is being used.
3. Exhibit a poster or display describing one or more ways that robotics technology is improving humankind's quality or length of life.
4. Exhibit a poster or display showing the programming guides you used to make your Lego, Vex, or similar robot perform each of two programs designed by you. Each program should include movement, use of multiple sensors, turns, and repetition. Include a statement describing your goal for each program and barriers you had to overcome to get your robot to perform as desired.
5. Any other robotics exhibit

## **AEROSPACE – DEPARTMENT 124**

**KEY LEADER – Damian Daniels, 262-745-7233**

### **RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Department 124 rules (p.105) and general regulations (p.84) apply.
2. Flying aircraft or rockets may be built from scratch or from a kit and must be painted. Snap together models or pre-painted, die cast or plastic models may not be entered.
3. Plastic models may only be entered as part of Class #1
4. Engines must be removed for judging and display.

#### **Division Letter: J. Aerospace – Grades 3-5**

#### **K. Aerospace – Grades 6-8**

#### **L. Aerospace – Grades 9 and above**

##### **Class #:**

1. Poster or display illustrating and identifying major structural parts of an aircraft (may use a kit or plastic model)
2. Poster, display or essay focused on career opportunities in the Aerospace industry
3. Poster or display showing a map and planned flight route
4. Limited to Division L: An exhibit of a U-control, Free Flight, or Radio Control Model, build by member; include 3" x 5" index card explaining finishing, flying results, and any problems encountered during construction
5. Poster or display illustrating progress towards obtaining one's own private pilot license
6. Kites, built to fly, Diamond, Flat Style box or Nagasaki Hata fighter
7. Kites, Child designed, flightworthy – for display
8. Hot Air Balloon flightworthy – for display
9. Poster or display focused on basic parts of rockets
10. Poster or display relaying information about rocket engines, the working, and types; exhibitor should be able to explain to the judge what coding means
11. Wooden aircrafts, built to fly
12. Limited to Division J: Straw Rocket – Flightworthy for display
13. Rocket Scratch Built – Flightworthy for display (1<sup>st</sup> Entry)
14. Rocket Scratch Built – Flightworthy for display (2<sup>nd</sup> Entry)
15. Rocket Scratch Built - Flightworthy for display (3<sup>rd</sup> Entry)
16. Rocket From Kit, painted using a brush and/or spray can – Flightworthy for display (1<sup>st</sup> Entry)
17. Rocket From Kit, painted using a brush and/or spray can – Flightworthy for display (2<sup>nd</sup> Entry)
18. Rocket From Kit, painted using a brush and/or spray can – Flightworthy for display (3<sup>rd</sup> Entry)
19. Rocket From Kit, painted using any other paint technique – Flightworthy for display (1<sup>st</sup> Entry)
20. Rocket From Kit, painted using any other paint technique – Flightworthy for display (2<sup>nd</sup> Entry)
21. Rocket From Kit, painted using any other paint technique – Flightworthy for display (3<sup>rd</sup> Entry)
22. Rocket Glider, painted using a brush and/or spray can – Flightworthy for display

- Rocket Glider, painted using any other paint techniques – Flightworthy for display

#### AEROSPACE REGULATIONS FOR COUNTY LAUNCH EVENT (DIVISION JJ, KK & LL):

- Entries in Divisions JJ, KK and LL will be shown at a time and location to be determined.
- Exhibitors are limited to one entry per class, and three entries for this division.

**Division Letter:** **JJ. County Launch Event, Grades 3-5**  
**KK. County Launch Event, Grades 6-8**  
**LL. County Launch Event, Grades 9 and above**

#### Class #:

- Rocket flight for height, mini and standard mini rocket motors. Three attempts will be permitted. (1/4A, 1/2A, A)
- Rocket flight for height, standard rocket motors. Three attempts will be permitted. (B, C6)
- Rocket flight for height, D Size rocket motors. Three attempts will be permitted. (C11, D)
- Rocket glider for length of flight. Three attempts will be permitted.
- Air glider for length of flight. Three attempts will be permitted.
- Hot Air Balloon, timed flight for length of flight. Three attempts will be permitted.
- Parachute drop based on time of drop and amount of weight.
- Straw rocket launched for greatest distance. Three attempts will be permitted. Limited to Division JJ only.

#### SCALE MODELS – DEPARTMENT 124

**KEY LEADER – Keith Reimers**

#### RULES GOVERNING EXHIBITS – READ THEM CAREFULLY

- Models must be a plastic, glue kit.
- NO SNAP TITE, SNAP IT, EZ SNAPZ, QUICK BUILD, OR other snap kits allowed. No pre-decorated, pre-painted or die-cast models allowed. No LEGOS, MEGABLOCKS, etc. allowed.
- Scratch-built or after-market parts and modified plastic model kits allowed.
- Painting your model is an option, but is suggested.
- Models / exhibits can be any scale, not to exceed 18" in any direction.
- A clear plastic display case is optional to display each entered scale model.
- Scale models are not to be exhibited as part of a display or diorama. **No bases allowed.**
- Exhibitor may only enter in their own age division, with one entry in each class, not to exceed more than three entries.
- Model box and/or instruction sheet for each model entered must be brought to fair judging.

**Division Letter:** **M. Scale Models – Grades 3-6**  
**N. Scale Models – Grades 7-8**  
**O. Scale Models – Grades 9 and above**

#### Class #:

- Model: Car – Truck – Motorcycle – Boat – Plane – Military – Miscellaneous (Spaceship, Skeleton, etc.)
- Model: Car – Truck – Motorcycle – Boat – Plane – Military – Miscellaneous (Spaceship, Skeleton, etc.)
- Model: Car – Truck – Motorcycle – Boat – Plane – Military – Miscellaneous (Spaceship, Skeleton, etc.)

GRAND & RESERVE AWARD FOR EACH DIVISION.....RIBBON

#### CONSTRUCTIVE DESIGN – DEPARTMENT 124

**(LEGOS, K'NEX, ERECTOR, OR ANY SIMILAR KIT)**

#### RULES GOVERNING EXHIBITS – READ THEM CAREFULLY

- Department 124 rules (p. 105) and general regulations (p.84) apply.
- KITS** may be used, **but must include designs or plans from the kit.** Kits may be **non-mechanical** (minimal moving parts no motors, electronics, etc.), or **mechanical** (may include moving parts, motors, electronics, etc.)
- Original Design: Non-Mechanical,** (minimal moving parts – no motors, electronics, etc.) should include any drawings, designs, or plans if they were part of the project. If exhibitor did not use any of the above, they must be able to explain how they created and/or came up with the idea.
- Original Design: Mechanical,** (may include moving parts, motors, electronics, etc.), should include any drawings, designs, or plans if they were part of the project. If exhibitor did not use any of the above, they must be able to explain how they created and/or came up with the idea. Exhibitor must be able to explain the mechanical, electrical and any other functions of the project. "Original Engineered Design: (may or may not include moving parts, motors, electronics, etc.) should be a creation innovatively built such that the end product is more than meets the eye (e.g. purposeful hidden compartments, unexpected moving parts with a purpose, etc.). Judging for this class will focus on the exhibitor's design ingenuity for their age group. Exhibitor must be able to explain how they came up with the design."
- Exhibits must not exceed 24"x24", and be no taller than 36".
- All exhibits must be displayed on a tray (with sides) or mounted to a firm base not exceeding the 24" x 24" size limit. The purpose of this is to ensure ease of transport in the exhibit area and to make sure all pieces of a single exhibit remain together.

**Division Letter:** **P. Constructive Design, Grade 3-6**

#### Class #:

- One entry using **Kit: Non- Mechanical**
- One entry using **Kit: Mechanical**

**Q. Constructive Design, Grade 7-13**

- One entry using **Original Design: Non-Mechanical**
- One entry using **Original Design - Mechanical**
- Original Engineered Design**

#### R/C CARS– DEPARTMENT 124

**KEY LEADER – Damian Daniels, 262-745-7233**

**RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Department 124 rules (p. 105) and general regulations (p.84) apply.
2. If cars are left for display with the exhibit, exhibitors leave them at their own risk.
3. Entries in classes #1 - #8 will be shown at a time and location to be determined.
4. All cars must be remote controlled, 1/10<sup>th</sup> scale and battery operated. All other info will be provided at the county R/C cars project meetings. Contact Damian Daniels for info.
5. Exhibitors are limited to one entry per class for their grade division, and one entry for class #9.

**Division Letter: R. R/C Cars**

**Class #:**

- |  |   |
|--|---|
| 1. Beginner, Grades 5-6. Two-wheel drive stock       | 7. Advanced, Grades 10-13. Four-wheel drive stock     |
| 2. Intermediate, Grades 7-9. Two-wheel drive stock   | 8. Advanced, Grades 10-13. Four-wheel unlimited       |
| 3. Intermediate, Grades 7-9. Two-wheel unlimited     | 9. All Grades. Self-painted R/C Car or                |
| 4. Intermediate, Grades 7-9. Four-wheel drive stock  | poster/display/illustration focused on some aspect of |
| 5. Advanced, Grades 10-13. Two-wheel drive stock     | R/C cars (shows in the Youth Bldg.)                   |
| 6. Advanced, Grades 10-13. Two-wheel drive unlimited |   |

**R/C DRONES– DEPARTMENT 124**

**KEY LEADER – Damian Daniels, 262-745-7233**

**RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Department 124 rules (p.105) and general regulations (p.84) apply.
2. If drones are left for display with the exhibit, exhibitors leave them at their own risk.
3. Entries in classes #1 - #3 will be shown at a time and location to be determined
4. All drones must be remote controlled, battery operated, and either quad or helicopter type. Size of drone will be determined by the exhibitor, but it must be able to navigate the contest agility course. All other info will be provided at the county R/C cars project meetings. Contact Damian Daniels for info.
5. Exhibitors are limited to one entry per class and a maximum of two entries for the division (1 performance contest and 1 entry for class #4).

**Division Letter: S. R/C Drones**

**Class #:**

1. Beginner, Grades 5-6. R/C Drone
2. Intermediate, Grades 7-9. R/C Drone
3. Advanced, Grades 10-13. R/C Drone
4. All Grades. Poster, display, or illustration focused on some aspect of R/C drones (shows in the Youth Bldg.)

**R/C FIXED WING– DEPARTMENT 124**

**KEY LEADER – Damian Daniels, 262-745-7233**

**RULES GOVERNING EXHIBITS – READ THEM CAREFULLY**

1. Department 124 rules (p.105) and general regulations (p.84) apply.
2. Entries in classes #1 - #3 will be shown at a time and location to be determined
3. All drones for this division must be remote controlled, battery or gas operated, and fixed wing type air craft. Size of drones will be determined by the exhibitor, but it must be able to navigate the contest agility course. All other info will be provided at the county R/C cars project meetings. Contact Damian Daniels for info.
4. Exhibitors are limited to one entry per class and a maximum of two entries for the division (1 performance contest and 1 entry for class #4).

**Division Letter: T. R/C Fixed Wings**

**Class #:**

1. Beginner, Grades 5-6. R/C Fixed Wing
2. Intermediate, Grades 7 -9. R/C Fixed Wing
3. Advanced, Grades 10-13. R/C Fixed Wing
4. All Grades. Poster, display, or illustration focused on some aspect of R/C Fixed Wing Aircraft (shows in the Youth Bldg.)