

## DEPARTMENT 24J MECHANICAL SCIENCE

Superintendents & Jr. Fair Board Representatives:  
Steve & Cindy Redmond, 715-884-2928

**Check General Rules and Judging Schedule found in the front of the book.**

Conference Judging will be followed.

All members must be present for judging or will be dropped one placing unless excused by Dept. 24J Superintendent. Panel exhibits no larger than 3' x 4'.

BEST OF SHOW .....	ROSETTE
Blue .....	\$2.50
Red .....	\$2.25
White .....	\$2.00
Pink .....	\$1.75

### CLASS A

#### Lot

1. Scrapbook, poster or exhibit on tractor maintenance
2. Automotive exhibit, scrapbook, or chart
3. Miniature scale model display showing stopping distances required for different road conditions at different speeds
4. A poster on tractor, automotive, ATV or snowmobile safety
5. Display of one piece of toy farm machinery (and an explanation of its operation and its parts)
6. Display of toy farm (cannot exceed 24" x 42" in size. Maximum height 14". Anchor or glue all parts to base. On a 5" x 7" note card that is mounted to the top of the base, tell a story of what your farm scene represents). May split grade 4-6/7 & up if needed.
7. Display of railroad scene (cannot exceed 24" x 42" in size. Maximum height 12". Anchor or glue all parts to base. On a 5" x 7" note card that is mounted to the top of the base, tell a story of what your theme scene represents)
8. Any other project not listed above

### CLASS B: 1<sup>st</sup> YEAR

Open to members enrolled in projects "Crank It Up" or members of other youth groups doing equivalent work.

#### Lot

1. Panel exhibit of small engine parts with identification of parts
2. Poster illustrating steps in a small engine service job
3. Poster showing correct steps in preparing a small engine for off-season storage
4. Small engine safety poster

### CLASS C: 2<sup>nd</sup> YEAR

Open to 4-H members enrolled in "Warm It Up" or members of other youth groups doing equivalent work.

#### Lot

1. Panel exhibit showing diagram of ignition system, fuel system, or lubrication system (actual parts may be used)
2. Panel showing worn or faulty engine parts with a statement as to cause and prevention
3. Poster showing the events in a four cycle engine with a brief explanation

### CLASS D: 3<sup>rd</sup> YEAR

Open to 4-H members enrolled in "Tune It Up" or members of other youth groups doing equivalent work.

#### Lot

1. Poster showing events in a two cycle engine with a brief explanation
2. Panel exhibit of carburetor parts with explanation of function of parts, float type or diaphragm type
3. Poster listing preventive maintenance measures recommended for two cycle engines

### CLASS E: BICYCLE SAFETY

Open to all members enrolled in the 4-H bicycle project.

#### Lot

1. Poster showing the different parts of the bicycle



2. Poster showing or telling of maintenance needed for keeping a bike in good operating condition or in adjustment
3. Poster stating the rules for safe bicycling

**CLASS F: AEROSPACE** Open to members enrolled in aerospace project or members of other groups doing equivalent work.

#### **MODEL AIRCRAFT OR AIR VEHICLES (NO ROCKETS)**

##### **Lot**

1. Small model of homemade aircraft made with no kit, but with balsa wood, paper, Lego, Knex, cardboard, etc., not made to fly
2. Small model of homemade aircraft made with no kit, but with balsa wood, paper, cardboard, etc., made to fly
3. Small model of homemade aircraft made from kit, not made to fly
4. Small model of homemade aircraft, made from kit, made to fly

#### **MODEL ROCKETRY**

Rockets should come on a flat stand no larger than 10" x 10". No tripods or shooting stands. Attach entry tag to rocket, not the stand.

5. Rocket Model – plastic fin unit only – with written explanation of parts, finishing involved, launch system used, etc.
6. Rocket Model – Skill Level One – (NO plastic fin unit) with written explanation of parts, finishing involved, launch system used, etc.
7. Rocket Model – Skill Level Two – (NO plastic fin unit) with written explanation of parts, finishing involved, launch system used, etc.
8. Rocket Model – Skill Level Three (NO plastic fin unit) with written explanation of parts, finishing involved, launch system used, etc.
9. Rocket Model – Skill Level Four – (NO plastic fin unit) with written explanation of parts, finishing involved, launch system used, etc.
10. Any other model or homemade rocket that is propelled by water or chemical reaction such as vinegar and baking soda. Type of fuel and mixture must be listed with model entry along with launch system.

11. Poster of basic rocket model parts
12. Poster demonstrating model rocket flight profile
13. Poster of various rocket recovery systems
14. Poster or scrapbook illustrating and describing US launch vehicles

#### **FLYING**

15. Poster on the history of flight
16. Poster on the basic parts of an airplane
17. Poster on aircraft propulsion
18. Chart on instruments, navigation, weather charts, regulations, safety – identify and explain
19. Scrapbook on any phase of flying **ROCKET LAUNCH**

The rocket launch will be held prior to the fair. The fair will provide A8-3 engines. Exhibitors must provide smallest engine available for launch class if different from A8-3. 20. Demo launch; Junior (grades 4-7)

21. Demo launch; Senior (grades 8+)

#### **CLASS G: MODELS**

Open to all members enrolled in scale model projects, or members of other youth groups doing equivalent work. Exhibits for use on land or sea.

- Models should be on a sturdy cardboard base (not in a box).
- All kits **MUST** be accompanied by instruction booklet.
- **NO AIRCRAFT OF ANY KIND.**

#### **SELF-MADE MODELS**

##### Grades Grades

4-7	8 & up	
1	2	Plastic (No Lego)
3	4	Metal
5	6	Lego/Mega Blocks
7	8	Knex

#### **MODEL MADE FROM A KIT (pre-painted)**

##### Grades Grades

4-7	8 & up	
9	10	Plastic (No Lego)
11	12	Metal



- |    |    |                  |
|----|----|------------------|
| 13 | 14 | Lego/Mega Blocks |
| 15 | 16 | Knex             |
| 17 | 18 | 3-D Puzzles      |

**MODEL MADE FROM A KIT (self painted) Plastic only**

19. Grades 4-7  
20. Grades 8 & up

**CUSTOMIZED MODEL**

Made from parts from kits of other models.  
Example: Model A Ford Kit, with parts from a Pinto or other car to customize the kit or stock car from model kit.

21. Grades 4-7  
22. Grades 8 & up

**CLASS H: ROBOTICS**

All programs must be visibly shown printed off of the software to be displayed at the fair as part of the entry. Programs must also be demonstrated to the judge with an actual robot.

**Lot**

- Any type of robot made during the current year with a note card attached explaining how the robot was designed and built (no kits)
- Any type of robot made during the current year with a note card attached explaining how the robot was built (kits allowed, no Lego Mindstorms or VEX)
- Poster: Differences among machines, computers & robots.
- Poster: parts of an NXT or EV3 robot's brain
- Program: Robot goes forward and backward (rotation at 720 degrees)
- Program: Robot to swing right, swing turn left & optional point turn.
- Program: Use a loop block to continuously have robot start and stop using a sensor of choice.
- Program: Robot to use the light sensor.
- Program: Robot using the touch sensor.
- Program: Robot using the ultrasonic sensor.
- Program: Demonstrate how to change the speed of the robot.
- Program: Robot goes completely around a container without touching it.

- Program: Robot grips soda can and returns it to starting point.
- Program: Robot travels around square race track.
- Robotic attachment or gripper you built with a note card explaining its purpose and how it works.

**CLASS I: GEOSPATIAL**

**Lot**

- Display of essential geographical data on my house
- Poster of types of geographical tools
- Poster on uses of geographical tools
- Poster of coordinate-grid reference system
- Display on types and uses of maps
- Map of my neighborhood with list of features

**CLASS J: METALWORK**

**When entering metalwork projects, please enter an approximate size. This will enable us to plan space for larger projects.**

<u>Grades</u>	<u>Grades</u>
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3-8	9-13
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**Lot**

- |    |    |   |
|----|----|---|
| 1  | 2  | Welded item   |
| 3  | 4  | Welded item made at school  |
| 5  | 6  | Machined item   |
| 7  | 8  | Machined item made at school  |
| 9  | 10 | Casted/forged item  |
| 11 | 12 | Casted/forged item made at school   |
| 13 | 14 | Welded repair item  |
| 15 | 16 | Machining repair item   |
| 17 | 18 | Casting/forging repair item   |
| 19 | 20 | Computer designed project   |
| 21 | 22 | Sheet metal item  |
| 23 | 24 | Any other metals project  |
| 25 | 26 | Poster of metalworking equipment and their uses   |
| 27 | 28 | Poster of metalworking safety   |
| 29 |    | Display of 3 welds (t-joint, butt arc weld, lap weld) using TIG, or wire welder. Joints may be no longer than 3". |