

CNY Rocket Team Challenge Participation Manual

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What is the challenge?

The CNY Rocket Team Challenge is an annual competition in model rocketry for Junior Level (Grades 4-8) and Senior Level (Grades 9-12) teams. Teams with a minimum of four students (and a maximum of eight) can register for the competition to receive a free model rocket kit, which they should build in collaboration with their team leader - e.g. teacher, coach, parent. Teams then bring their *assembled* rocket to the event, where it will be launched with the assistance of MOST and Syracuse Rocket Club staff.

All rockets must pass inspection on the day of the event before being launched. Please refer to Section IV for Inspection Requirements.

How are rockets evaluated and prizes awarded?

Teams will be evaluated on the following criteria:

- **Student Presentation** – Judges will conduct brief interviews, asking students to demonstrate their understanding of: the Parts of a Rocket, Newton's Laws of Motion, Basics of Flight (Lift/Thrust/Drag), Flight Phases, Rocket Safety, and the Engineering Design Process
- **Rocket Aesthetic** - Paint & Decoration
- **Flight Performance** – Successful Launch & Landing
- **Egg Recovery** – Condition of onboard egg after landing
- **Flight Height** – Rocket Apogee
- **Apogee Prediction (*SENIOR TEAMS ONLY*)** – At check-in on event day, Senior teams are required to submit their rocket's predicted apogee and total weight with payload.
 - RockSim: Free trial versions of this simulator software are available at http://www.apogeerockets.com/Rocksim/Rocksim_trial
 - ThrustCurve: <http://www.thrustcurve.org/guidepage.jsp>
 - Rocket Equations: http://www.rocketmime.com/rockets/rckt_eqn.html
 - Model Rocket Apogee Predictor: <http://webalt.markworld.com/webalt.html>

The following prizes will be awarded at the conclusion of the event:

- Top Overall Score, 1st – 4th Place (Senior Division)
- Top Overall Score, 1st – 4th Place (Junior Division)
- Best Team Name (Senior Division)
- Best Team Name (Junior Division)
- Most Accurate Apogee Prediction (Senior Division)
- Highest Flight (Junior Division)

What comes with my rocket kit? How do I assemble it?

Rocket kits vary based on the grade level of the participants. Kits are designed to suit these age bands. **Assembly guides** for each of these kits are available at most.org/learn/stem-challenges under the “Rocket Team Challenge” dropdown.

Junior Level Kit (Grades 4-8)

- **Estes Green Eggs Rocket**
- **Eye Bolt**
- **Nylon Parachute & Snap Swivel** (for attaching parachute)
- **Estes C11-3 Motor** (*provided at event*)
- **Wadding** (*provided at event*)
- **Egg** (*provided at event*)

Senior Level Kit (Grades 9-12)

- **LOC Graduator Rocket**
- **Motor Retainer**
- **24mm to 29mm Engine Adapter**
- **Aerotech E30-4 Motor** (*provided at event*)
- **Wadding** (*provided at event*)
- **Egg** (*provided at event*)

What are the inspection requirements for my rocket?

A Repair Station will be available on site with various drills, tools, and epoxy if repairs and modifications are necessary for your rocket to pass inspection. *All rockets must pass the following inspection in order to be launched:*

- **Painted:** The rocket should have a good primer coat to protect the outer surface and fins. A finish coat with design is best – just remember, paint adds weight!
- **Nose Cap:** The nose cone of your rocket needs to be secure to the top of your payload bay to prevent it from coming off during the flight and releasing the payload. It is recommended that a small hole be drilled through the payload section’s tube (air frame) and into the part of the nose cone that inserts into the airframe (the shoulder). Screw into the hole a ½ inch sheet metal screw.
- **Payload:** Your rocket requires a separate payload section that is isolated from the motor tube section. Payload is (1) a recording altimeter and (2) an egg. Both the altimeter and the egg will be provided at the event; this inspection criteria refers to the existence of a separate *payload section*.
- **Launch Rail Buttons:** Two in perfect vertical alignment (use an angle iron to align) must be fixed securely to the lower tube and offset from the fins. It is best if the button screws are anchored in wood – like the engine mount spacers – and are spaced about one foot apart. Buttons are in the kit but also available at the MOST (call for pick up). Buttons will be also available at the launch. A pair of buttons plus screws weigh 4.2 grams or 0.14 oz.
- **Parachute shock cord anchor:** Epoxy patching the anchor cord to the lower tube must be dry and capable of sustaining a strong tug from the shock cord. If they fail the tug test, the rocket will not fly until a new patch of 5-minute epoxy has been applied and given an hour to reach full strength.
- **Motor Mount:** Motor mount must be glued securely.