

ENVIRONMENTAL HEALTH AND SAFETY

Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older

#73 MODEL ROCKETRY SAFETY

Model rocketry is a fun hobby that provides opportunities to learn about propulsion systems and the mechanics of flight. Because model rockets are propelled by rocket motors that use solid rocket fuels, certain precautions must be taken to prevent injuries to participants. Typical injuries associated with model rocketry include contusions or abrasions to the eye, burns to the hands, fingers, and arms, and lacerations and contusions to the hands and fingers. The following provides information about model rocketry safety.



Photograph Courtesy of the
Livermore Unit of National
Association of Rocketry

Model Rocketry Safety ⁽¹⁾

- Use only lightweight, non-metal parts for the rocket nose, body, and fins.
- Use only certified, commercially-made model rocket motors. Never tamper with rocket motors or use them for any purposes except those recommended by the manufacturer.
- Always launch rockets with an electrical launch system and electrical motor igniters. The launch system shall have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.
- If the rocket does not launch when the launch button is engaged, either the launcher's safety interlock shall be removed or the battery shall be disconnected and nobody shall approach the rocket until waiting at least 60 seconds.
- Always use a countdown before launching. Ensure everyone is paying attention and are located at least 15 feet distant from a rocket with D motors or smaller and 30 feet from larger rockets. If there is uncertainty about the safety or stability of an untested rocket, check the stability before flight and fly the rocket only after warning spectators and clearing them away to a safe distance.
- Always launch rockets from a launch tower, rod, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up and use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, use eye protection, place launchers so that the end of the launch rod is above eye level, and cap the end of the rod when it is not in use.
- Model rockets shall not weigh more than 1,500 grams (53 ounces) at liftoff and contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse. If a model rocket weighs more than one pound (453 grams) at liftoff or has more than four ounces (113 grams) of propellant, it must comply with Federal Aviation regulations before flying.
- Model rockets shall not be launched at targets, into clouds, or near airplanes. Flammable or explosive payloads shall not be put into model rockets.
- Rockets shall be launched outdoors in an open area as large as shown in the below table and in safe weather conditions with wind speeds no greater than 20 miles per hour. There shall be no dry grass close to the launch pad and the launch site shall not present a risk for grass fires. Launches shall not take place when the fire hazard level is "high" or "extreme."

LAUNCH SITE DIMENSIONS		
Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft)
0.00-1.25	1/4A, 1/2A	50
1.26-2.50	A	100
2.51-5.00	B	200
5.01-10.00	C	400
10.01-20.00	D	500
20.01-40.00	E	1,000
40.01-80.00	F	1,000
80.01-160.00	G	1,000
160.001-320.00	Two Gs	1,500

- Always use a streamer or parachute recovery system so that the rocket returns safely and undamaged and can be flown again. Use only flame-resistant or fireproof recovery system wadding in model rockets.
- Never attempt to recover a model rocket from power lines, tall trees, or other dangerous places.

If you suffer an injury while using model rockets, tell your group leader, parent, or guardian. Seek medical attention if the injury is serious.

- (1) **Modified from Model Rocket Safety Code, National Association of Rocketry, revised 2001, available online at:**
<http://www.nar.org/NARmrc.html>.