girl scouts of northern illinois

Rocketry / Model Rocketry

Council Approval: Required

Activity Permitted for: J, C, S, A

Not Permitted for: *D, B

About Rocketry

Launching model rockets is a relatively safe and inexpensive way to learn about the principals of engineering, design, physics, and in some cases chemistry. Model rockets are constructed of paper, wood, plastic, and other lightweight materials and use an electrical launch system. Sport rocketry clubs can be found in communities across the United States.

*Daisies and Brownies are not quite ready to participate in model rocketry (as defined above), but they can participate in simple science experiments like air powered drinking straw rockets, balloon rockets, stomp rockets or water powered bicycle pump rockets.

*Daisies and Brownies may observe model rocket launches at a safe distance.

Volunteers should use basic safety principles, including eye safety and safe distances when setting up simple rocketry experiments. For guidance, see the Miscellaneous Activities Section of Safety Activity Checkpoints and always consult the safety standards at the beginning of Safety Activity Checkpoints.

Note: Rockets over 1,500 grams are considered “High Powered Rockets” and require certification from the National Association of Rocketry. Please contact your council for information and approval for High Powered Rocketry. Radio Controlled Rocket Gliders are not approved.

Learn More:

National Association of Rocketry

NASA Beginners Guide to Model Rockets

ESTES Model Rockets Education

National Fire Protection Association

Include Girl Scout Members with Disabilities. Talk to Girl Scout members with disabilities and their caregivers. Ask about needs and accommodations. Connect with facilitators ahead of time to determine any access or safety steps that need to be arranged in advance.

Equity. In addition to physical and social-emotional disabilities consider the history, culture, and past experiences of the Girl Scout members in your troop that could affect their ability to equally participate in an activity. Work with members and families to understand how an activity is perceived. Ensure that all Girl Scout members and their families feel comfortable that they have access to whatever is needed to fully participate such as the proper equipment, prior experiences and skills needed to enjoy the activity.

Safety Activity Checkpoints

Standard Safety Guidelines. Refer to the Standard Safety Guidelines at the beginning of Safety Activity Checkpoints which apply to all Girl Scout gatherings and activities. When the adult-to-girl ratio, or other safety parameters, are stricter for a specific activity than in the Standard Safety Guidelines always follow the stricter parameters in the activity chapter.

COVID-19 Guidelines. Review the Coronavirus Safety in Girl Scouts section under the Standard Safety Guidelines. Be certain to consult your council's specific COVID-19 guidance which can be accessed under the same section. Always call ahead to the vendor, property or facility involved to check for their COVID-19 safety requirements as you prepare to take girls for this activity.

Emergency Action Plan (EAP). Review and document your Emergency Action Plan (EAP) ahead of time before taking girls out for this activity. Think through scenarios of what can go wrong such as an accident, physical injury to a girl or adult, missing girl, or sudden illness.

Verify instructor knowledge and experience. Make sure that the facilitator has experience with model rocketry and that they understand common safety protocols. Consider partnering with your local rocketry club or science teacher who may have experience with model rockets.

Assess maturity level. Participants must be old enough to understand safety procedures and handle equipment so as not to endanger themselves and others.

Launch Site. Launch rockets outdoors in an open area. Choose a large open area or field that is free of crowds, away from power lines, buildings, tall trees, and low-flying aircraft. The larger the launch area, the better the chance of recovering the rocket. Football fields, parks, and playgrounds often work well. According to the National Association of Rocketry, launch site size depends on the size of the rocket and should be at least as large as the accompanying table

below. Set up safety zones for launch and for observation (at least 15 feet away with D motors or smaller and 30 feet away with larger rockets.)

Launch Site Dimensions

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00 - 1.25	1/4A, 1/2 A	50
1.26 - 2.50	A	100
251 - 5.00	B	200
5.01 - 10.00	C	400
10.01 - 20.00	D	500
20.01 - 40.00	E	1000
40.01 - 80.00	F	1000

Prepare for emergencies. Follow your Emergency Action Plan (EAP) and always have a first aid kit available and know ahead of time where the nearest emergency room is located. For this activity, have a specific preparedness plan in case of grass fires.

Get permission/Check local ordinances. You should always check with your local city government for any special regulations that may apply to your area. Generally, you can fly most model rockets in a clear area the size of a football or soccer field. Follow FAA guidance. For example, if you live near a U.S. border, take care not to cross over into the territory of a foreign country or within the U.S. be careful not to cross into a sovereign nation or territory; and never launch rockets near airports, low-flying aircraft or military bases. Seek permission from the site and consider if permission is needed from any neighboring properties should rockets need to be recovered.

Weather Conditions. Check for safe weather conditions. Be prepared to postpone the launch, if needed. Wind speeds should not be greater than 20 miles per hour. There should be no lightning storms predicted in the area. Ensure that there is no dry grass close to the launch pad and that the launch site does not present risk of grass fires.

Materials. Ensure that equipment and materials are in good working condition. Use materials that are lightweight and non-metal parts for the nose, body, and fins of the rocket. Rockets should not weigh over 1,500 grams - these require a High-Power Rocketry Certification.

Motors. Use only certified commercially made model rocket motors. Do not tamper with the motors or use them for any purposes except those recommended by the manufacturer.

Ignition System. Launch rockets with an electrical launch system and electrical motor igniters. Launch system should have a safety interlock in series with the launch switch. Use a launch switch that returns to the "off" position when the rocket is released. Fuse-lit ignition is prohibited.

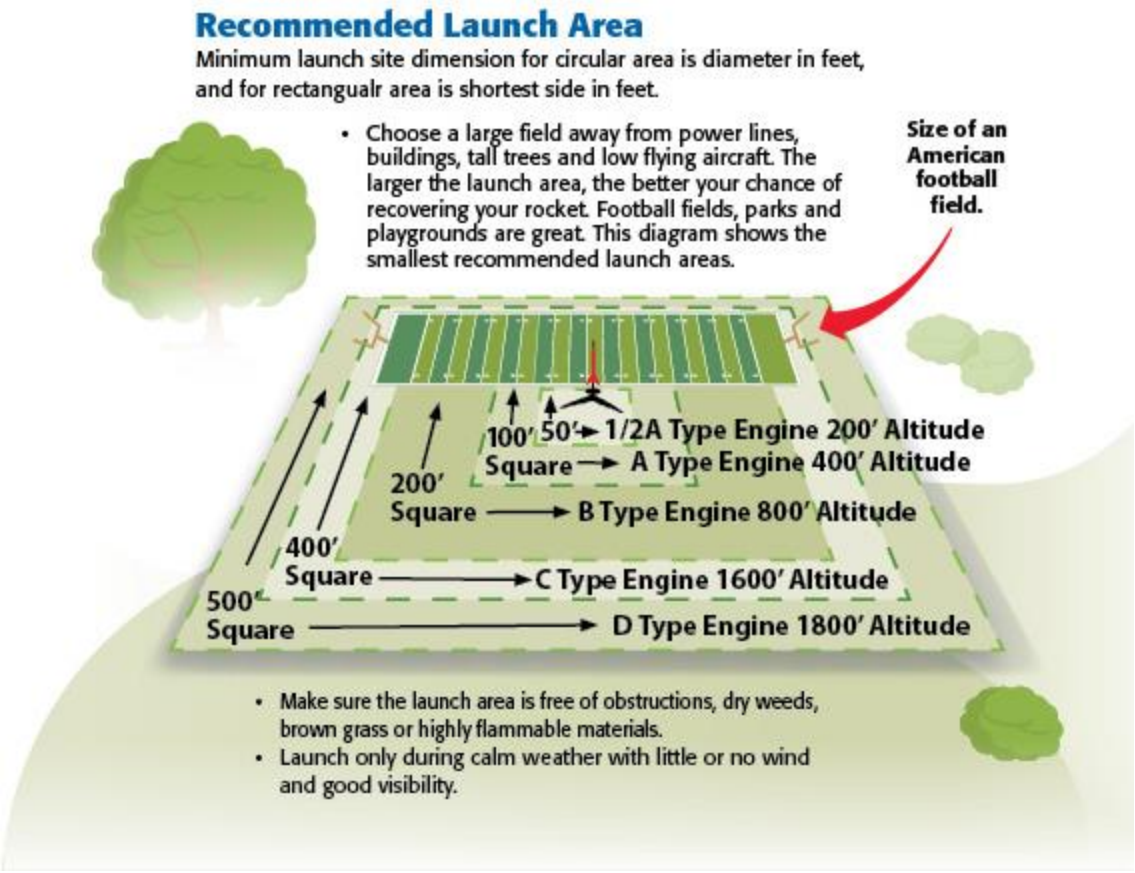
Launch Safety: Use a countdown before launch and ensure that observers are paying attention and at a safe distance. Safety zones may need adjusted based on wind conditions. Use a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up. Make sure the rod is above eye-level or capped off when not in use. Use a blast deflector to prevent the motor's exhaust from hitting the ground. Consult the National Association of Rocketry for guidance on simultaneous launches.

Flight Safety: Do not launch rockets at targets, into clouds or near airplanes. Do no put any flammable or explosive payload on/in the rocket.

Misfires. If the rocket does not launch, have a plan to safely disconnect the battery and wait at least 60 seconds before allowing anyone to approach the rocket.

Recovery. Use a flame-resistant or fireproof recovery system such as a streamer or parachute on the rocket so that it returns safely and undamaged. Rockets may be used again if they aren't damaged. Do not attempt to recover a rocket from power lines, tall trees, or other dangerous places.

Dress appropriately for the activity. Dress for the weather. Often launch sites lack shade. In hot weather make proper arrangements for shade, ensure that participants have sunscreen, and make water available.



Source: https://estesrockets.com/get-started/

*Based on the Model Rocket Safety Code of the National Association of Rocketry