



The 21st Century is here. Science and technology offer endless adventure and great educational experiences. How do I get (my child, my students) motivated, excited, Involved?

If you are fortunate enough to live in or around Las Cruces, New Mexico, the answer is F.L.A.R.E. The Fellowship of Las Cruces Area Rocketry Enthusiasts offer high quality monthly events in sport rocketry to the general public. FLARE is a registered non-profit club affiliated with both NAR and Tripoli. These National Rocketry organizations foster contest rocketry and educational activities, some in conjunction with NASA and the National Science Foundation.

FLARE is reaching out to NASA, SEMA, RASM, and science and technology teachers in our Schools, to offer professional quality rocket building and launching activities designed to inspire excitement in young people. All activities are safe, supervised, and family-friendly*. Monthly hobby rocketry launches are the first Saturday of each month, next to the NMSU Stadium. FLARE also stages High-power events at our west mesa launch facility. FLARE sponsors open Rocket Building workshops five times a year. Some members of the club are available for classroom instruction, teacher training, or project consultation.

Launch events are insured and supervised by safety officers. Launch equipment, supplies, and motors are available¹.

We offer knowledge, experience, and positive models for learning a love of science through rocketry.

<http://FLARE-Rocketry.com>

* Minors must be accompanied by an adult.

¹ Supplies and motors provided on a cost basis. Large groups should register well in advance to assure availability. Kits may be available at workshops on an at cost basis. There are no other fees.



Model and Amateur Rocketry

A little background

Hobby rocketry is not fireworks. While many hundreds of people each year are injured while handling fireworks, the rocketry hobby is very safe indeed. Why?

- Strict rules for the handling of, and launching of, rockets
- A wide selection of commercially produced motors, manufactured to exacting standards
- Electronic launch systems with safety interlock mechanisms, which eliminate the chance of mis-fire as long as the rules are observed.
- A wide variety of ready-to-launch, and build-yourself rocket kits which are designed to be very stable and safe to launch.

The leading national associations, The National Rocketry Association (NAR) and Tripoli, provide certification programs for rocket kits, motors, and launch equipment in order to assure an acceptable level of safety. These associations also provide rules, training, and certification criteria for all persons who engage in the hobby. FLARE is affiliated with both of these organizations and observes all of these rules. Several of our members are certified RSOs (Range Safety Officers).

Manufacturers such as Estes™, Quest™, and Aerotech™ offer a wide selection of kits, many of which are available at our local hobby stores. The most common kits use small black powder motors which are self contained single-use motors

designed for rockets weighing less than 10oz.

Such rockets may fly

beyond 1000ft. altitude, providing all of the excitement of real rocket science in a very safe and economical package. Rockets use parachute or streamer recovery systems in order to return safely to the ground so that they may flown again.



As your interest in rocketry grows, the size and complexity of your rockets may grow right along with you. You may build very large vehicles which may include payloads such as computer based controllers, altimeters, video or photographic devices, and even actual scientific payloads.



The Sky is the Limit.

Getting started

Resources and Knowledge

Rocket construction requires very simple materials and supplies. A basic kit of tools and adhesives may be assembled for under \$15.00. You probably already have some of what you need at hand.



Required

- Rulers
- Craft knives
- Newspaper
- Carpenter's glue
- Sandpaper
- Pencils
- Work tables

Optional (or depending on kit)

- Plastic model glue
- Superglue
- Epoxy
- Mixing sticks
- Rocket Workstands

The kits you will be working with are made of cardboard and paper. Some of them will have pre-molded plastic fin cans, most will have pre-cut balsa wood fins. Rocket kits are rated by Skill Level, from 1 to 5. Skill Level 1 kits are where we all begin.

Apogee[®], Estes[®], and Quest[®] all offer bulk kit packages which contain 12 or 25 complete kits at very reasonable prices. A few good sources for these are:

<http://www.discountrocketry.com/>
<http://www.ehobbies.com/>

Be sure to use Google[®] to search for "Apogee Estes Quest Bulk Kits" to find the best deal available. Many vendors have seasonal specials or clearance sales. Vendors have different policies regarding P.O.s. You may find that conducting the classroom activity is the easy part.

Visit <http://esteseducator.com/>, <http://questaerospace.com/rcentral-edresources.asp>, <http://flyrockets.com>, and [http://apogeerockets.com/education/_for_classroom resources](http://apogeerockets.com/education/_for_classroom_resources).



Bring rocketry math & science into your classroom

Conducting a workshop

Hands-on learning

Tips on construction and kids

There are a few construction mistakes that stand out as most common when you first build a rocket. These tips will help insure success:

1. **Never pull out the launch controller and motors** inside the classroom. If you want to show the controller to your class, do not put batteries in, and **DO NOT** bring out the motors. Use an illustration on the white board, and do the actual demonstration outside.
2. **Review the instructions.** Instructions include illustrations which help clarify each assembly step. It is good practice to read the instructions one or more times before you begin. You should then prompt the students at each step to look at the instructions for that step.
3. **Test fitting** is important. You are working with paper and cardboard materials. When you apply moisture (glue) to these materials, they will swell. If they do not fit when dry, then adding moisture will swell them and make it impossible to fit them. Test fit each assembly before you apply glue. Use sandpaper and/or the nose cone to size or stretch components so that they will fit.
4. **Cutting hazards** are serious. You will be using exacto knives or cutting blades to execute some steps of construction. First of all, fresh cutting instruments are critical. Dull cutting instruments cut more readily than sharp ones because dull blades require more pressure to cut and will lead to accidents.
5. Use **lots of glue** when you assemble your kit with carpenter's glue. This adhesive dries to a firm, flexible bond when used generously. If you are stingy with the glue, the bond will not hold. On the other hand, excess glue can cause issues with inserting a motor. Where you cannot wipe away excess glue, use a little less than too much. Using more glue also gives you more time to correct alignment. The glue will not set as quickly, so there will be an extra minute or two to spot misaligned or improperly seated parts and to make a correction.
6. **Only use superglue when absolutely necessary.** The use of superglue (CA) in the classroom is almost as hazardous as using cutting tools. It is very likely that you have one or more pranksters in your group, and at least one student who does not understand how powerful CA is. This can be a recipe for a trip to the emergency room.
7. **Strait lines are easy.** Most modelers use a small aluminum angle to apply fin lines or a launch lug line to the body tube. If you do not have an angle handy, then place your tube against the door frame of your classroom door. This tip, and a pencil, are all you need.



Building and flying a basic model rocket kit is an easy and satisfying experience for all ages. You can guide a class through a building session in less than an hour. Choose skill level 1 kits with molded fine cans for greatest success with first time builders.

For more online resources, visit <http://FLARE-Rocketry.com> and click on the Education link.