



Skill Level 1

Estes Screamer

1.91X Upscale

Designed By Jay Goemmer

Revision Date: February 11, 2006

Length:	15.625"
Diameter:	1.040"
Fin Span:	5.64"
Weight:	0.95 oz

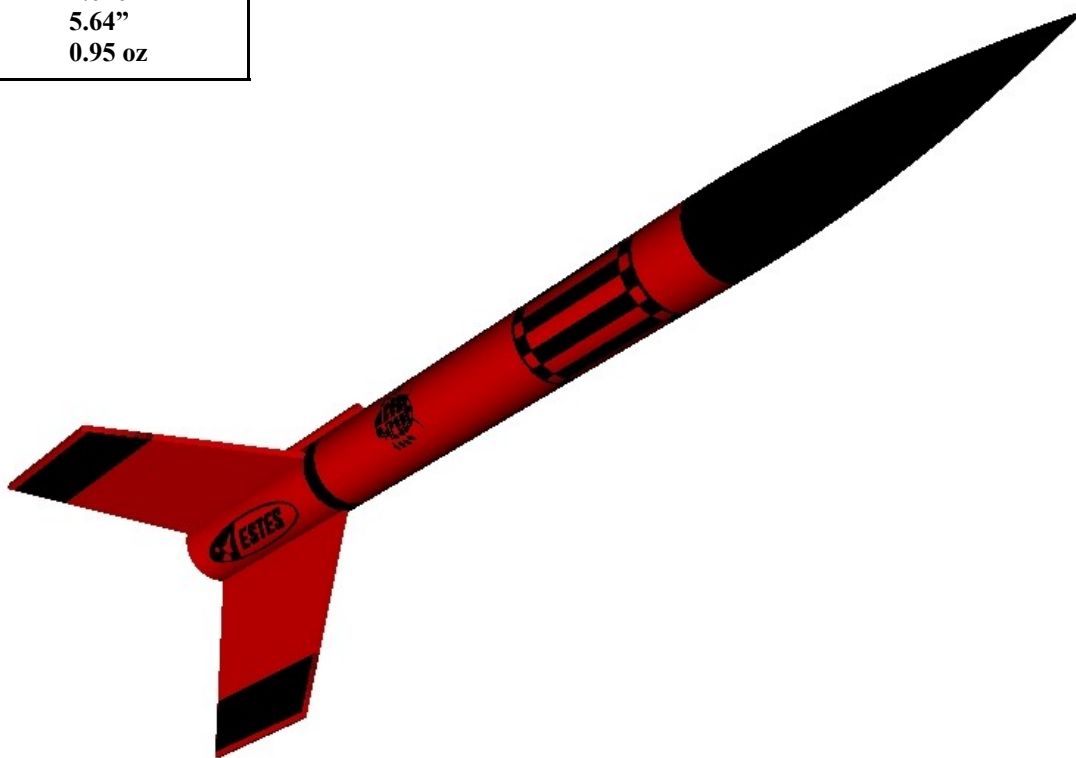


Image created with RockSim v8

Main Parts List

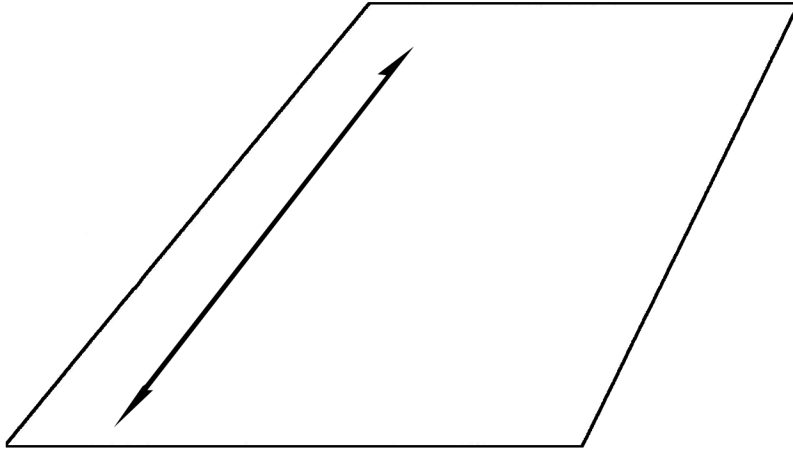
Nose Cone.....	BC-1045	Parachute.....	CPK-12
Body Tube.....	ST-10100	Shock Chord.....	SC-24
Motor Mount.....	EM-710	Shock Chord Mount.....	SCK-24
Fin Stock.....	3/32" x 3"	Screw Eye.....	SE-1
Launch Lug.....	LL-122	Snap Links.....	(2) #12

Additional Items Required

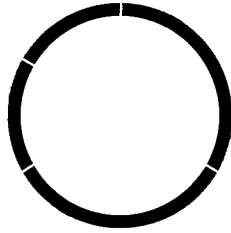
Small bottle of yellow carpenter's glue; sharp hobby knife; 0.05mm pencil; steel ruler; sheets of 220-, 400-, and 600-grit sanding papers; lightweight filler compound; tack rag; sprayable primers, paints, and Acrylic gloss clear coat; small, soft-bristle hobby brushes; various clamps and weights.

It is also recommended that you have a personal copy of **The Model Rocketry Handbook, Seventh Edition**, by G. Harry Stine and Bill Stine. Read and understand the sections on Construction, Recovery, and Safety.

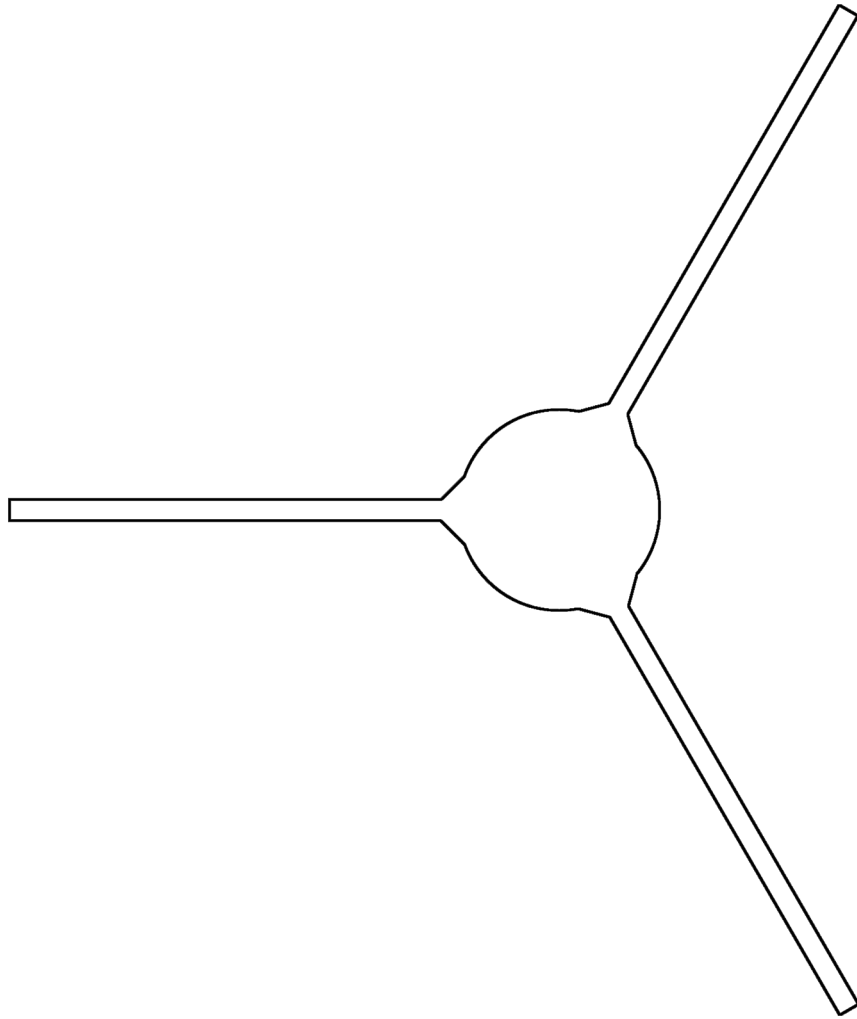
Fin Template



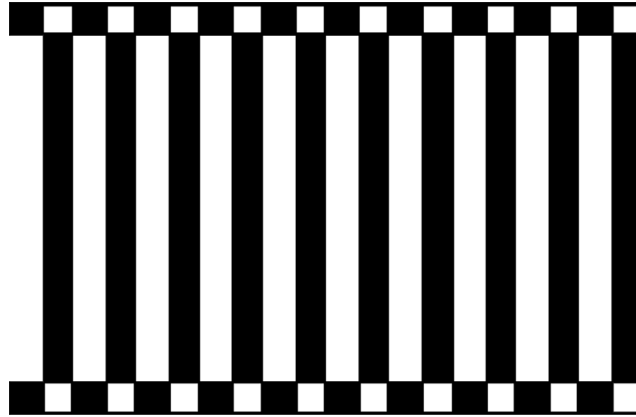
Fin Locater Guide



Fin Alignment Guide



Decal Patterns



Roll Pattern



Body Stripe



Fin Stripes



"Mini Brute" Bug



Estes Logo

Screamer

Name Stripe

General Assembly Sequence

- **Step 1** Give the main body tube and the motor tube a complete sanding with 220-grit paper to remove the shine from the surface. This roughens up the finish to allow glue, filler, and primer to adhere better.
- **Step 2** Test fit the nose cone into the body tube. If the fit is too tight, make adjustments to the shoulder diameter as needed. The nose cone should not be so loose that it falls out, but not too snug that it takes excessive effort to pull it out.
- **Step 3** Cut out the fins from the balsa sheet, using the template provided on page 2. Pay attention to the grain orientation. Give the surfaces a careful sanding with 220-grit to remove the fuzziness. Round over all of the edges *except* the root edge with 400-grit paper. Square up the root edge. Stack and clamp the fins together, then apply a layer of *thinned* glue to the root edges.
- **Step 4** Give the nose cone a gentle surface sanding to remove excess fuzzing, and to correct any dimensional issues due to swelling. Be careful not to remove too much material, and thus change the shape. You only want to bring the cone back to the intended shape.

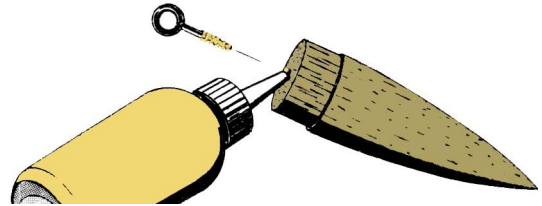


Figure 1

- **Step 5** Use the screw eye threads to cut a hole into the center of the base of the nose cone's shoulder. See Figure 1. Reverse the screw eye and coat the threads with glue. Force some glue down into the hole, and reinsert the screw eye until it bottoms out. Do not wipe the excess glue away. Let this dry in a point-down vertical position until the glue dries.

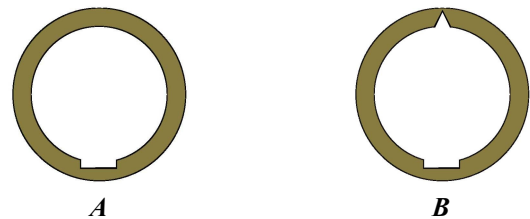


Figure 2

- **Step 6** Modify both of the CR-710 rings as shown in Figure 2A, using a knife or a sanding twig. Modify one of these rings as shown in Figure 2B with a “V” notch directly opposite the flat notch.
- **Step 7** Draw a line the full length of the ST-73 motor tube, directly through the center of the pre-cut motor hook slot. Mark the tube at 1” and 2.5” from the end *opposite* the slot, then draw lines around the tube at these locations. Insert one end of the hook into the slot, directly over the first alignment line, then slide the “A” ring down from the top until it touches the line at 1”. Slide the “B” ring down until it touches the ring at

2.5". The flat notches of both rings fit over the hook. Apply glue to the ring-tube joints, keeping glue out of the "V" notch in the "B" ring. Clean out any glue that happens to fill the notch. Apply a thin layer of glue around the inside-top end of the tube, then insert the thrust ring until it bottoms out against the tip of the hook. Set this aside while the glue dries.

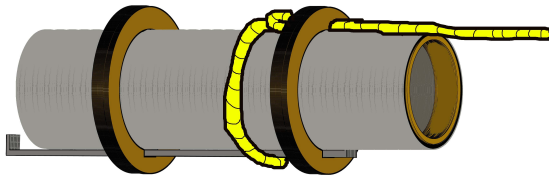


Figure 3

- **Step 8** Tie a slip knot in one end of the Kevlar thread, then loop the knot around the middle of the mount as shown in Figure 3. Push the long end of the thread through the "V" notch of the "B" ring, and pull out the slack. Push the thread up against the back of the "B" ring tightly, then apply glue to the ring and thread to secure it. Allow to dry.
- **Step 9** Slide the Fin Locator Guide onto the main body tube, and mark the locations for the three fins and the launch lug. Extend all four lines 5" from one end of the tube. Remove the guide.
- **Step 10** Place the root edge of a fin against the body tube along each of the fin alignment lines, with the trailing edge of the fin even with the bottom of the tube. Mark each fin alignment line at the leading edge of the fin. Mark the launch lug alignment line at 1.5" and 3.75" from

the bottom edge of the tube. Apply a layer of thinned glue along each fin line between the leading edge mark and the edge of the tube. Apply a layer of thinned glue to the launch lug line between the two marks. Allow to dry.

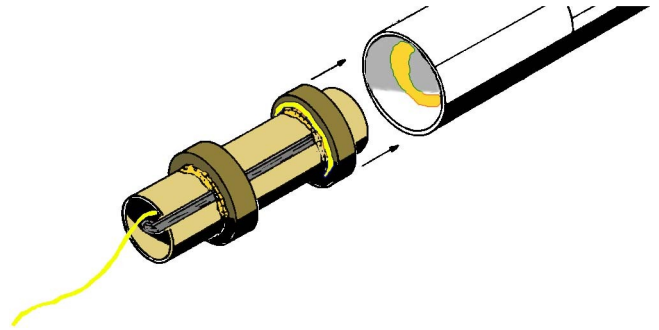


Figure 4

- **Step 11** Push the long end of the Kevlar thread down through the center of the mount from the top. As shown in Figure 4, apply a generous bead of glue up inside the bottom end of the main body tube, about 2" up from the edge. Insert the motor mount into the main body tube, aligning the hook with the launch lug alignment line, and push forward with one continuous motion until the bottom edge of the motor tube is even with the bottom edge of the body tube. Do not hesitate or stop during this operation, or the glue will freeze the mount in the wrong place. Set the body tube in an upright position and allow the glue to dry (about an hour). Invert the tube and apply a thinned bead of glue around the joint between the "A" ring and the body tube, filling any gaps that might show. Allow this to dry (about 30 minutes).

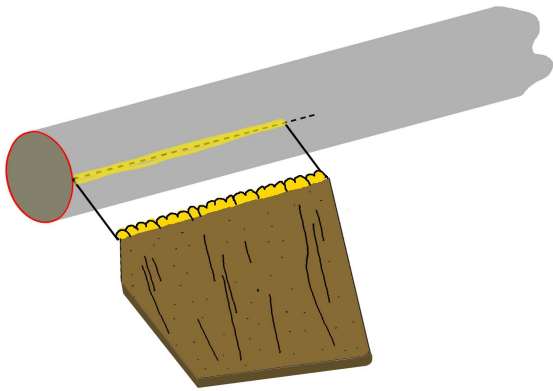


Figure 5
(Not this model shown)

- Step 12** Apply glue to one of the fin lines, directly on top of the thin glue layer applied previously. Apply a similar bead to the root edge of one fin. As shown in Figure 5, carefully press the fin root into the glue on the line, aligning the root edge of the fin with the bottom edge of the tube. Hold the fin in place for about 15 seconds before releasing. Use a 1/4" wide soft-bristle brush, moistened, to remove the excess glue from both sides of the fin joint. Slide the Fin Alignment Guide down from the top of the tube and gently adjust the fin until it fits through the slot. The length of each fin slot is not equal to the full height of the fin, so only push the guide toward the rear until it touches the fin at the top of the slot. Allow the fin to dry before removing the guide. Repeat this step for each of the two remaining fins. Remove the fin alignment guide, then attach the launch lug to the lug alignment line in a similar manner, and allow to dry.

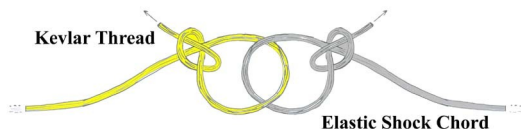


Figure 6

- Step 13** Tie a slip knot in one end of the elastic shock chord, then insert the free end of the Kevlar thread through the loop and tie an intersecting skip knot in it, as shown in Figure 6. Pull these two knots together, and coat them with a layer of thinned glue to secure them. When dry, attach one of the two snap swivel links to the free end of the elastic chord with a slip knot, and secure it with thinned glue. Allow to dry. Do not attach the shock chord to the nose cone at this time.
- Step 14** Apply a bead of glue around the base of each fin, and around the launch lug. Spread this glue into the crevasses of the joint using a wet finger, to form a smooth, rounded fillet. This will reinforce the joints and make the finishing tasks easier.

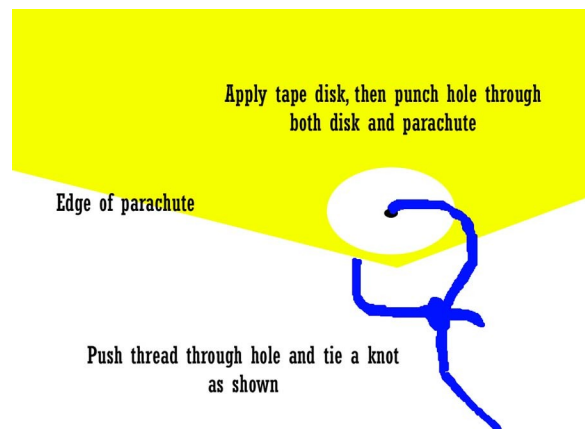


Figure 7

- Step 15** Assemble the parachute according to the SEMROC instructions, with the modification shown in Figure 7. Attach the shroud lines to the remaining snap swivel link and secure the knot with thinned glue. Allow to dry. Do not attach the

parachute to the nose cone at this time.

Finishing Sequence

- **Step 16** Apply a thinned filler compound to all of the exposed balsa surfaces and allow a day to dry. We recommend Elmer's Fill-N-Finish for this job, thinned to a cream soup consistency and brushed onto the wood. This compound should also be applied to the bare tube along the spiral seam, to fill the gap between the wraps. When dry, sand with 220-grit paper and inspect for remaining blemishes. Repeat this treatment until the surface is acceptably free of dings, gouges, and other visible imperfections.
- **Step 17** Prime the entire model with a sprayed white primer, either from an aerosol can or with a traditional spray gun. We recommend the use of either Rust-O-Leum Bare Metal Primer, or Zinser's Kilz, as these provide the best general coverage, and are sandable. Apply at least two complete coats of primer, with each coat being given a full day to dry, before sanding the first time with 220-grit paper. You will sand off nearly all of these coats, leaving only enough to fill the remaining scratches and dings. Tack rag the model and spray again, allow a day to dry, then sand with 320-grit wet paper to polish the surface. Inspect and repeat with another coat as needed to achieve the best possible sub-surface for the color coats.
- **Step 18** The original Estes "Mini Brute" Screamer was a deep red overall, with a black nose cone and black trim decals. Use a scrap piece of ST-10 tubing as a holder for the nose cone, and spray with black. This can be flat or gloss. Shove some paper towels into the top end of the main body tube, then place the model onto a holding spike or a length of 1/2" wood dowel with an expended motor casing on one end. Spray the model with a deep red, then set the model aside for two full days to allow the solvents to completely dissipate from the paint.
- **Step 19** Remove the paper towels from the body tube, then insert the nose cone. Apply a clear gloss acrylic to the entire model, to seal the paint and to provide a more uniform surface for the decals. We recommend Future Floor Finish for this job, as it is not as aggressive as aerosol gloss coats and will not attack the paint or the decals. The best finish is achieved with a spray gun or an airbrush, and the FFF can be thinned with pure ammonia or Windex. The FFF can be applied with a soft foam brush, however. Allow a few days for the FFF to fully dry before applying decals.
- **Step 20** Patterns for the decals are provided on page 4 of this manual. The original had only one pair of fin stripes; you can create additional pairs from the patterns to allow for some variation in the final model. When the adhesive on the decals has fully dried, wipe the excess away gently with a soft cloth. Apply a second coat of

clear gloss acrylic to protect the decals.

Pre-Flight Sequence

- **Step 21** Attach the two snap links to the nose cone screw eye.

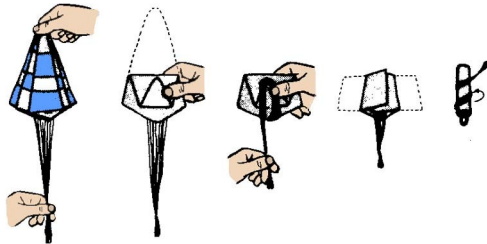


Figure 8

- **Step 22** Use the illustration in Figure 8 to see how to fold the parachute for flight. Form a spike by taking the center of the parachute in one hand and pulling taut the shroud lines with the other. Fold into thirds, then bring the sides together, and finally wrap the lines around the parachute. Don't wrap too tightly, or the parachute might have trouble opening. The parachute should be able to slide loosely into and out of the body tube.

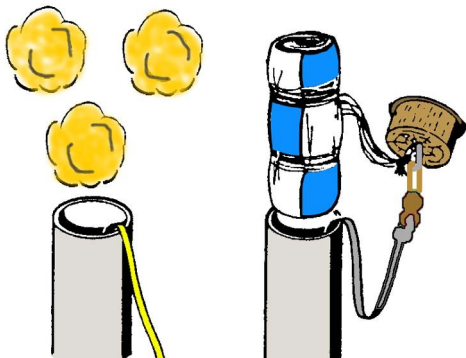


Figure 9

- **Step 23** Fill the body tube to a depth of about 3" from the motor

mount with either recovery wadding sheets, or shredded loose-fill cellulose home insulation (flame-resistant). Press the wadding material down gently with a dowel. Do not pack the material tightly, or it might not allow the parachute to deploy properly. You only want a gas seal here to protect the parachute from hot particles. Insert the shock chord and Kevlar thread on top of this material, then insert the parachute last. Insert the nose cone.

- **Step 24** Select the engine you wish to fly with, and insert it into the engine mount. For first flights we recommend either the A8-3, or the A3-4T with an adapter (the A3 has a longer burn than the A8, but the A8 has a slightly higher initial impulse). The model will actually reach about 50' higher with the A3 than with the A8.

Recommended Motors

A8-3 300'
A3-4T 350'
B4-4 630'
C6-5 1200'

- **Step 25** Read and understand the safety code on the last page of this booklet, then go fly!

**Developed for BARCLONE Rocketry
by C. P. McGraw**

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by Jay Goemmer**

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by C. P. McGraw**

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Model Rocket Safety Code

Materials: I will use only lightweight, non-metal parts for the nose cone, body, and fins of my rockets.

Motors: I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.

Ignition System: I will launch my rockets with an electrical launch system and electrical motor ignitors. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.

Misfires: If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock, or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.

Launch Safety: I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with "D" motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them to a safe distance.

Launcher: I will launch my rockets from 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, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or I will cap the end of the rod when it is not in use.

Size: My model rocket will not weigh more than 1,500 grams (53 oz) at liftoff, and will not contain more than 125 grams (4.4 oz) of propellant or 320 N-sec (71.9 lb-sec) of total impulse. If my model weighs more than one pound (453 grams) at liftoff, or has more than four ounces (113 grams) of propellant, I will check and comply with Federal Aviation Administration (FAA) regulations before flying.

Flight Safety: I will not launch my rockets at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload into my rockets.

Launch Site: I will launch my rockets outdoors, in an open area at least as large as shown below, and in safe weather conditions with winds speeds no greater than 20 MPH. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.

LAUNCH SITE DIMENSIONS

Total Impulse (nSec)	Motor Size	Minimum Field Size
<i>0.00 – 1.25</i>	<i>1/4A – 1/2A</i>	<i>50'</i>
<i>1.26 – 2.50</i>	<i>A</i>	<i>100'</i>
<i>2.51 – 5.00</i>	<i>B</i>	<i>200'</i>
<i>5.01 – 10.00</i>	<i>C</i>	<i>400'</i>
<i>10.01 – 20.00</i>	<i>D</i>	<i>500'</i>
<i>20.01 – 160.00</i>	<i>E, F, G</i>	<i>1000'</i>
<i>160.01 – 320.00</i>	<i>2G</i>	<i>1500'</i>

Recovery System: I will use a recovery system, such as a streamer or parachute, in my rockets so that they return safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rockets.

Recovery Safety: I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

Model Rocket Safety Code
developed by the
National Association of Rocketry
Revised Code November, 2004