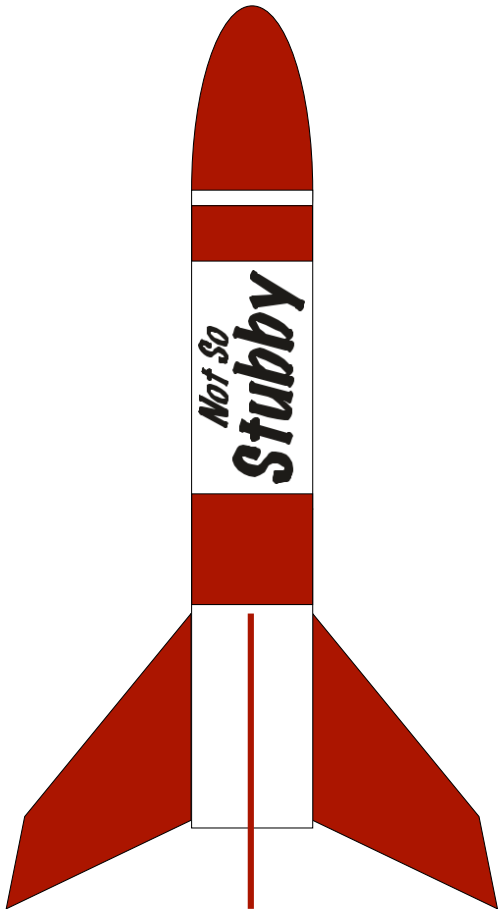


# *Not So Stubby*

An easy-to-build model rocket kit! Great kit for beginners and a fun sport model for the more experienced modeler!



## Specifications:

Length: 12"/30.5 cm

Diameter: 1.637"/41.58 mm

Weight: 2.5 oz/70.9 gm

Parachute Recovery

Recommended Engines: A8-3; B6-4; C6-5

Skill Level: Beginner

Center of Pressure: 8.8" from tip of nose

This is a model rocket kit requiring construction. Tools, adhesives, finishing materials, launch equipment and engines are not supplied.



[www.asp-rocketry.com](http://www.asp-rocketry.com)

Estimated (calculated) altitudes:

with A8-3: 165 feet/50.3 meters

with B6-4: 405 feet/123.4 meters

with C6-5: 840 feet/256 meters

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## Parts List - Be sure to check the following list to assure your kit is complete:

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2 Body Tubes (White), 1 Tube Coupler (Brown); 1 Engine Tube (Red), 1 Engine Block (Spiral-Wound Paper), 1 Centering Ring (Spiral-Wound Paper), 2 Centering Rings (Laser-Cut Plywood), 1 Metal Engine Hook, 1 Set of Laser-Cut Balsa Fins, 1 Balsa Nose Cone, 1 Metal Screw Eye, 1 Kevlar® Shock Cord, 1 Elastic Shock Cord, 1 Launch Lug, 1 Parachute Kit, 1 Tube Marking Guide, 1 Decal Set, 1 Craft Stick.

## Tools & Materials - You will need the following to complete your model:

Required: Adhesive (A wood glue, such as Elmer's Carpenters Glue or Titebond can be used for all steps and is recommended); sandpaper (medium - 220 or 280 grit); pencil; scissors; hobby knife; tape (cellophane or masking).

Optional: sandpaper (fine - 320 or 400 grit, extra fine - 500 or 600 grit); filler material (such as Elmer's Fill & Finish, Elmer's Professional Carpenter's Wood Filler or interior spackling paste); sanding sealer (or balsa fillercoat); thinner (appropriate type for the sanding sealer); small paint brush; paint (Spray paint, such as Rust-Oleum, Krylon, or Testors is recommended. Be sure not to mix different types or brands of paint without testing.) - primer; colors as desired & clear; sanding block; tack cloth.

## Assembly Instructions - you can use the checkboxes to mark off each step as they are completed.

1) We'll start by building the Engine Mount. Refer to Figures A through C as needed. Locate the engine tube (the smaller red tube), the metal engine hook, the engine block (the smaller spiral-wound paper block that fits inside the engine tube), the 2 plywood centering rings, the centering ring (the larger spiral-wound paper block that fits outside the engine tube), and the Kevlar® shock cord (which looks like a heavy piece of thread).

First test fit the wood centering rings over the engine tube - they should be a smooth, yet snug, fit. If needed, use your sandpaper on the inside of the rings so that they fit easily. Set the rings aside for now.

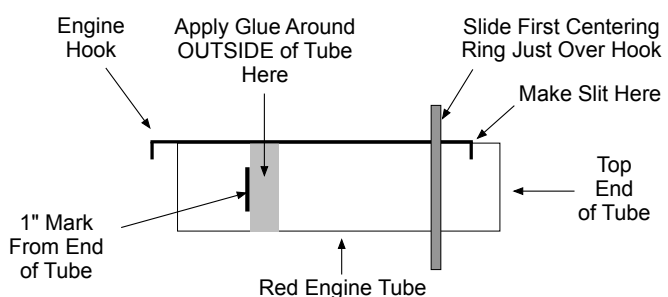


Figure A

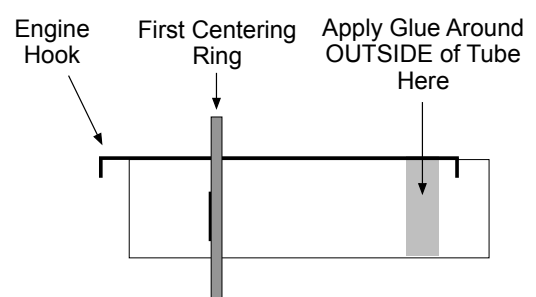


Figure B

Take the engine tube, and with your hobby knife make a small horizontal slit about 1/8" wide and 1/4" from one end of the tube. Make a pencil mark 1" from the other end of the tube. Slip one of the "hook" ends of the metal engine hook into the slit (you can hold the hook in place with a small piece of tape if you need to) - be sure the hook is straight along and parallel to the tube. Slip one of the plywood centering rings over the top end of the tube (the end closest to the slit) and

down just over the hook. Apply a layer of glue to the outside of the engine tube just above the 1" mark (see Figure A) and slide the centering ring down until it is in the proper location (see Figure B) - be sure to check the alignment of the engine hook. Next apply a layer of glue around the outside of the tube just below the top of the engine hook as shown in Figure B and and slide the second plywood ring in place as shown in Figure C.

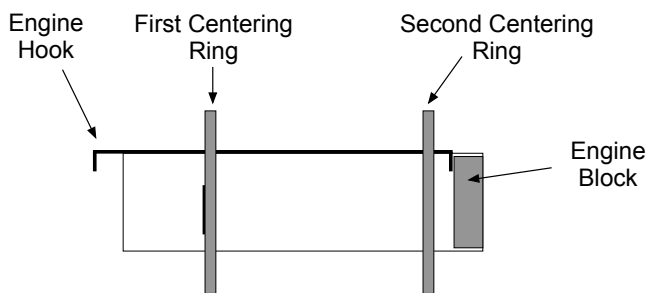


Figure C

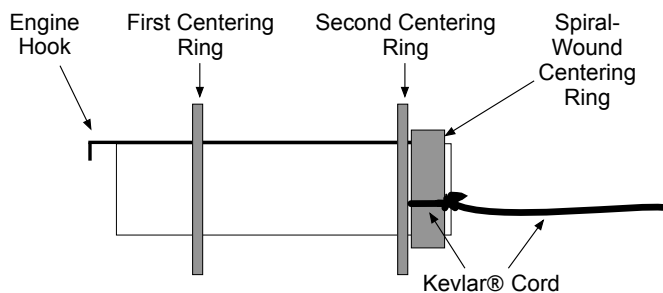


Figure D

Apply a layer of glue *inside* the tube just above the end of the metal hook and slip the engine block into place above the hook as shown in Figure C.

Take the Kevlar® shock cord and tie one end firmly around the spiral-wound centering ring. Apply a layer of glue outside the tube above the second plywood ring and slip the spiral-wound ring over the end of the tube into place as shown in Figure D. Set the engine mount aside and allow to dry.

□ 2) Locate the white elastic shock cord. Take the loose end of the Kevlar® and one end of the elastic and hold the ends evenly. Tie a simple overhand knot about 1/2" to 1" from the ends and tighten down the knot firmly so the two pieces of material are held tightly together. If needed, trim the loose ends to about 1/4" to 1/2" long. See these steps shown left to right in Figure E.



Figure E

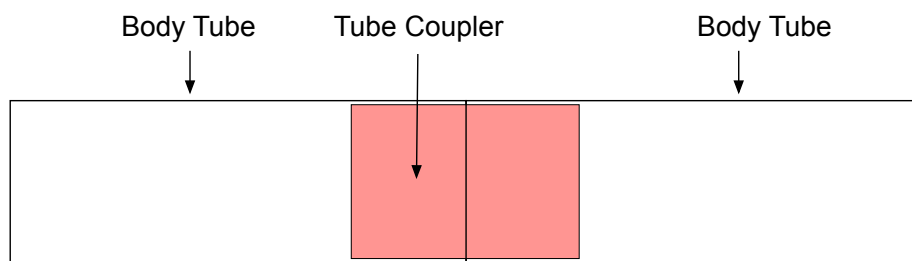


Figure F

□ 3) Locate the 2 white body tubes and the tube coupler (the 3" long brown tube that fits inside the body tubes). Make a pencil mark half-way along the coupler (1 1/2" from one end). Apply a layer of glue around the inside of one the body tubes (you only need to apply the glue about 1" up inside the tube) and then slip the coupler into the tube to the half-way mark. Apply glue to the inside of the remaining body tube and insert the other end of the coupler until the tubes meet - see Figure F. Be sure the tubes are straight and evenly aligned and allow to dry.

After the glue is dry, very lightly sand the outside the of the tube with medium or fine sandpaper until the surface just loses its' shine. This will allow the glue to penetrate the paper of the tube and the fins to stick to the tube better. Locate the Tube Marking Guide and cut it out. Wrap the guide around the body tube - line up the marks on each end to align the guide (see Figure G). Use a

piece of tape to hold the guide in place. With a sharp pencil mark the body tube at the arrows at the end of each line for the fins and the launch lug. Remove the guide from the tube. Using a drawer edge, door frame or a small length of metal angle, extend each mark the full length of the tube (see Figures H and I). On each of the 4 fin lines, make a mark  $1/8$ " from one end of the body tube (this will be the bottom end of the tube) and also make a mark on the launch lug line 2" from the same end of the tube.

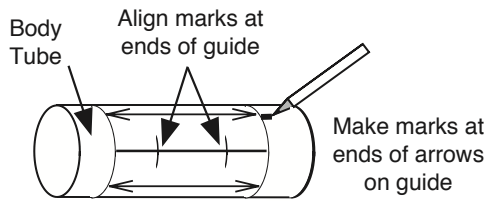


Figure G



Figure H



Figure I

□ 4) When the engine mount has completely dried, it is time to glue it into the body tube. First take the loose end of the shock cord and thread it through the top end of the engine mount tube so that it hangs out the back of the tube (the end where the hook extends from) - this will help to prevent from getting glue on the shock cord while you are gluing the engine mount in. Test fit the engine mount assembly into the body tube. If needed, sand the outside of centering rings for a smooth, but snug, fit - you should be able to slide the engine mount into the tube in one smooth motion. Remove the engine mount from the body tube.

With your craft stick spread an even layer of glue on the inside of the body tube where the engine mount will fit. In one smooth motion, insert the engine mount into the bottom of the body tube (Be sure to insert the end with the engine block first!). The bottom of the engine tube should be even with the bottom of the body tube - the hook will be extending out from the end of the tube. See Figure J. Allow to dry completely. After the mount is dry, thread the shock cord back through the engine mount so that it is inside the main body tube.

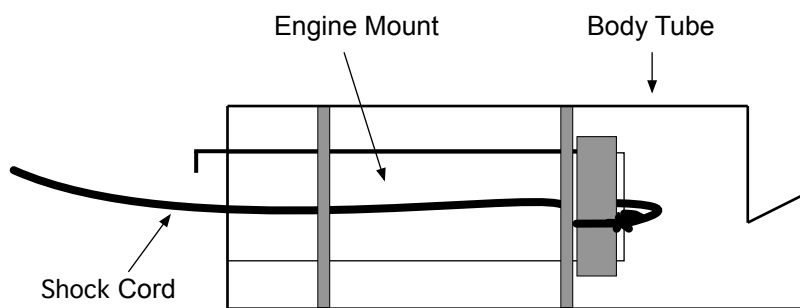


Figure J

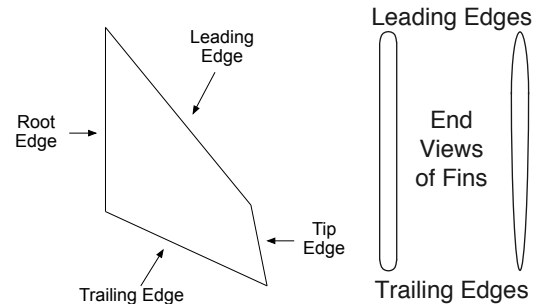


Figure K

Figure L

□ 5) Locate the set of fins. Carefully remove the fins from the laser cut sheets of wood. You may need to separate them from the surrounding wood with your hobby knife. It is not required, but if desired you may round or airfoil the leading and trailing edges of the fins. This will make the fins more aerodynamic and allow you rocket to fly higher than it would if you just left the

fin edges square (the airfoiled, or “teardrop” shaped fin is more aerodynamic than a fin that is just rounded). In either case, be sure to keep the root edge (the edge that will be glued to the body tube) square. The tip edge may be kept square or rounded. See Figures K and L (the left example in Figure L is a rounded fin, the right example is an airfoiled fin). Using medium grit sandpaper, shape each fin as desired (a sanding block is may be used for this). If you don't have a sanding block, lay the sandpaper down on a flat surface and move the edges of the fin against the sandpaper. Be careful not to remove too much wood at one time - roughly shape one side then turn the fin over and do the same on the other side. Continue this procedure with medium and then fine sandpaper to further shape and smooth the fins until you are satisfied with their appearance. Repeat with extra fine sandpaper if desired.

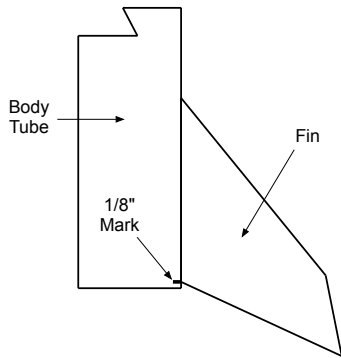


Figure M

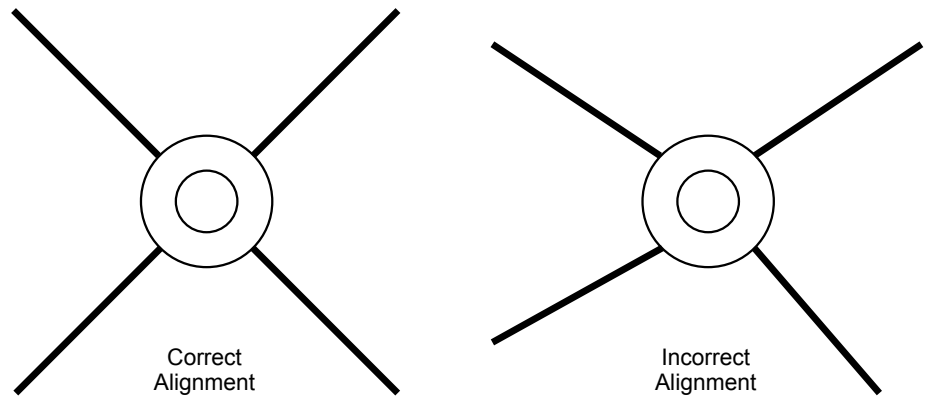


Figure N

□ 6) You will now attach the fins to the body tube. One fin at a time, apply a thin layer of glue to the root edge of each fin and to the body tube along the line where the fin will be attached and allow the glue to dry. Next apply another thin layer of glue to the root edge of the fin and firmly press in place on the body tube. Note that the bottom of the root edge of each fin should be even with the 1/8" mark you made on the body tube (see Figure M). As the glue sets, be sure that the fin is straight out from and parallel to the tube. Looking from the base of the model you can use the lines drawn down the body tube as a guide to be sure the fins are straight. Allow the model to rest horizontally while the glue dries on each fin (you can download the “Rocket Caddy” from our website to make a stand that will hold your model horizontally). Repeat for the remaining fins. See Figure N for what correctly aligned fins should look like and an example of incorrectly aligned fins.

After the fins are completely dry, apply a small amount of glue to the joint between the root edge of the fin and the body tube. Smooth the glue with your finger to form a small, smooth fillet and remove any excess glue (see Figure O). Allow the model to rest horizontally while the glue dries on each set of fins. The fillets will strengthen the fin attachment.

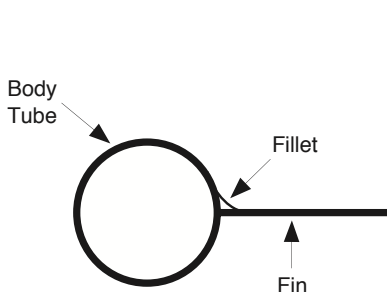


Figure O

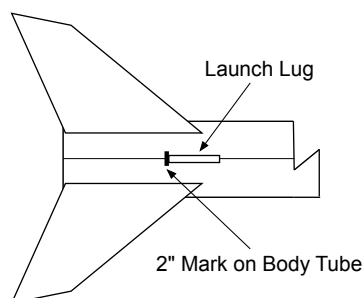


Figure P

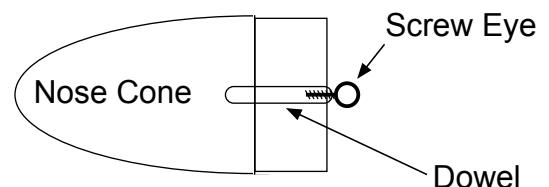


Figure Q

□ 7) Locate the launch lug (the very small white tube). Using the same method as you used to attach the fins, glue the lug to the body along the launch lug line you drew earlier. The bottom edge of the lug should be at the 2" mark you made on the line (see Figure P). Be sure the lug is parallel to the body. After the glue is dry, apply fillets to the lug.

□ 8) Locate the balsa nose cone, the nose cone dowel (that fits inside the hole in the bottom of the nose cone) and the metal screw eye. Test fit the shoulder of the nose cone into the top end of the body tube - sand the shoulder if needed for a smooth fit.

Take the screw eye and put a small amount of glue on the tip. Thread it into the hole bored in one end of the dowel (see Figure Q). Squirt some glue into the hole in the bottom of the nose cone and then insert the dowel and allow to dry.

□ 9) Refer to Figures R through V as needed for this step. Locate the bag containing the parachute material, the round self-adhesive reinforcements, the four pieces of shroud line and the snap swivel.

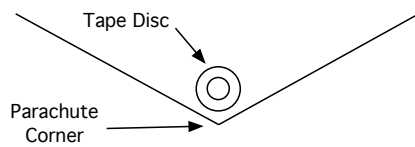


Figure R

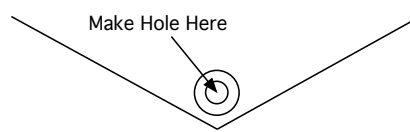


Figure S

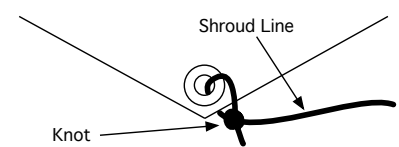


Figure T

Apply one of the self - adhesive discs to each corner of the parachute as shown in Figure R. Press each **firmly** in place. Next cut a hole (or an "X") in the center of each disc with your hobby knife (see Figure S). Press down again on the self - adhesive discs to make sure they are well attached. Tie the end of one of the shroud lines through the hole in one of the discs as shown in Figure T. **Do not** tighten the knot all the way down as this will weaken the parachute material. Tie the other end of the shroud line through the hole on the adjacent side of the canopy. Repeat for the remaining lines. It should now look like Figure U. With one hand, pick up the parachute by the top center of the canopy. With your other hand, gather together the shroud lines. Pull down on the lines so that the points of the canopy are all even (see Figure V). Tie a knot about two inches from the bottom of the lines. Thread the ends of the lines through the eyelet of the snap swivel (moisten the lines if needed) and tie firmly. Apply a small amount of wood glue to the knot and allow to dry. Attach the parachute to the rocket by attaching the snap swivel to the screw eye at the bottom of the nose cone.

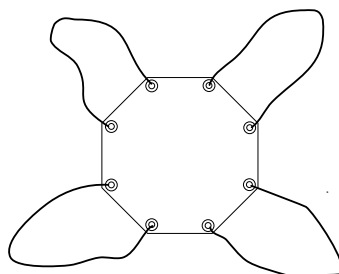


Figure U

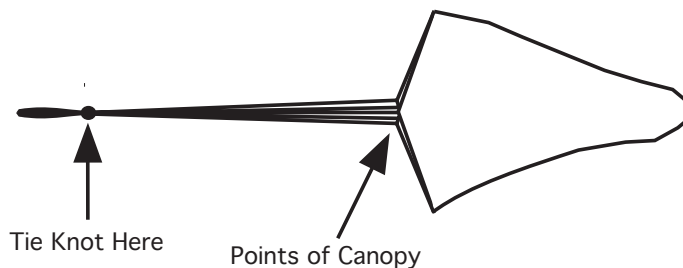


Figure V

Pack the parachute according to the following directions (or use any method that you feel comfortable with). Hold the parachute by the top of the canopy and the ends of the shroud lines until the canopy of the parachute is formed into a spike. Fold the canopy in half vertically then roll into a cylinder small enough to fit easily into the body. Wrap the shroud lines around the parachute. Insert the shock cord, then the parachute down into the body tube then insert the nose cone into the end of the body tube.

## Finishing and Decorating

The model may be decorated and/or painted in many ways, depending on how you want it to look and how much time you wish to put into it. The following instructions refer to a full finishing of the model including filling the wood grain. Be sure to do all balsa filling, painting, etc. in a well ventilated area. Alternately you may simply decorate the model with any colors of felt tip markers, decals/stickers, etc. If you decide not to fully finish the model as described below, skip to the Flight Preparation and Launching section.

□ 9) Prior to beginning this step, be sure to read any instructions on the brand of sanding sealer you are using - follow the manufacturers directions if they vary from those below. Be sure to use the thinner recommended by the manufacturer to clean your brush. Using fine sandpaper (then extra fine, if desired) go over all the wood parts to ensure they are smooth. If there are any dents or “dings” in any of the wood parts, apply one of the recommended filler materials to the area and allow to dry. Sand the area until smooth and repeat if necessary. Wrap a single layer of scotch tape (or masking tape) around the shoulder of the nose cone (the part that goes into the body tube) - this will prevent building up the thickness of the shoulder while painting. Insert the nose cone shoulder into the top of the body tube. Next apply a coat of sanding sealer to all wood parts (the nose cone and fins)- it is not necessary to seal the nose cone shoulder. Allow the sealer to dry then apply a second coat. After the second coat is dry, sand with medium or fine sandpaper until the surfaces are smooth. Continue with single coats of sealer, sanding in between each coat, until the wood grain is completely filled and the surface is smooth.

□ 10) You will need to use something such as a dowel or a section of newspaper rolled into a tight cone inserted into the base of your model to hold it while painting. If desired, lightly go over the model with a tack cloth to remove any excess dust or other particles which could mar the finish. It is a good idea to do this before applying each coat of primer and paint. Be sure to read the instructions on the brand of paint you are using - follow the manufacturers directions carefully. Be sure not to mix different types or brands of paint without testing. It is recommended (but not absolutely necessary) that you apply one or more coats of primer before the color coats of paint - this will give a much smoother surface to your model and allow the paint to adhere better. If using primer, sand with fine and/or extra fine sandpaper after each coat is completely dry. Use as many coats as needed to get a smooth finish before proceeding to the color coats.

□ 11) First give a base coat of the lightest color you will be using on the model - several light coats are preferable to one or two heavy coats (this will be true for all the colors you will be using). Apply as many coats as needed to get a nice even color. Allow to dry thoroughly.

□ 12) If applying other colors, use masking tape to cover up the areas of the model you do not wish to paint with the second color. Apply the second color as you did the first and allow to dry. Continue this process if other colors are desired. After the paint has dried carefully remove the masking.

□ 13) At this time you may apply any decals, stickers, trim tape, etc. if desired. The enclosed water-slide decals can be applied as follows: Cut out the decals, leaving as little clear area around them as possible. One at a time, soak in a shallow bowl of room temperature water until the decal loosens from the backing (30 to 45 seconds or so) and apply to the model. If necessary, dab away any excess water with a paper towel. Allow the decals to dry completely. To protect the paint and other

decorations, apply one or more coats of clear paint (such as Krylon Crystal Clear or similar) and allow to dry.

## **Flight Preparation & Launching**

Remove the nose cone and parachute from the body tube and loosely insert some flame - proof recovery wadding (such as that made by Estes or Quest) into the top of the body tube. Use enough wadding to fill the tube to a depth of at least one and a half body diameters.

Pack the parachute as you did in Step 8, insert the shock cord, then the packed parachute down into the body tube. Slide the nose cone into the body tube. Be sure to check the fit of the nose - if too tight, sand the shoulder down - if too loose, wrap with tape. The nose cone should be loose enough to slip out easily, but tight enough so that you can turn the model upside down without it falling out.

Select an engine from the list of recommended engines. Slip the engine into the engine mount tube until the engine hook slides down over the end of the engine to hold it into place. Insert the igniter according to the manufacturers directions.

Place the rocket on the launcher by sliding the launch lug over the launch rod. Attach the micro - clips to the igniter. Move back to a safe distance and be sure the launch area is clear. Check for low - flying aircraft, give the countdown and launch!

To fly your model again, pull back the metal hook and remove the used engine (be careful if you just flew it, it may be hot!). You may need to use a pair of pliers to grasp the exposed end of the engine to help pull it out. Then repeat the instructions above for your next flight!

## **Be sure to read & follow the NAR Safety Code before flying this or any other model rocket!**

(Note: the NAR Safety Code is normally included with each package of Model Rocket Engines and can also be found on the National Association of Rocketry web site at [www.nar.org](http://www.nar.org))

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