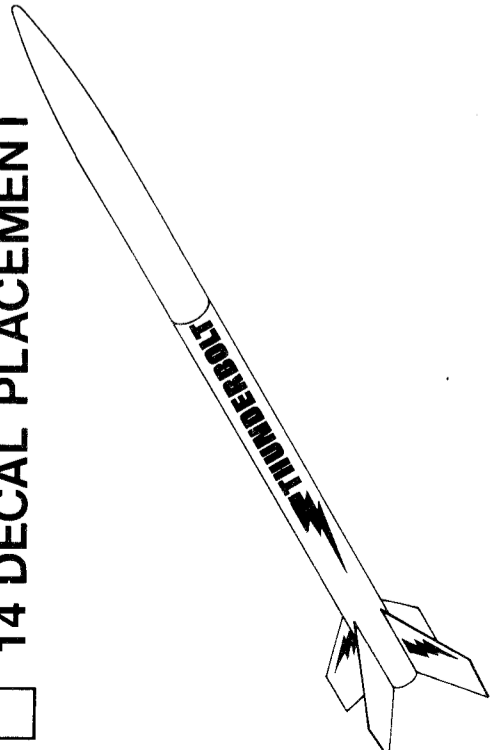


14 DECAL PLACEMENT



If you elect to apply decals to your model, be sure that paint is dry (allow at least overnight for drying.) Cut out a section of decal, dip in lukewarm water for approximately 30 seconds, and then slide off the backing sheet and onto model. Blot away excess water. For best results, let the model dry overnight and apply a coat of clear spray to protect the decals.

LAUNCHING COMPONENTS

Be sure to follow the HIA-NAR* Model Rocket Safety Code when carrying out your model rocket activities.

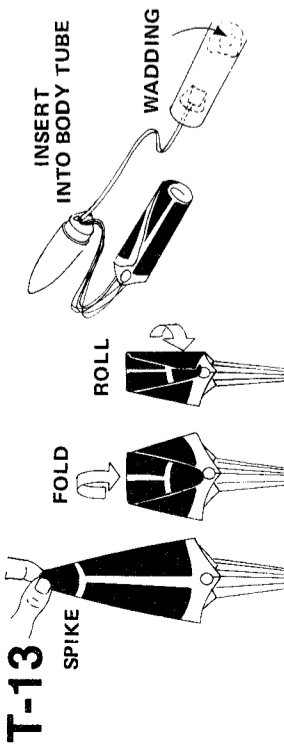
*HIA -- Hobby Industry of America
NAR -- National Association of Rocketry

To launch your model you will need the following items:

An Estes model rocket launch system
Parachute recovery wadding (Estes Cat. No. 2274)
Recommended Engines: A8-3, B4-4, B6-4, B8-5, C6-5, C6-7. Use an A8-3 engine for your first flight.

COUNTDOWN CHECKLIST

T-14 Pack 4 or 5 squares of loosely crumpled recovery wadding into the body tube.



Hold the parachute at its center and pass the other hand down it to form a "spike" shape. Fold this spike in half. Roll parachute into tube shape to fit easily into body. Pack chute into the tube on top of the wadding. Pack the shroud lines and shock cord in on top of the parachute and slip the nose cone into place.

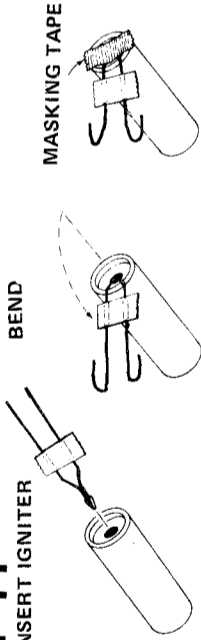
NOTE: DO NOT pack parachute until you are actually ready to launch. For maximum parachute reliability, lightly dust the chute with ordinary talcum powder before each flight, especially in cold weather.

T-12 Pack parachute, shroud lines, and shock cord neatly into rocket body.

NOTE: Nose cone should separate easily from rocket body tube, but should not be extremely loose. If fit is too tight, sand inside of body tube and shoulder of nose cone with fine sandpaper. If fit is too loose, add a wrapping of transparent tape or masking tape to the shoulder of the nose cone.

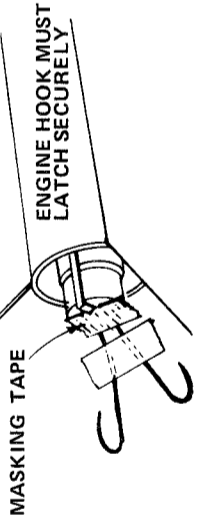
T-11

INSERT IGNITER



Select an engine and install an igniter as directed in the engine instructions. Use A8-3 engine for your first flight.

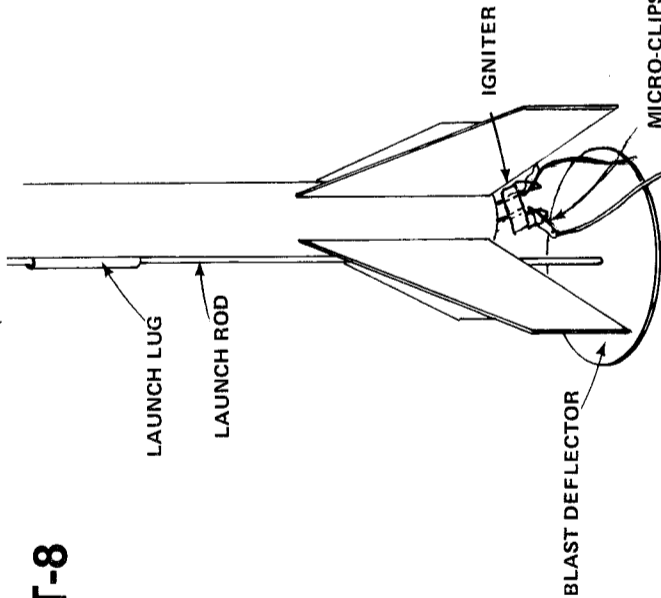
T-10



Insert engine into rocket engine mount. Engine hook must latch securely over end of the engine.

T-9 Disarm the launch panel—REMOVE SAFETY KEY!

T-8



Slide the launch rod through rocket launch lug and place rocket on launch pad. Make sure the rocket slides freely on the launch rod. Clean the micro-clips and attach them to the igniter wires. Arrange the clips so they do not touch each other or the metal blast deflector. Attach clips as close to protective tape on igniter as possible.

T-7

Clear the launch area. Alert recovery crew and trackers. Check for low flying aircraft and unauthorized persons in the recovery area.

T-6

Arm the launch panel—INSERT SAFETY KEY!

5-4-3-2-1-LAUNCH!!

Repeat Countdown Checklist for each flight.

MISFIRE PROCEDURE

Occasionally the igniter will heat and burn into two pieces without igniting the engine. This is almost always caused by a failure to install it correctly. REMOVE SAFETY KEY from launch panel, remove the model, clean the igniter residue from the engine nozzle, and install a new igniter. Repeat the Countdown Checklist.

82175

THUNDERBOLT

SKILL LEVEL 1 - Recommended for Beginner Rocketeers.

BEFORE YOU START

Read all instructions before beginning work on your model. Make sure you have all parts and materials. When you are thoroughly familiar with the assembly procedure, begin construction. Check off each step as you complete it. In each step, test-fit all parts together before applying any glue. If some part doesn't fit properly, sand lightly or build up as required for precision assembly.

TOOLS AND MATERIALS

In addition to the parts included in this kit you will need: Scissors, white glue (Elmer's Titebond, or similar), a sanding sealer, masking tape, paint brush, blue spray enamel, and black spray enamel.

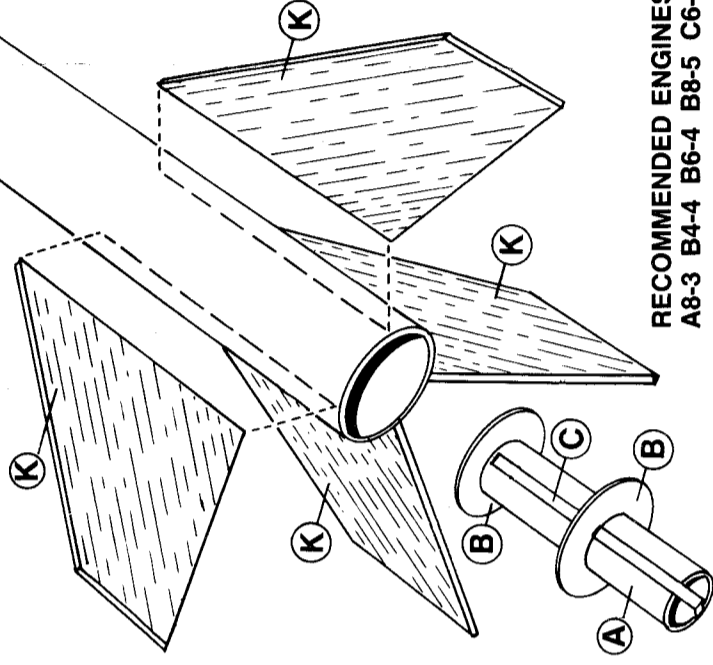
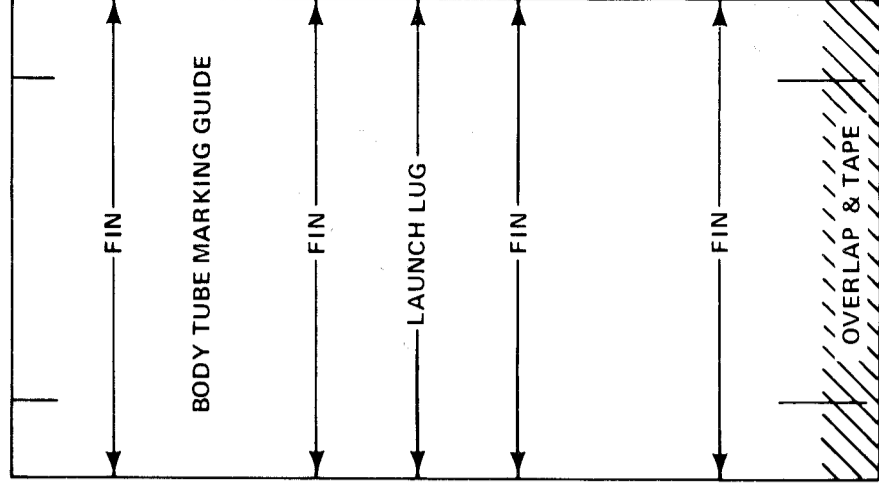
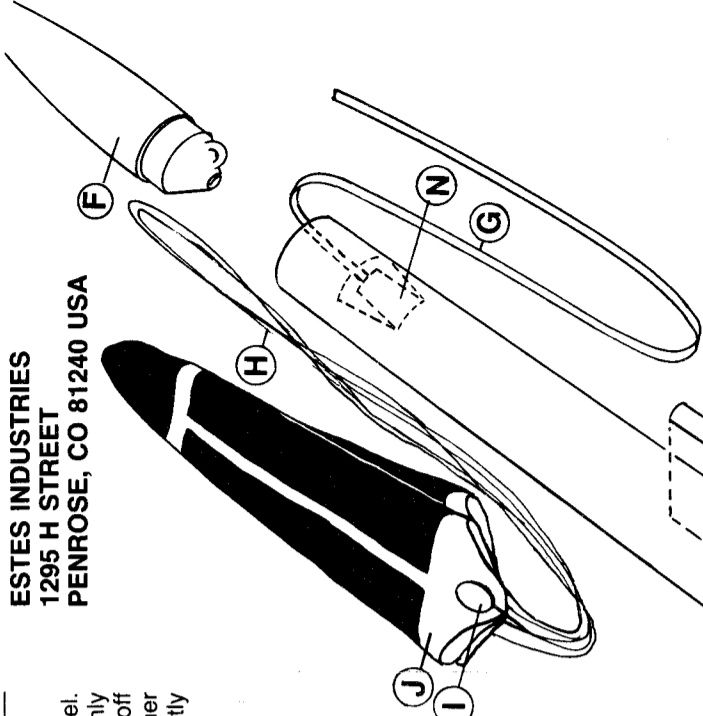
PARTS LIST KIT NO. 1429

A	1 Engine Mount Tube (type BT-20J)	30326
B	2 Adapter Rings (type RA-2055)	30126
C	1 Engine Hook (type EH-2)	35025
D	1 Body Tube (type BT-55)	30382
E	1 Launch Lug (type LL-2B)	38178
F	1 Nose Cone (type PNC-55AC)	71070
G	1 Shock Cord (type SC-1)	85730
H	1 Shroud Line (type SLT-108)	38239
I	1 Tape Disc Set (type TD-3F)	38406
J	1 Parachute (type PK-18A)	85566
K	1 Balsa Fin Sheet (type BF-78)	32239
L	1 Decal (type KD-1429)	37091
M	1 Pattern Sheet (type SP-1429)	On This Page
N	1 Shock Cord Mount (type SCM-50)	On This Page



A DAMON COMPANY

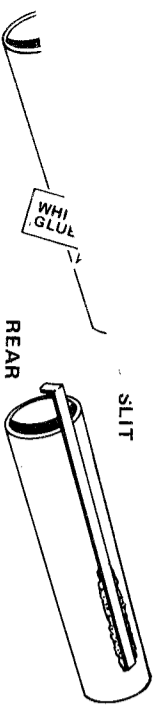
ESTES INDUSTRIES
1295 H STREET
PENROSE, CO 81240 USA



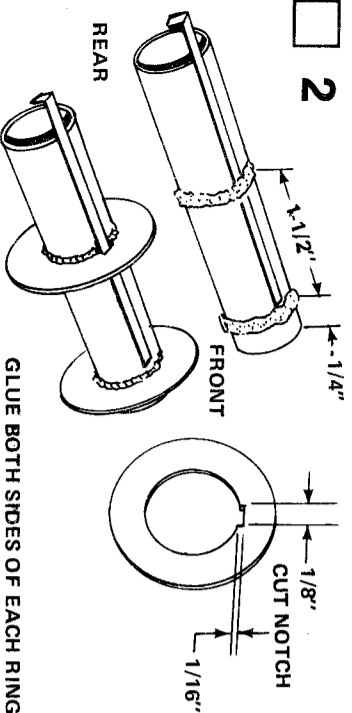
RECOMMENDED ENGINES:
A8-3 B4-4 B6-4 B8-5 C6-5 C6-7

CTIONS

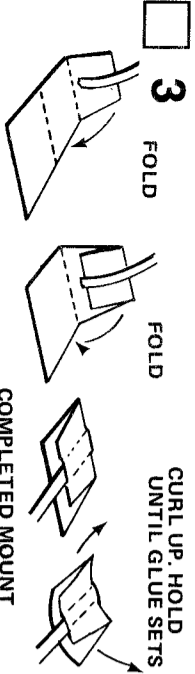
PUSH END OF HOOK INTO SLIT



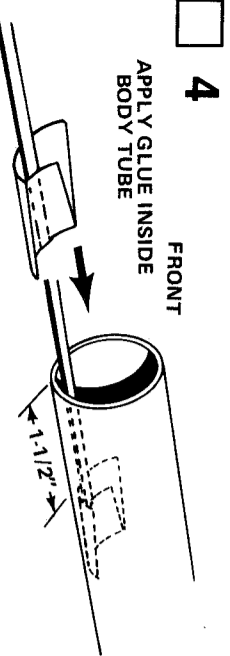
Cut a 1/8 inch wide slit in the engine mount tube (part A), 1/4 inch from one end as shown. Apply a 1 1/2 inch long line of glue to the tube as shown. Push one end of the engine hook (part C) into the slit and press the main part of the hook into the glue.



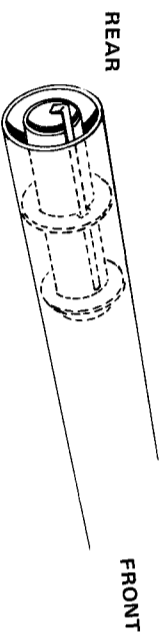
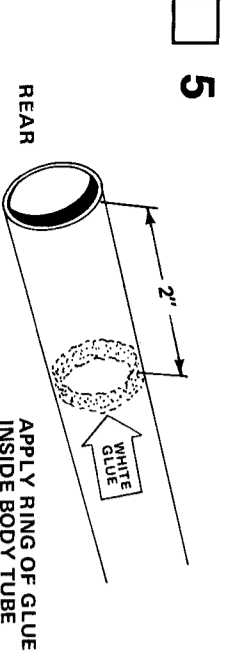
Separate the adapter rings from the die-cut card (part B). Cut a notch in one of the rings as illustrated and glue the rings to the engine mount tube. The notched ring should be placed over the engine hook. Let this assembly dry completely.



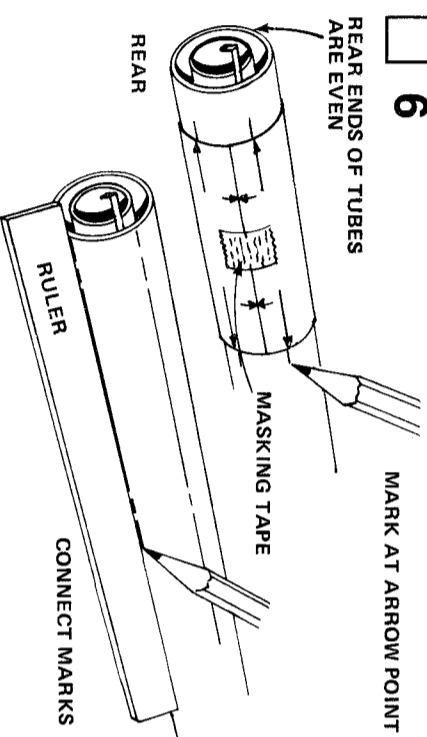
Cut out the shock cord mount (part N). Fold on dotted lines, then unfold and apply glue to Section 1. Lay the end of the shock cord (part G) into the glue. Fold over and apply glue to the back of Section 1 and the exposed portion of Section 2. Fold again to complete mount. Curl the edges of the mount up so it will match the contour of the body tube and hold with your fingers until the glue sets.



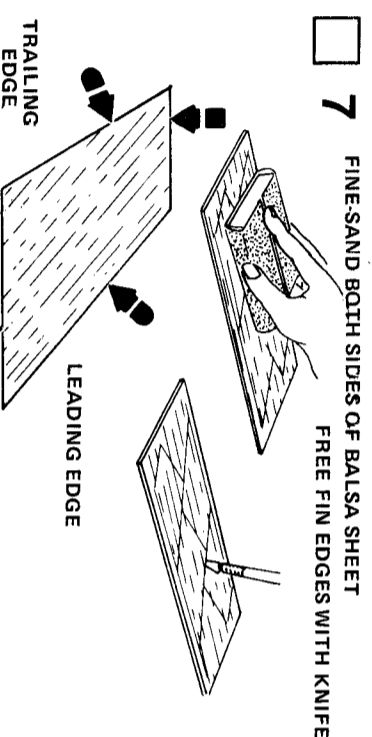
Apply glue to the inside of the body tube (part D) at one end over an area about 1 1/2 to 2 inches from one end. The glued area should be the same size as the shock cord mount. Press the mount into the glue as shown and hold it until the glue sets.



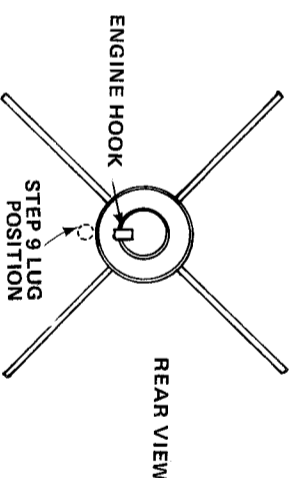
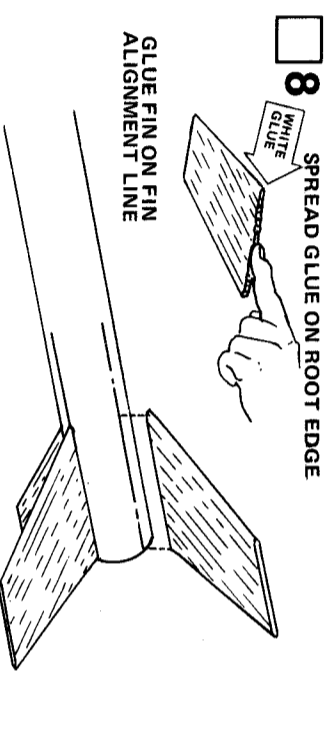
Test-fit the engine mount assembly into the other end of the 18 inch long body tube. If necessary, sand the edges of the rings until the unit slides smoothly in the tube. Apply a ring of glue around inside of rear end of body tube about 2 inches to 2 1/2 inches from the end of the tube. Immediately slide the engine mount into place, unnotched ring first, so the end of the engine mount is even with the rear of the body tube. Do not pause during this operation, or the glue may stick with the model in the wrong position.



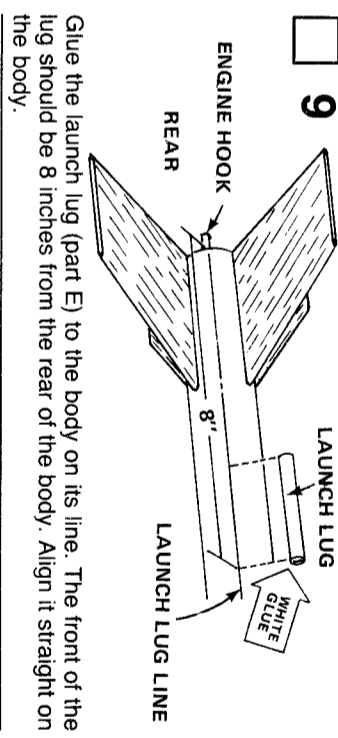
Cut out the body tube marking guide. Wrap it around the rear of the body tube. Mark the tube at each arrow point, front and rear. Draw a straight line connecting each matching front and rear mark. (Use a ruler when drawing lines.) Extend the launch lug line forward 8 inches (align launch lug line with engine hook).



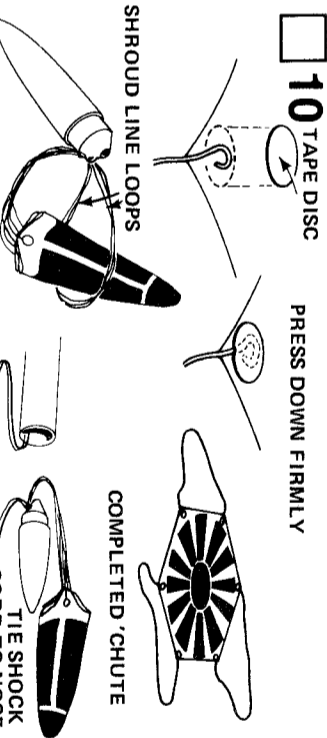
Fine-sand the balsa sheets (part K), then carefully remove the die-cut fins from the sheet. Free the edges with a sharp knife. Sand the leading and trailing edges of the fins round. Leave the other edges square.



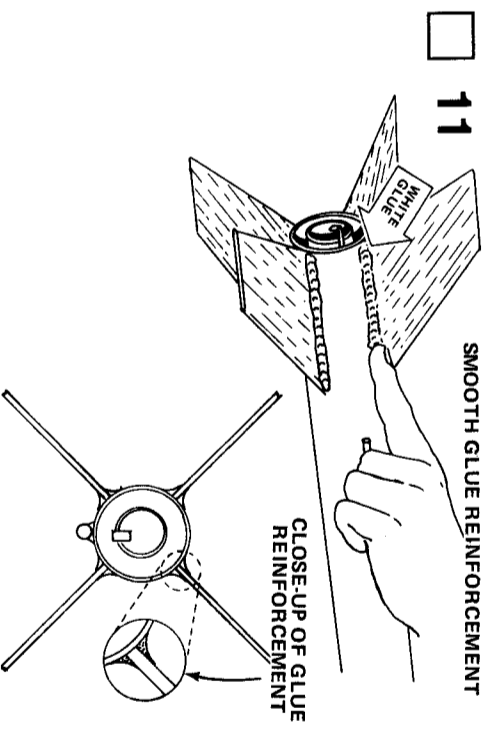
Apply glue to the root edge of one fin. Glue fin to the fin alignment line so rear of fin is even with the end of the body tube. Be sure fin projects straight out from the body tube. Allow to dry. Repeat for the remaining fins.



Glue the launch lug (part E) to the body on its line. The front of the lug should be 8 inches from the rear of the body. Align it straight on the body.



Pass chute through loop. Cut out the parachute (part J) on its edge lines. Cut three 36 inch lengths of shroud line (part H). Attach line ends to the top of the parachute with tape discs (part I) as shown. Pass the shroud line loops through the ring on the nose cone (part F). Pass the parachute through the loop ends and draw the lines tight against the ring. Set the knot with a drop of glue. Tie the free end of the shock cord to the nose cone ring.



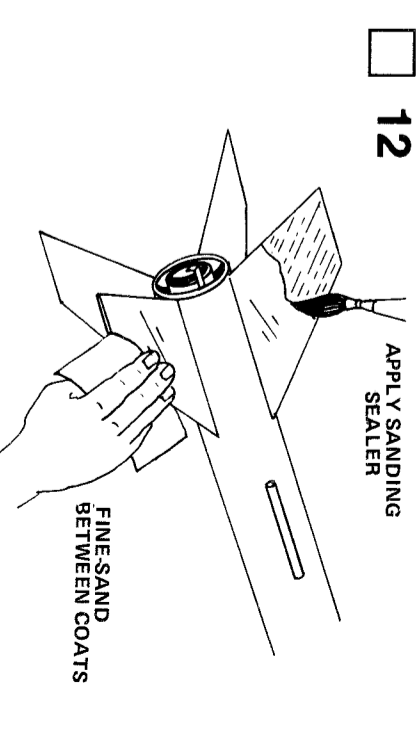
Apply a glue reinforcement to each fin joint and launch lug. Holding the model level, apply a line of glue to both sides of each joint. Smooth out the glue with your finger. Keep the model level until the glue dries.

PAINTING AND DETAILING

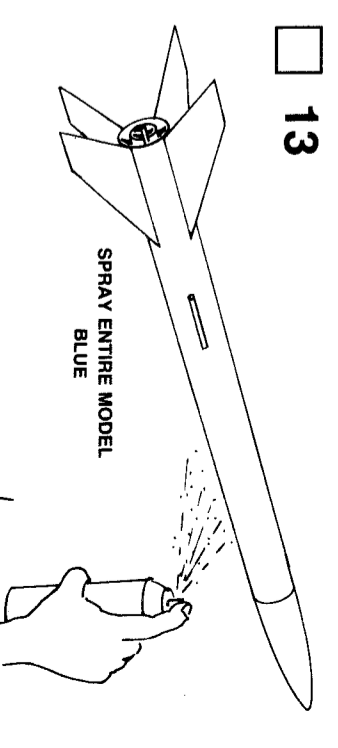
It is recommended that after the first trial flights, and before higher altitude flights, that finishing, sanding, and painting be done. This will increase the altitude achieved.

Your model will be ready to fly as soon as the glue dries. The length of time required for the glue to dry varies from about one hour to several hours. The lower the temperature, the higher the humidity, and the more glue you applied, the longer is the time required for the glue to dry. If you used white glue, do not fly the model until the glue has dried enough to be clear.

The THUNDERBOLT flies well without the application of sanding sealer and paint. To achieve superior performance, the balsa should be sealed and then the entire model given a smooth coat of paint to reduce drag.



Apply all glue reinforcements to fins and launch lug as shown in Step 11. There will be ten reinforcements. Let all glue dry completely. Apply sanding sealer to all balsa surfaces. Allow the sealer to dry and sand it smooth. Repeat this step as many times as needed to fill all the grain lines in the wood. Use spray enamel to finish your model.

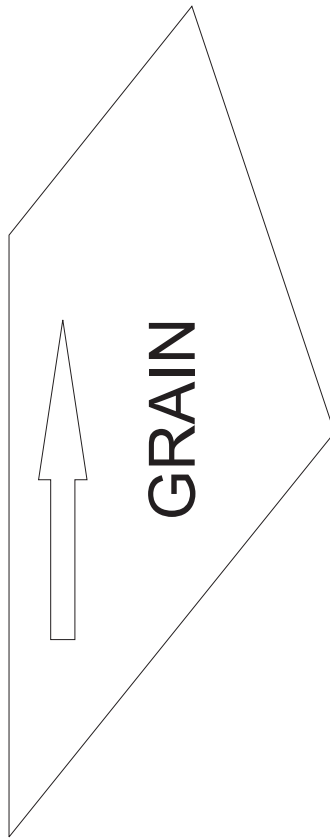


Spray paint the entire rocket with blue spray enamel. When this is dry, measure 10 1/2 inches from the tip of the nose cone down the body tube and place a mark. Wrap the remaining portion of the rocket with newspaper and seal with masking tape to prevent the paint from running under the paper. Spray paint the nose cone and body tube to the mark with black spray enamel. When painting your rocket, spray several light "mist" coats of paint rather than one heavy coat.

THUNDERBOLT

ESTES PN 37091





4 FINS $\frac{3}{32}$ BALSA

ROOT- $2 \frac{11}{16}$ "

LEADING EDGE $3 \frac{1}{8}$ "

TIP $1 \frac{1}{2}$ "

TRAILING EDGE $2 \frac{5}{16}$ "