Mk-109 STINGRAY™
FLYING MODEL ROCKET KIT INSTRUCTIONS
TOOLS REQUIRED: SCISSORS, PENCIL, HOBBY KNIFE, SMALL PHILLIPS HEAD SCREWDRIVER, TUBE-TYPE PLASTIC CEMENT
ALL GLUED AREAS ARE SHADED IN GRAY

1. A. Apply plastic cement as shown on slide front engine ring (inside engine mount tube. Line up with long not

B. Slide rear engine ring over tube. Line up with short not

2. IMPORTANT! LINE UP LAUNCH LUG OPENINGS!

A. F

B. THIS NOTCH FRONT, TES BEFORE GL

3. FRONT ENGINE RING (1)

ENGINE MOUNT TUBE - 735A (1)

4. A. Snap tube coupler off of the nose cone and discard.

B. Roll clay weight "snakes", of nose cone, a small phillips head screw, press clay int cone tip.

CAREFUL! DO NOT CUT OFF THIS PIECE
3. Locate elastic shock cord and shock cord mount.

B. Apply plastic cement to the bottom of the shock cord mount as shown. Attach to body tube through square hole. Let dry.

C. Tie double knot in end of shock cord. Thread other end through until knot is tight against shock cord mount.

5. Form loop with parachute shroud lines.

B. Push loop through eye of nose cone.

C. Pass parachute through loop.

D. Pull tight.

E. Tie shock cord to the eye of the nose cone with a double knot.
6. PACKING PARACHUTE

Wrap lines loosely around 'chute. Insert parachute into rocket.

DO NOT FORGET TO PACK RECOVERY WADDING IN THE ROCKET BEFORE FLYING - SEE STEP 8

SLIDE SHOCK CORD & NOSE CONE INTO PLACE.

7. APPLYING DECALS

REMOVE DECALS FROM BACKING PAPER. APPLY DECALS AS SHOWN ON BOX ART. WHEN POSITIONED CORRECTLY, RUB DOWN TO REMOVE BUBBLES.

8. FLYING YOUR ROCKET

ROCKET PREPARATION
Remove nose cone, shock cord and parachute.

ENGINE PREPARATION
Hold engine upright, drop in igniter. Igniter must touch propellant.

Separate igniter and igniter plug.

Insert igniter plug.

Firmly push all the way in.

Bend igniter wires back.

Insert engine into rocket.

LAUNCH SUPPLIES
To launch your rocket, you will need the following:

- Launch Pad (Estes Porta-Pad® II)
- Launch Controller (Estes Electron Beam®)
- Recommended Estes Engines: A8-3, B4-4, B6-4, B6-6, C6-5 or C6-7. For your first flight, use an A8-3 engine.
- Recovery Wadding (EST 302274)
- Igniters and Igniter Plugs (included with Estes engines)

Use only Estes products to launch this rocket.

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>PROJECTED ALTITUDE</th>
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<tbody>
<tr>
<td></td>
<td>Feet</td>
</tr>
<tr>
<td>A8-3</td>
<td>190</td>
</tr>
<tr>
<td>B4-4/B6-4</td>
<td>475</td>
</tr>
<tr>
<td>B6-4/B6-6</td>
<td>510</td>
</tr>
<tr>
<td>C6-5/C6-7</td>
<td>1050</td>
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TIPS FOR FLYING YOUR ROCKET

- Choose a large field away from power lines, buildings, tall trees, and low flying aircraft. Try to find a field at least 76 meters (250 feet) square. The larger the launch area, the better your chance of recovering your rocket.
- Launch area must be free of dry weeds and brown grass.
- Launch only during calm weather with little or no wind and good visibility.
- Don’t leave parachute packed more than a minute or so before launch during cold weather (colder than 4°C Celsius [40°F Fahrenheit]). Parachute may be dusted with talcum or baby powder to avoid sticking.
- Always follow the National Association of Rocketry (NAR) MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities. The safety code is enclosed with this kit.
COUNTDOWN AND LAUNCH

10. Safety key must not be in launch controller. The safety cap with safety key attached should already be on the launch rod.

9. Remove safety cap from launch rod, slide launch lugs over rod. Make sure rocket slides freely and micro-clips are clean for good electrical contact.

8. Attach micro-clips to the igniter wires. Arrange the micro-clips so they do not touch each other or the metal blast deflector. Attach micro-clips as close to protective tape on igniter as possible.

7. Move everyone back from your rocket as far as launch wire will permit (at least 5 meters - 15 feet).

6. Insert safety key to arm the launch controller.

5. Start audible countdown:

4...3...2...1...

LAUNCH!
Push and hold button until engine ignites.
For safety, immediately remove safety key from launch controller and replace safety cap on launch rod.

MISFIRES
When an ignition failure occurs, remove the safety key from the launch control system and wait one minute before approaching the rocket. Remove the expended igniter from the engine and install a new one. Be certain the coated tip is in direct contact with the engine propellant. Broken or chipped coating will not affect the performance of the igniter. Reinstall the igniter plug as illustrated previously. Repeat the countdown and launch procedure.

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