

Toobish Model Rocket Kit Instructions

An Introductory Tube Fin Rocket with Streamer recovery



The Toobish model rocket kit is a simple rocket that assembles with just wood glue and requires no tools. It's a great first rocket kit, because the fins are easy to attach straight, and with streamer recovery, it flies well on small fields on 1/2A6-2 motors, but it also flies up to 900 ft on a C6-5 motor! The matte white finish bonds well to wood glue or white school glue, and accepts decoration using pencils, pens, markers, stickers, or paint.

Specifications

Overall Length	35.5 cm (14 inches)
Airframe Diameter	24 mm (0.95 inches)
Mass	27 grams (0.95 ounces)

Recommended Motors

Motor	Expected Altitude
1/2A6-2	100 ft (33 m)
A8-3	250 ft (76 m)
B4-4 or B6-4	500 ft (152 m)
C6-5	900 ft (274 m)



What's in the Bag



- 1 13 inch x 24mm body tube
- 1 plastic ogive nose cone
- 6 1.5 inch x 24mm tube fins
- 1 18mm motor mount
- 1 Motor hook
- 2 centering rings
- 1 motor block
- 1 3 foot Kevlar shock cord
- 1 2 inch x 24 inch Mylar streamer

Note: your kit may include a ¹/₈ inch x 1 inch white straw called a launch lug. It is not needed for this version of the kit.

Not included:

- Wood or craft glue
- Decoration supplies
- Motor, igniter, and recovery wadding

Video Instructions

You can find the video instructions for the Toobish model rocket kit in the Videos tab of the Rocketry Works Toobish product page:

https://www.rocketryworks.com/toobish-model-rocket/

Flight Safety

Before flying any rocket, you should read, understand, and follow the Model Rocketry Safety Code:

https://www.nar.org/safety-information/model-rocket-safety-code/



Motor Mount Assembly

We start work **without glue**--for now, we're just positioning parts of the motor mount, which is the trickiest part of assembly. For this step, you'll need:



- Plastic nose cone (actually just a tool for now)
- 18mm x 2.75 inch motor tube
- 2 centering rings 18mm 24mm
 These are cardboard rings about the size of a quarter.
- Metal motor hook
- Yellow Kevlar shock cord

- Insert one end of the metal motor hook into the slot near one end of the motor tube.
- 2. Align the motor hook along the tube, with about ¼ inch sticking past the end of the tube.







 Chamfer the inside of a centering ring using the nose cone to gently angle the inside edge of the centering ring. This will help the centering Ring slide over the forward end of the motor tube. This is now the aft centering ring.

Remember--we use no glue in this section.

- Slide the chamfered end of the centering ring over the forward end of the motor tube--this is the side closest to the slot in the tube (the side away from the exposed hook.
- 5. Leave the aft centering ring in the middle of the tube.

It can help keep the motor hook in place while you work.

Note: Make sure you work from the forward end of the motor tube; it's OK if that end gets a little bent; it will be inside the rocket. But you want the aft end of the motor tube--the end with the exposed hook--in good shape so you can get motors in and out.







6. Tie one end of the shock cord around the middle of the motor tube, above the aft centering ring.
Tie 2 overhand knots near one end of the shock cord.
An overhand knot is the first knot you use to tie your Tie 2 of them to keep them from coming apart.

Note: Minimize the length of the tail left at the end of the knot. Keep as much length on the long end of the shock cord as possible.

 Tighten the double overhand knot tight. You don't want this to come out again.

Remember--we use no glue in this section.







- 10. Slide the chamfered edge of the forward centering ring onto the forward end of the motor tube.
- Align the 2 centering rings near the middle of the tube with the shock cord tied between them.

The shock cord will be pinched inside the forward centering ring, pointing away from the exposed motor hook.

Remember--we use no glue in this section.

- Chamfer one end of the other centering ring using the nose cone as a chamfering tool. This is the forward centering ring.
- 9. Insert the loose end of the shock cord through the chamfered end of the forward centering ring



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Glue the Motor Mount Together

Finally! It's glue time! But read the directions carefully, because it's important not to use too much glue. this is the hardest part of assembly. For this you'll need:



- Before you start, use the bag your kit came in as a drop cloth to keep glue off your work surface. This helps a lot with clean up.
- Apply a small bead of glue around the forward end of the motor tube where the motor hook fits into the slot.
 This is the end with the shock cord attached.



- A small bottle of wood glue, craft glue, or school glue
- The assembled, but unglued motor mount
- The motor block, which is the smaller cardboard ring--about the size of a dime
- The plastic bag your kit came in--it's a good way to keep glue off your work surface



Note: Do not glue the centering rings in place where they are.



5. Repeat steps 1 - 3 with the aft centering ring, leaving the aft centering ring about the same distance from its end of the motor tube.

- 3. Slide the forward centering ring into the bead of glue, covering the slot in the motor tube.
- 4. Wipe away any excess glue from the motor tube and the centering ring.Pay particular attention to leave the outside edge of the centering ring free of glue.







6. Place a small bead of glue around the inside of the forward end of the motor mount.Do not use a lot of glue here--use just enough to Secure the motor mount inside the tube.Clean any drips immediately.

Warning! Do not glue the aft end of the motor tube. Your motor needs to go there! If you get a lot of glue inside the tube, wipe it away before proceeding, or it may prevent your motor from fitting into the tube.

- Insert the motor block into the forward end of the motor mount. It should rest against the forward end of the motor hook inside the tube and also be flush with the forward end of the motor mount.
- Check to make sure you don't have any glue inside the motor tube. Glue that dries in here will prevent your motor from fitting inside the motor mount. Use a pencil or a stick to wipe away any excess glue.
- 9. Set the motor mount aside to dry on its side on the plastic bag.





Airframe Assembly

For this step, it is particularly important to use as little glue as possible, and that you are using your plastic bag to keep glue off your work surface. Keep your glue bottle over the plastic bag, and place your rocket only on the bag. With your motor mount set aside to dry, collect the parts of your rocket body:



- 1 13 inch x 24mm body tube
- 61.5 inch x 24mm tube fins
- Wood glue or school glue

1. Apply a small dot of glue on the middle of one tube fin.

You don't need a lot of glue, so keep your rocket neat by minimizing the glue you use to attach the fins. A small dot is plenty.







2. Attach the tube fin to the aft end of the body tube.

3. Place the aft end of the airframe on the plastic bag to align the first tube fin with the aft end of the body tube.

This helps make sure the tube fins are aligned parallel to the body tube.







4. Repeat steps 1 - 3 until you have attached and aligned all 6 tube fins.

 Apply 2 small dots of glue between each pair of tube fins.
 It's best to position the dots about ¼ of the way from each end.







Note: When you're done gluing the tube fins, you should have at least one clear triangle between fins. This will serve as the launch lug on the launch pad. If you've used the right amount of glue, your kit will have a clean look, free of excess glue.

- 6. Set the assembled airframe upright on the plastic bag, and gently press the fin assembly down to make sure the aft end of all the tube fins is flush with the aft end of the body tube.
- 7. Double check that each fin is glued to the body tube and to its neighbors.
- Let the glue dry until the fins are safe to handle without coming off.
 The exact time will depend on the glue you use and the temperature and humidity.



Insert the Motor Mount

Just one more part that requires glue remains--you still need to join the two assemblies you built--the motor mount and the airframe. It's important that you follow these directions in order, and when you insert the motor mount into the airframe, you must move in one continuous motion. If you stop inserting the motor mount before both centering rings are inside the airframe tube, the motor mount may get stuck part way in.



- While your tube fins are drying, pick up the motor mount, which should be ready to handle by now.
- Insert the loose end of the shock cord backwards through the motor mount, so the loose end sticks the aft end.

Note: This will keep the shock cord out of the way when we insert the motor mount into the Body tube. You can coil up the extra shock cord if it's in your way.



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3. Apply a generous bead of glue around the entire inside the airframe tube, just above the aft end of the body tube.

Note: "*Generous*" means a solid bead of glue around the entire inside circumference of the body tube, but not so much that it's dripping out the back or dribbling forward.

 In 1 fluid motion, insert the motor mount into the aft end of the body tube until both centering rings are inside the tube.
 Don't stop part way, or the motor mount may get stuck out of position.







5. While the motor mount glue is still wet, push the loose end of the shock cord back through the motor mount.

Pull it all the way through the body tube so it hangs out the forward end.

Note: When you're done, the end of the motor mount should stick out the aft end of the body tube slightly.





 Lay the rocket flat on its side to prevent the glue from dribbling back to block the motor tube.
 It helps to prop up the forward end of the body tube With the nose cone so no glue drips forward in the tube.



Attach the Nose Cone and Streamer

You're now done gluing this rocket, but you still need to attach the nose cone and streamer.



 Insert the loose end of the shock cord through one of the holes in the nose cone Shoulder.

Make sure you tie the knot near the end of the shock cord, so as much of the shock cord as possible is between the airframe and the nose cone.

2. Tie a double overhand knot to secure the nose cone.

Shown here is the beginning of that knot--the same knot you use to start tying your shoes. Tie two of them so they won't come apart.







 Tuck the extra end of the shock cord into the nose cone and keep the knot inside the nose cone, too. This will help keep the knot out of the way of the body tube when the nose cone is in the tube.

- Lay the streamer out flat and place the shock cord over the streamer about 1 streamer width from the end of the streamer.
- 5. Align the shock cord so the nose cone is within 1 streamer width of the streamer.
- Remove the backing from the Rocketry Works sticker and place it sticky side down on the shock cord and the streamer. Make sure the sticky side is fully on the streamer, so it doesn't stick to anything but the streamer and shock cord.

Warning! Leave the streamer out of the body tube until the glue inside the body tube dries completely.





Let the Glue Dry

The glue that will hold your rocket together will dry best laying flat on its side, with the forward end propped up on the nose cone. This prevents the glue inside the body tube from dripping back into the motor tube or running all the way out the forward end where the nose cone will go. Do not insert the streamer until the glue inside the body tube has completely dried.

Decorate Your Rocket!

This is your rocket, so you can decorate it any way you want! Pencils, pens, markers, stickers, or paint all stick well to the white tubes. But you should write your name or initials somewhere on the rocket.

Prepare for Flight

- 1. Insert 3 or 4 squares of recovery wadding into the forward end of the body tube, leaving the wadding loosely packed, so it takes up the full width of the tube without packing tightly.
- 2. Fold the streamer in half, and in half again, then start rolling the streamer to form a roll 2 inches wide and smaller than the body tube diameter.
- 3. Insert the shock cord and streamer into the body tube, making sure that they slide freely inside the tube.
- 4. Insert the nose cone shoulder into the body tube, making sure that the nose cone rotates freely and that neither the shock cord or streamer are pinched between the nose cone and the body tube.
- 5. Being careful not to let the nose cone fall out of the front end of the rocket, turn the rocket nose end down, with the motor mount pointing up.
- 6. Insert the motor into the motor mount with the nozzle end facing up, away from the rocket. It helps to start the motor at an angle, twisting slightly as you use the motor casing to bend back the motor hook.
- 7. Insert an igniter, tip down, into the motor nozzle, and place the plastic cap to secure the igniter in the nozzle.
- 8. Follow the launch safety procedures outlined in the Model Rocketry Safety Code to launch your rocket. <u>https://www.nar.org/safety-information/model-rocket-safety-code/</u>