Basic Elastic Launch Glider Instructions

This plane will help you learn how to build, trim and launch a Science Olympiad Elastic Launch glider. The fuselage parts, wing mount and tail surfaces are pre-cut. It should go together without too much of a problem. But just in case, you can email questions to me at rkleinert@verizon.net or contact us at www.soarmd.org.

Before doing anything else, please take a few minutes to watch the Glider Launch video on the BASS website. Watch it several times to get a feel for what a launch, transition and glide should look like Please note that I am left handed. I hold the launcher in my right hand and the tail of the plane in my left hand. I point the nose up at the ceiling and bank the plane to the left (the left wing panel is lower than the right panel). It climbs to the left and transitions into a left hand glide circle. The plane is built to fly to the left. The left tip of the stabilizer is about ¼" higher than the right tip, and the rudder is glued to the left side of the fuselage with a 1/32"thick by 1/8" square shim glued at the back of the rudder.

If you are right-handed, then you should do just the opposite i.e., hold the launcher in your left hand, bank the plane to the right and build the plane to fly to the right. The plan shows a plane that is built to fly to the right with the right stabilizer tip higher than the left tip and the rudder on the right side of the fuselage.

You will need the following tools:

Sand paper glued to sanding blocks
Adhesive (Please see below)
razor blade, Xacto type knife or small box cutter
pins
A board or flat surface to build on.
Cardboard template to shape the leading edge of the wing (optional)
Wax paper

Making Glue Joints:

We recommend using Duco or Ambroid cement thinned with acetone. Glue each joint in two steps. The first step is called "sizing". Or "double gluing". Coat each side of the joint, gently slide the sides together then pull them apart and let them dry (about 2 minutes). Step 2; put more cement on each side to be joined. Hold them together with pins or weights as needed until dry (10-20 minutes if using thinned cement)

You can use Carpenter's glue without thinning it, but do use the double gluing technique. It will take longer to dry. We do not recommend using white glue.

We do not recommend using instant glue, but if you do, here are some thoughts: Be sure to follow the safety instructions. Protect your fingers and your eyes and don't breathe

the fumes. When you buy the glue, buy de-bonder as well. Use only a very small amount - put a drop on a piece of wax paper and apply with a pin. You can put your fingers inside sandwich bags while using the glue. It's awkward, but a lot better than sticking your fingers together or to something else.

Let's get started:
Fuselage
Part A is 15" long. It is flat on the bottom and tapers from 5/16" to 1/8" at the tail. The taper has already been cut in your kit. Part B is about ¾" long and has an angle cut on each end. Size the joints, then glue Part B to part A at the nose as shown on the plans. Be sure the angle on Part B forms a "notch" or "Vee" when glued to Part A. Pin, clamp or weight down the joint until dry. After the joint is completely dry, round the nose using a dime as a guide in shaping the nose radius.

Flying Surfaces are all made from 1/32 sheet balsa.

For better flights: This balsa is supposed to be 1/32" thick, but actually measures 1/20" thick, so you can sand off some of the wood and have a lighter airplane that will fly longer.

Wing
Use your template or measure and cut the leading edge of the wing to shape.
On your plan you will see a dashed line dividing the wing into two 6" panels. Check the side-to-side balance by laying the centerline on a ruler or other thin edge. One side will probably be heavier than the other, if so, turn your wing so the heavier side will be on the side of your glide circle (The right side if you are right handed).

Now, use a sanding block to put a 45-degree angle or bevel on the leading edge of the wing.
For better flights: Also taper the trailing edge. Draw a light line 1" from the leading edge. Put the trailing edge on the edge of your board and use a sanding block to taper from the line to the trailing edge. Get the edge as thin as you can get it. As a guide, 4 pieces of bond paper are about 1/64 of an inch thick, That is a good thickness to shoot for. Go slowly and don't press down hard on the wood, let the sandpaper do the work.

When you are finished shaping the wing, cut it in half on the centerline.

The wing has an airfoil and dihedral. The airfoil is a curve from the leading edge to the trailing edge and dihedral is the angle from the root or center of the wing to the tips. You can see the airfoil curve by looking at the wing mount on the plan. The dihedral angle is shown in the Front View of the plan.

The glider uses a wing mount to set the airfoil and dihedral. It also holds the wing on the fuselage.

To prepare the wing for gluing to the wing mount, place your wing mount just off the side of a board. or flat surface. With one hand, bend the 3” side of a wing panel over the curved section of the wing mount. The leading edge should be lined up with the dot on the mount. Prop up the wing tip 1 ½” with a block or small box. The 3” edge of the wing should be just past the edge of the board.
With a sanding block in your other hand, gently sand a bevel on the 3” edge of the wing. It only takes a few strokes. Be sure the sanding block is perpendicular to the surface of the board your wing is resting on. Now reverse the direction of the wing mount and do the same with the other wing panel.

Now put a small piece of wax paper under your wing mount and pin the mount to your board. Be sure the sides are vertical to the board. Put one coat of glue on each wing root wing and the grove in the mount and let it dry. Now put another coat of glue on the wing roots and mount, prop up each wing tip 1 ½ inch and carefully pin the wing roots to the wing mount and let the glue dry completely. It’s best to let this joint set overnight.

Stabilizer and Rudder
The stabilizer and rudder have already been cut to size in your kit.

Using the double gluing technique, glue the stabilizer onto the bottom of the fuselage. The back or trailing edge of the stabilizer should be ¾” ahead of the tail end of the fuselage. Don’t put glue on the last 1’8” of the stabilizer.. If you want your plane to turn right then the right side of the stabilizer should be tilted ¼” higher than the left side. (See the front view on the plan). Let this joint dry.

Rudder. Cut a 1/8” square piece of 1/32 balsa and glue it to the left side of the rudder at the very back, or trailing edge of the rudder. Then glue the rudder to the top of the stabilizer and the right side of the fuselage.

Assembly
When all glue joints are dry, use ¼” x 1” strips of masking tape to attach the wing mount to the fuselage. The leading edge of the wing should be 4” behind the front of the fuselage, as shown on the plan. Use a good quality masking tape, not the blue painter’s tape that has lower tack adhesive. Taping the wing mount on allows you to make adjustments to the wing angle if necessary.

Balance your plane at the point shown on the plan.

There is a picture on the BASS website showing how to check the center of gravity using the tips of a pair of scissors. The glider should balance at a point half way between the leading and training edges of the wing to start test flying. Add modeling clay to the nose or tail to bring the center of gravity to that point.

Congratulations your glider is ready for trimming flights.