

INSTRUCTIONAL GUIDE

Contents

One Trebuchet Kit:

- 1 Precut Wooden Parts Sheet
- 6 Metal Washers
- 1 Metal Rod, 3.75" Long
- 1 Wire, 5" Long
- 1 Cloth Rectangle
- 1 Pack of Clay
- 1 Rubber Band
- 1 Monofilament, 36" Long

Also Needed but not Included:

- White glue
- Pliers for bending the heavy wire
- A fingernail file or 220 grit sand paper
- Waxed paper
- Scissors



NOTE: If you have purchased the Trebuchet Kit Classroom Set (P4-1961) glue and spreaders for twelve assemblies are also included.

For more information regarding Trebuchets, their history and what makes them work, please visit our web site at www.arborsci.com.

Assembly

Assemble the Sling

Cut the monofilament into three equal pieces. Set one length aside for the time being. With the remaining two lengths, tie a loop in one end of each monofilament so that when stretched taut each line is about 8 inches long.

Thread the monofilament through the hole in the cloth and then back through the loop in the end of the monofilament. Pull the monofilament tight so the slipknot grips the cloth. Repeat this with a second length of monofilament at the other end of the cloth. Tie another loop on one end of the monofilament line as shown below, make sure the loop is large enough to slip over the end of the throwing arm easily.

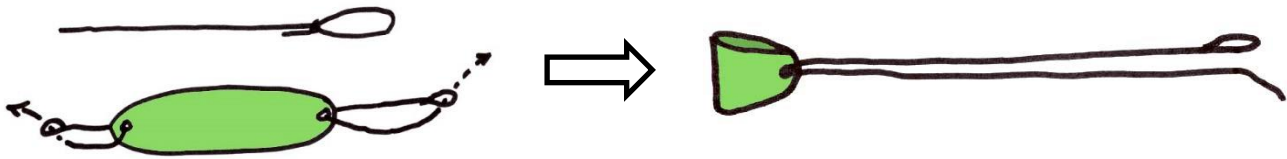
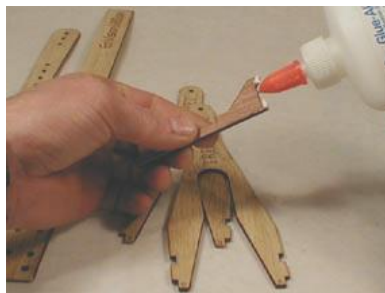


Figure 4. Construct the sling

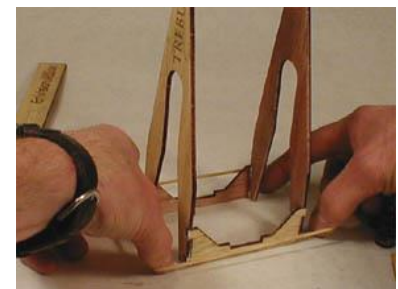
Attach cross braces to sides

Start by applying glue to the ends of the cross pieces. Then, align the letter marked on the cross brace with corresponding letter on the trebuchet side. Press the pieces together and wipe off any excess glue with your finger or a damp cloth. Repeat with the second cross brace.



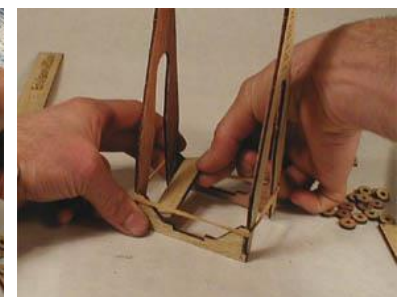
Clamp the assembly with a rubber band

When the cross braces are glued in place, stand the assembly on a piece of waxed paper and then hold them together with a rubber band until the glue dries. Gently release the rubber band so the parts don't fold flat.



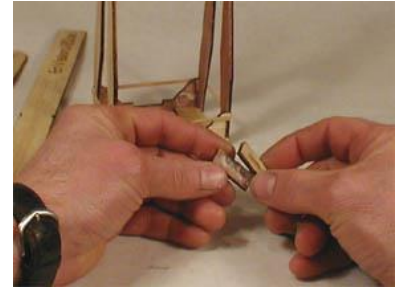
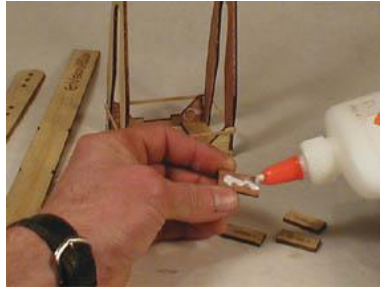
Install large rectangles inside the base

Insert the large rectangles into the base so that the corresponding letters match up. Press it flat to the table and snugly against the cross braces and side. Repeat this with the second one on the opposite side. Set the completed base aside while the glue dries and move on to the next steps.



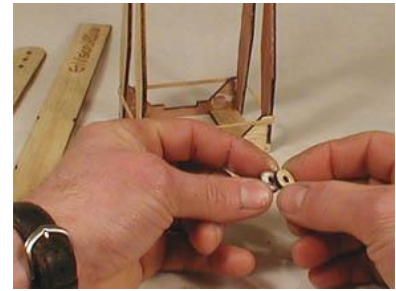
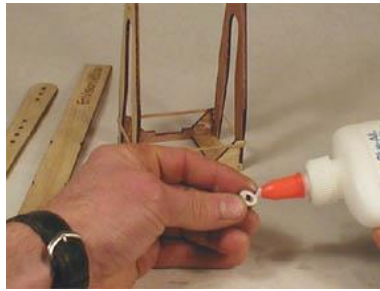
Assemble the shims

Select the four smaller rectangles labeled 'shim 1' and 'shim 2'. Apply glue to one side of shim 1 and shim 2. Press the second shim 1 onto the glued side of the first shim 1. Repeat this with shim 2.



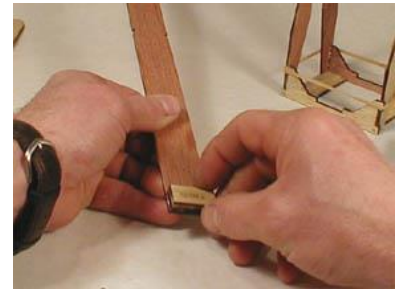
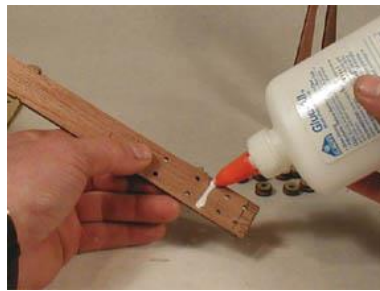
Assemble the spacers

Select one of the spacers (small wooden wheels), and apply glue to one side. Press a second spacer onto the glued side of the first spacer. Make sure they are aligned so the hole goes straight through both spacers.



Glue the shims under the bed

Select the long rectangular piece and apply a line of glue to the underside as shown. Press one of the shims onto the glue line. Repeat with the second shim by turning the bed around and gluing the second shim to the end of the bed as you did with the first shim.



Begin assembling the sling

Cut the monofilament into two 12-inch lengths. Tie a loop in one end of each piece. Measure 8 inches from the end of this loop, and fold the monofilament at this point. Tie a second loop. When the monofilament is pulled tight, each piece should be the same length.



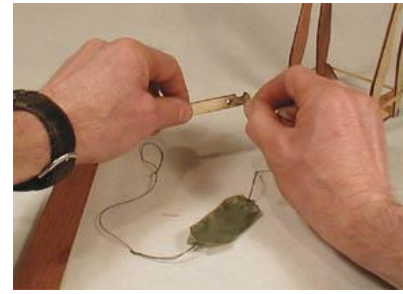
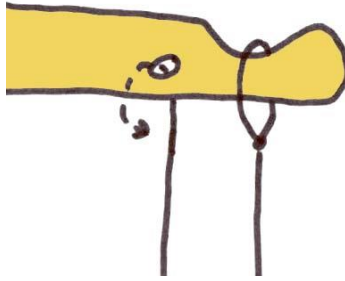
Tie the monofilament onto the cloth

Pass one end of the looped monofilament through the hole in one end of the cloth rectangle. Thread the free end of the monofilament through the loop that was passed through the cloth to make a slip knot, and pull this tight against the cloth. Repeat this with the second length of monofilament through the opposite end of the cloth.



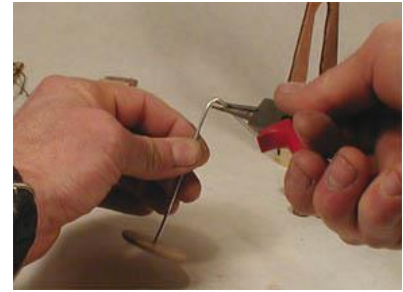
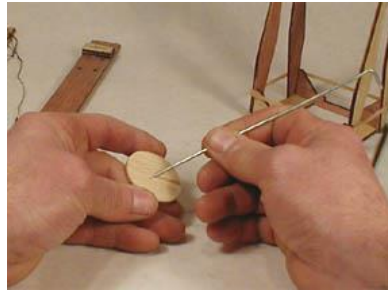
Attach the sling to the throwing arm

Using the end with the loop, hook the line over the notch in the throwing arm. Then fold the cloth sling in half. While holding the folded cloth, slip the other line through the small hole and tie it off so that the lines are even.



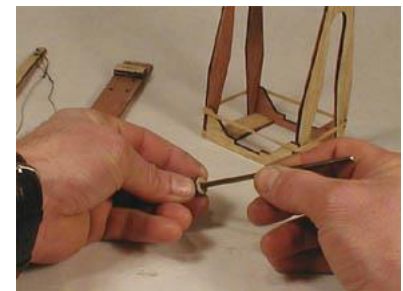
Form the weight hanger

With pair of pliers, form a 90-degree bend 1/4 inch from one end of the wire. Insert the straight end of the wire through the hole in the center of the large circular piece of wood and slid the wood down to the sharp bend. Bend a hook in the straight end of the wire.



Begin assembling the throwing arm

Select one of the small circular spacers and press it onto one end of the 1/8-inch metal rod.



Insert the rod and assemble the spacers and throwing arm at the trebuchet's top

Place two spacers, the throwing arm, and two more spacers onto the rod as shown. Pass the rod through the other side of the trebuchet and secure it with another spacer. Slide the spacers along the rod to hold the rod in place against the sides of the trebuchet and to hold the throwing arm centered between the sides.



Glue and assemble the bed on the base

Apply glue to the underside of the bed between the notches near the center. Press the bed into the matching notches in the base so that the end with the holes is on the same side as the long end of the throwing arm.



Insert the hook of the weight hanger

Through one of the holes in the short end of the throwing arm. This can be removed at any time to add or remove additional weights.



Fashion the Trigger

Feed one end of the remaining length of monofilament down through one of the small holes in the bed near the end of the throwing arm. Loop it under the bed and up through the adjacent hole. Tie a knot in the monofilament, making a loop large enough to slip loosely over the end of the throwing arm. Do not trim the free length of monofilament, this will be your triggering lanyard.

To Launch the Trebuchet

Place a pea sized lump of clay in the sling, tip the throwing arm back and slip it under the trigger loop on the bed. Lay the sling on the bed with the free loop of the sling's monofilament over the notched end of the throwing arm. Hold the base in place by firmly pressing on the cross brace between the side pieces with one hand and firmly launch by pulling back on the trigger lanyard to release the throwing arm.

Related Products

Lever Lab (P4-1600) Experiment at two levels with the innovative Lever! Attach the center pivot to the Workshop Stand and use Hooked Masses to create equal torques on each end and establish equilibrium.

Physics Workshop Bundle (P4-1806) The Physics Workshop Bundle is a complete solution for the lab equipment you need for physics and physical science students exploring force and motion concepts. Each Lab is supplied complete with curriculum materials.

Mini Projectile Launcher (94-1970) This simple but precise launcher is versatile and great for indoor classroom use with projectile motion studies! The Mini Projectile Launcher projects 16 mm steel balls at ranges suitable for use on the benchtop or from the bench to the floor. Three launch speeds give ranges of 1m, 1.5m, and 2m.