

Trebuchet Kit

P4-1960 & P4-1961



BACKGROUND:

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

KIT 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

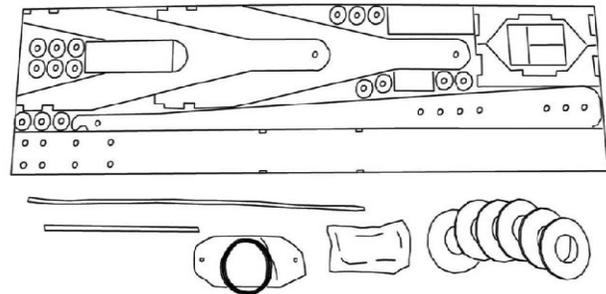


Figure 1 Trebuchet Parts.

Also Needed:

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, spreaders and additional rubber bands for twelve assemblies are also included.

ASSEMBLY (A STEP-BY-STEP PHOTO GUIDE IS ALSO INCLUDED):

Begin by breaking out the wooden parts. Use a fingernail file or a small piece of fine grit sand paper to remove any burrs or splinters. Use the wire to poke out the centers of all the small holes. Place a sheet of waxed paper on the tabletop and build the trebuchet on top of this to catch any excess glue. Gather the two side pieces and the cross braces and refer to Figure 2 and Figure 3 to see how they go together.

Apply glue to each of the parts and then gently fit them together so that the letters printed on the parts match (A to A and B to B). Fit the larger rectangles inside the base and glue them into place as shown in Figure 3. Be sure these rectangles and the base set firmly on the tabletop. A rubber band can be wrapped around the base and sides at this time to hold everything in place while the glue dries.

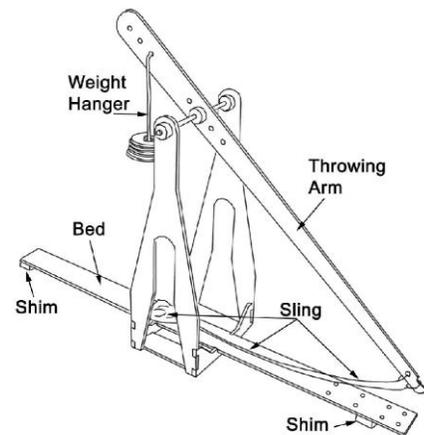


Figure 2 Assembled Trebuchet.

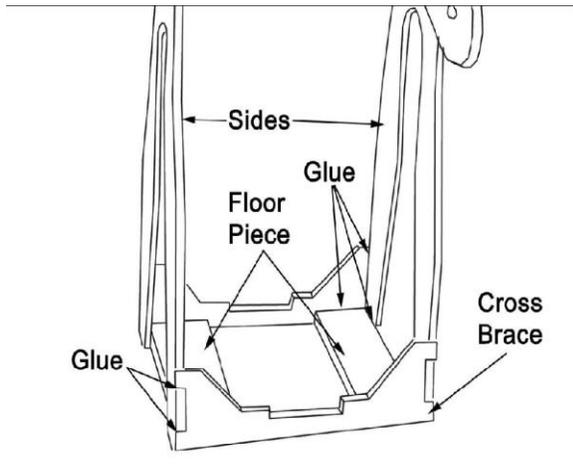


Figure 3 Assemble the base and sides

Collect two of the small wheel shaped pieces and glue them together. Continue in this manner until all the wheel shaped pieces have been used. Glue the small rectangles labeled Shim 1 together, and glue the small rectangles labeled Shim 2 together. Then glue the shims under the bed (the long rectangle) as shown in Figure 2. After the glue on the base has dried, lay the bed with the shims facing downward, into the slots of the base and glue this in place.

Construct the Weight Hanger

Use a pair of pliers and put a 90 degree bend in one end of the wire. Poke the straight end of the wire through the small hole in the large wooden circle and then bend the wire again approximately 2 inches from it's end as shown in Figure 4.

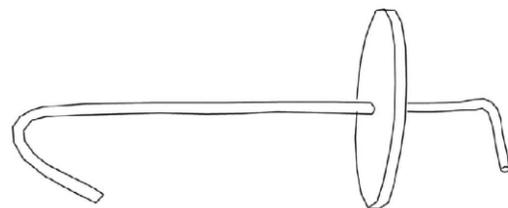
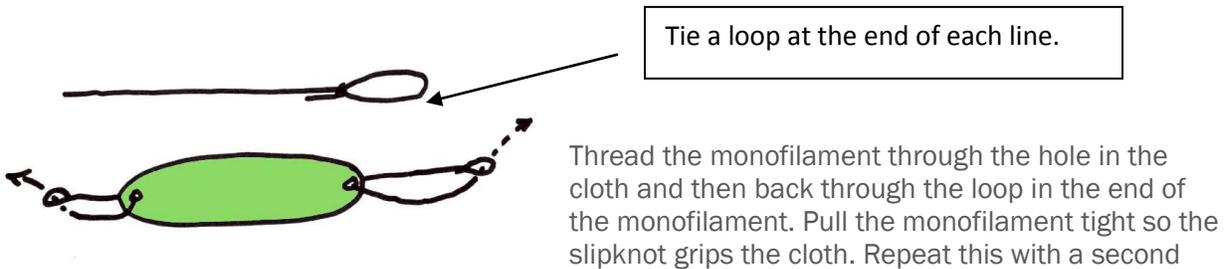


Figure 4 Assemble the weight hanger

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.



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.



Mount the Throwing Arm

Take one of the spacers (glued wheel assemblies you made earlier) and press it onto the end of the short metal rod. Pass the metal rod through the hole at the top of one side of the trebuchet. Slip two more spacers over the metal rod, then the throwing arm as shown in Figure 5, then two more spacers. Push the metal rod through the hole in the opposite side of the trebuchet and finally press the last spacer over the rod. Slide the spacers along the rod as necessary to keep the throwing arm centered and the rod in place between the trebuchet sides (refer to Figure 2).

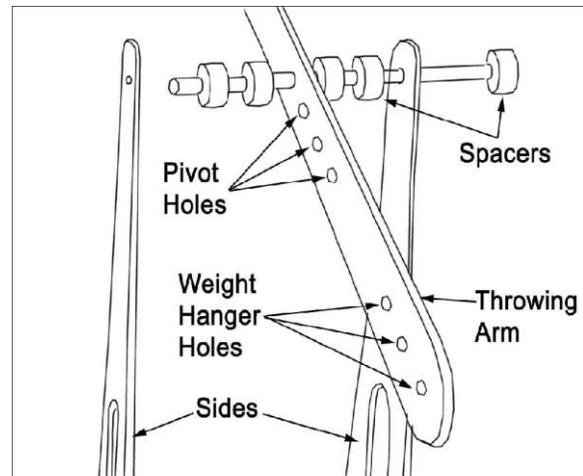


Figure 5 Mount the throwing arm

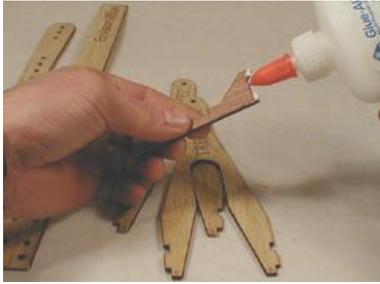
Fashion the Trigger

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.

STEP-BY-STEP PHOTO ASSEMBLY GUIDE:



Apply glue to cross braces

Start by applying glue to the ends of the cross pieces

Attach cross braces to sides

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

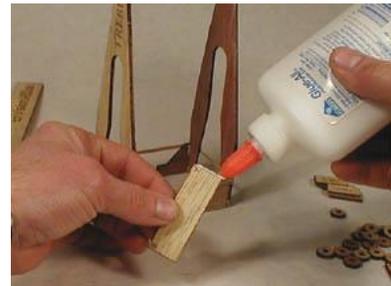


Clamp the assembly with a rubber band

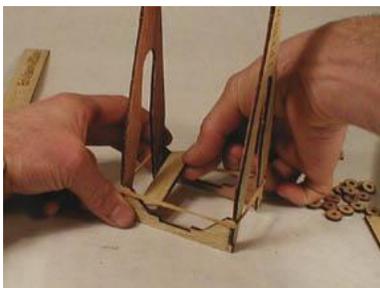


When the cross braces are glued in place, stand the assembly on a piece of waxed paper and then hold them together with a rubber band until the glue dries. Gently release the rubber band so the parts don't fold flat.

Apply glue to the large rectangles



Position large rectangles inside the base



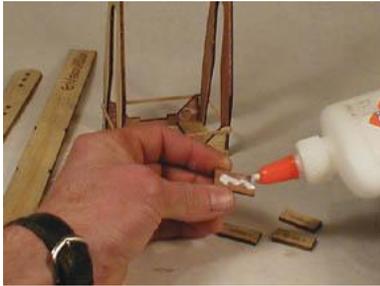
Insert the large rectangles into the base so that the corresponding letters match up. Press it flat to the table and snugly against the cross braces and side. Repeat this with the second on the opposite side.

Set the base to one side

While the glue dries, move on to the next steps.



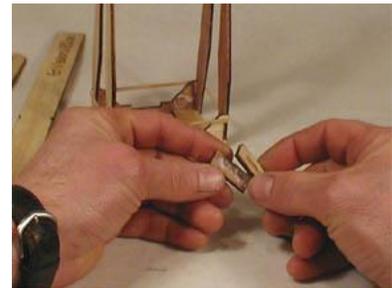
Assemble the shims



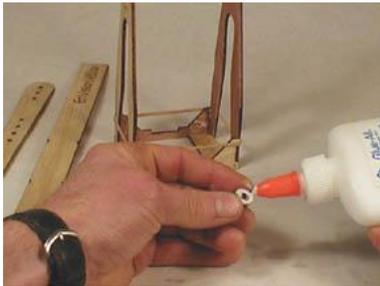
Select the four smaller rectangles labeled 'shim 1' and 'shim 2'. Apply glue to one side of shim 1 and shim 2.

Glue the shims together

Press the second shim 1 onto the glued side of the first shim 1. Repeat this with shim 2.



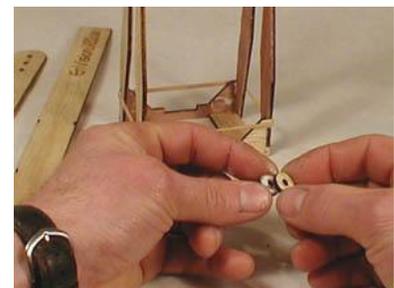
Assemble the spacers



Select one of the spacers (small wooden wheels), and apply glue to one side.

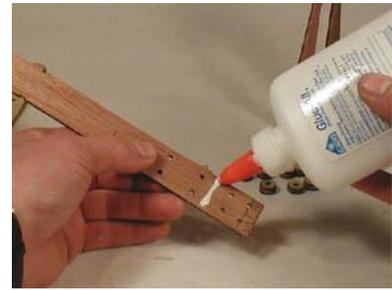
Glue spacers together

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.

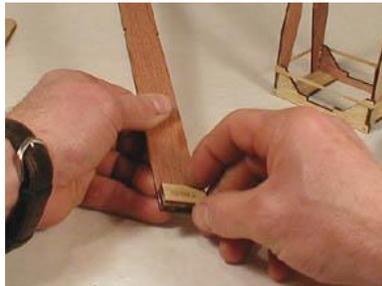


Glue the shims under the bed

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



And repeat with the second shim

Turn the bed around and glue the second shim to the end of the bed as you did with the first shim.

Begin assembling the sling

Cut the monofilament in to 12 inch lengths. Select two of the lengths. Tie a loop in one end of each of the pieces. Using a ruler, 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, the length of each piece should be the same from loop tip to loop tip.



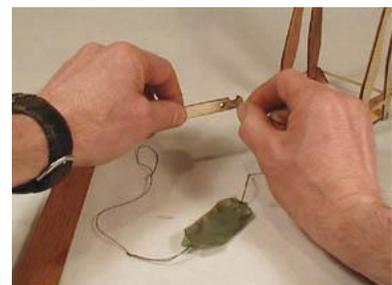
Tie the monofilament onto the cloth

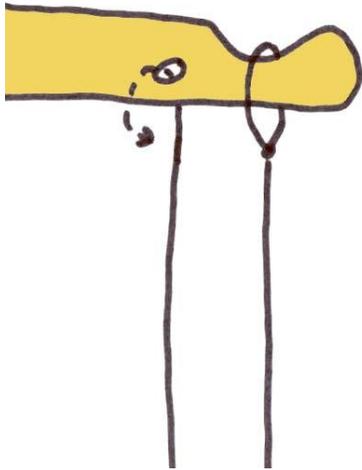


Pass one end of the looped monofilament through the hole in one end of the cloth rectangle. Thread the free end of the monofilament through the loop that was passed through the cloth to make a slip knot, and pull this tight against the cloth. Repeat this with the second length of monofilament through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

Attach the sling to the throwing arm

It's important to make sure the monofilament lines are equal length while attaching. The loop end needs to be large enough to slip over the throwing arm notch easily.





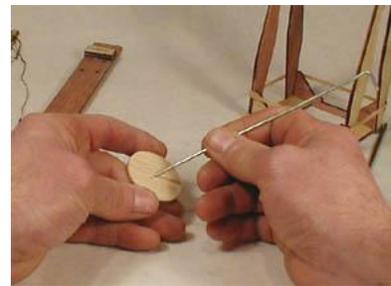
Using the end with the loop, hook the line over the notched end of the throwing arm. Then fold the cloth sling in half. While holding the folded cloth, slip the other line through the small hole and tie it off so that the monofilament lines are even.

Form the weight hanger

Using a pair of pliers, place a 90 degree bend 1/4 inch from one end of the wire.

Assemble the weight platform

Insert the straight end of the wire through the hole in the center of the large circular piece of wood. Slid the wood down to the sharp bend.



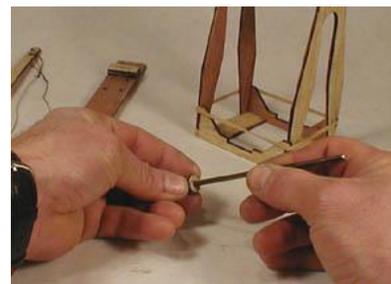
Bend a hook in the wire

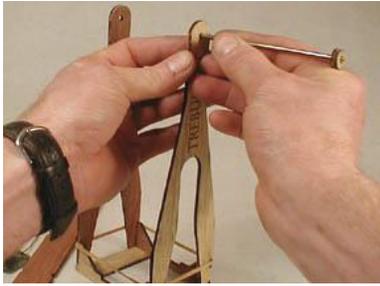


Approximately 2 inches from the end of the wire, bend a hook as shown, and then set this part aside.

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.

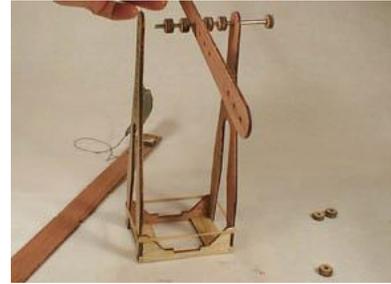




Insert the rod into the top of the trebuchet

Assemble the spacers and throwing arm

In this order, 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 the bed to the base



Apply glue to the underside of the bed between the notches near the center.

Assemble the bed on the base

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.

