How to build a Pikler Triangle

An amateur guide to building a 35” x 32” base and 31” tall, folding Montessori climber for gross motor development and creative play.

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DISCLAIMER: This is the DIY approach Montessori in Real Life's husband took to building a Pikler Triangle. He made it up as he went along. The plans below are the product of building two Piklers and learning along the way. These are not intended to be perfect and are not in any way tested for structural integrity or safety standards. Proceed at your own risk: (1) because we can't be held liable for the resulting work product and (2) because building one of these takes more time than it seems like it should. There is very little magic in these plans. Modify as needed. Have fun, and happy climbing!

Materials

Item	Quantity	Notes
Wood		
1" x 36" Sanded Oak Dowel	13	Most types of wood will work. I built a similar version out of pine. If you decide to change the dowel width, only go up (thinner than 1" will not work). The 10' wide oak board should be sold by the foot at any lumber yard / Home Depot. The poplar squares and the stair board are only necessary if you plan to add on a ramp. You could also swap out the stair board for a different 1" thick board - a length and width of your choice.
¾" x 2 ½" x 72" Oak Boards	4	
¾" x 10" x 20" Oak Board	1	
⅝" x 36" Poplar Squares	4	
11 ½" x 48" x 1" Oak Stair Board	1	
Hardware		
Construction Screws (Pikler)	28	2" construction screws (#8x or similar)
Washers	4	[optional] Any size that works with your post screws (below)
Thick wood screws	4	1 ¼" long screws (to anchor the non-collapsible arm). Something ~ the width of a pen.
Stainless Steel Post Screws	2	1 ½" long post screws (for the collapsible arm)
Construction Screws (Ramp)	4	1 ¼" construction screws (#6x or similar)
Tools		
Compass	1	Or a Pringles lid!
Compound Mitre Saw	1	A circular saw / jig saw will work in a pinch
Jig Saw	1	A router table would be better

Random Orbital Sander	1	Any power sander will do
Power Drill & Standard Bits	1	You're going to drill holes of various sizes
Countersink Bits	1	Match the size to your wood screw heads
Forstner Drill Bit (1 1/16" or 26mm)	1	Ideally the forstner bit is *slightly* larger than the dowels. It's possible with a 1" bit.
Long Reach Clamps	3+	These will make your life easier. Not crucial.
Speed Square	1	
Measuring Tape	1	

Cut List

Wood	Cut	Quantity
¾" x 2 ½" x 72" Oak Boards	32" long	2
	36" long	2
1" x 36" Sanded Oak Dowels	29 ½" long	13
¾" x 10" x 20" Oak Board	9" x 10"	2
⅝" x 36" Poplar Squares	Cut to a width that matches the width of your ramp (Oak Stair Board)	4
11 ½" x 48" x 1" Oak Stair Board	Just buzz off the rounded edge with a table saw or circular saw	1

Before you begin

These plans are not an exact science. Expect to make some modifications on the fly. Pilot holes are your friend. It's really easy to split the support beams and/or dowels along the way. Take the time to drill pilot holes and countersink your screw heads. Also, this thing takes a while. Expect to spend at least 5 hours on the triangle itself. Have fun and good luck!

Step 1: Make your cuts

Make all your cuts as outlined in the 'cut list'. These cuts are intended to produce a bunch of rectangular (and tubular) pieces of wood that we'll round off (and in some cases turn into triangles) later. If you've opted to build a ramp to accompany your Pikler Triangle, you will need to ensure that the Poplar Squares are the same length as the width of the final ramp. When making a solid oak Pikler Triangle, I opted to purchase a board intended to be used as a stair, and I used a table saw to rip off the rounded edge. If you're using pine or another type of less expensive wood, you may find that it's cheaper to purchase a board rather than a stair. Precision in the ramp width is unimportant, but matching the length of the Poplar Squares to the width of the board is key.

Step 2: Round off the support beams

Use your compass to draw rounded edges on your support beams (the ¾" x 2 ½" x 72" boards) as pictured below (Figure 2.1). The exact degree of rounding is unimportant. What's important is that you round off each board in a uniform way. You'll end up drawing rounding circles 8 times: once per end of each support board. These boards will make up the A-frame of the Pikler Triangle.

Figure 2.1

Use one of your clamps to anchor one of the boards to a stable surface with plenty of room to work around it with a jigsaw (Figure 2.2)

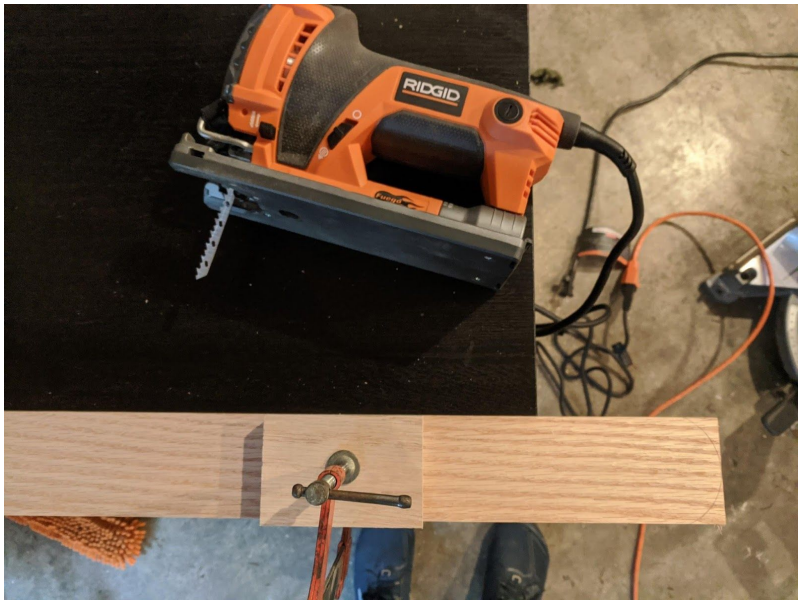

Figure 2.2

Using the jigsaw, cut along your guide line to round off each end of the board. You won't be able to do this perfectly, and that's okay. See Figure 2.3 for a view into an acceptable margin of error.

Figure 2.3

Leave the board clamped to the sturdy table and use your random orbital sander (or palm sander / belt sander) to smooth out all the imperfections and round off the 90-degree edges of the wood (so that your little one doesn't grab onto - or fall into - something pointy). Before and after shots are in Figures 2.4 and 2.5 below.

Figure 2.4

Figure 2.5

Step 3: Prepare the support beams

Precision will be very important in this step. First, ensure that your rounded, long, boards are virtually identical to one another. The same should be true for your rounded, short boards. If they are a fraction of an inch different, match them together, clamp them and sand the rounded

sections at the same time so as to match the slightly longer one to the shorter one (see figure 3.1).

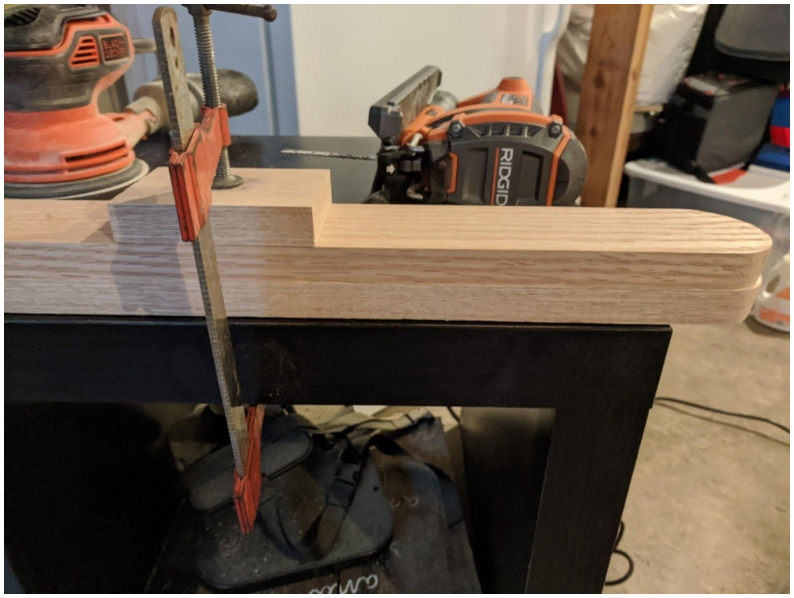

Figure 3.1

Start with the two longer boards. Using your measuring tape (or square), measure off tick marks every 5”, **beginning 1 ¼”** from the top. Also find the center of the board so as to create a cross-hairs to act as your drilling guide (see figure 3.2). Next, move on to the two shorter boards. Using your measuring tape (or square), measure off tick marks every 5”, **beginning 2 ¼”** from the top. Also find the center of the board so as to create a cross-hairs to act as your drilling guide (see figure 3.3).

Figure 3.2

Figure 3.3

Clamp the support boards to a sturdy table once again. At each cross-hair, use your forstner bit to drill a recess in which each dowel will sit. This provides support for the Pikler Triangle. These recesses should go roughly ½ of the way through the support boards. The exact depth is less important than consistency in the depth across each recess drilled. The best consistency could be achieved with a drill press. I don't have one, so I used a hand power drill (and it worked fine). If your dowels are 1" in diameter, it would be worth looking for a forstner bit that is **slightly** larger than 1". Why? If you use a 1" forstner bit and have 1" dowels, you'll have to clamp and re-clamp over and over again when we get to actually assembling the ladders (in order to force the dowel into the recess). It's totally possible (that's what I did), but I don't recommend it. See figure 3.4 for an image of the forstner bit and a drilled recess.

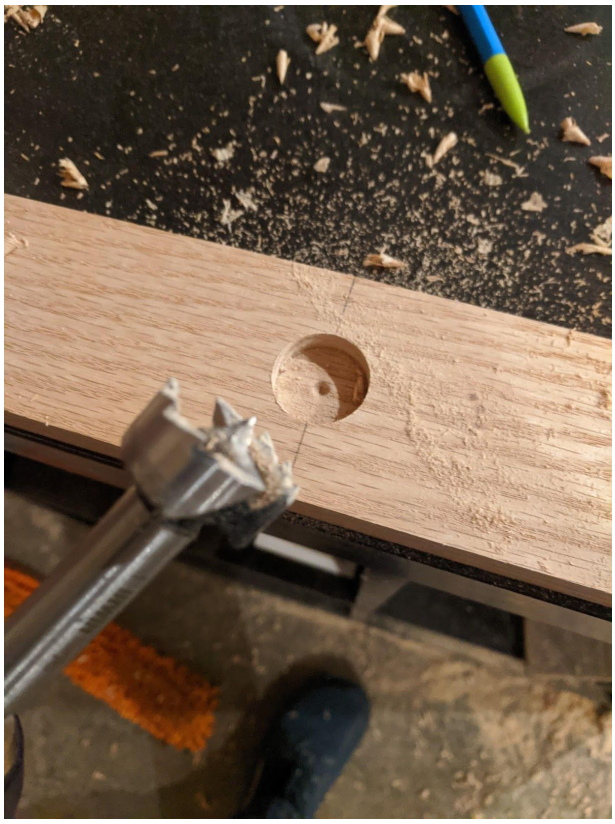

Figure 3.4

Repeat this process at each cross-hair (on one side of each board only) until your support beams look like those in figure 3.5.

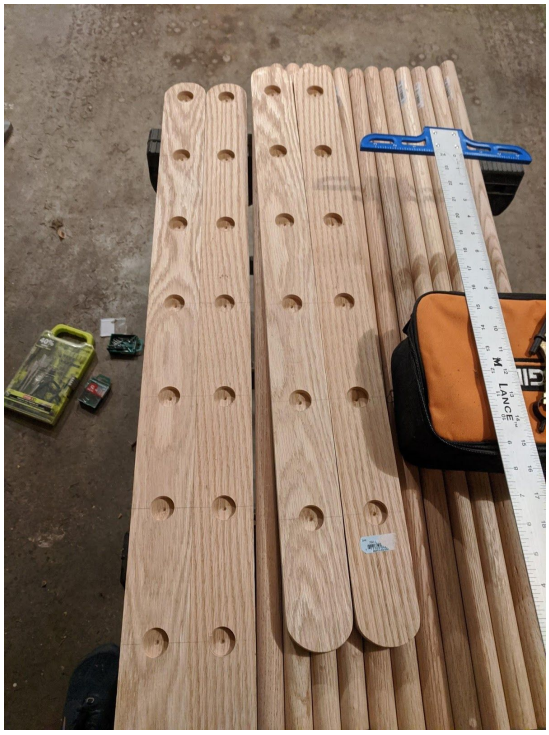

Figure 3.5

In order to facilitate an easier assembly later, we need to drill pilot holes on the opposite side of the support beams (so we know where to place our rung screws). This step is technically optional, but doing so will allow you to sand away all those pencil marks without worrying about losing your measurements. Flip the support boards over and re-measure all those cross-hairs you measured before. Then use a very small drill bit to drill a pilot hole in the center of where each rung will go. See figure 3.6.

Figure 3.6

Take your random orbital sander (or other sander) and buff down those boards! Get rid of the pencil marks, 90-degree edges, or any roughness that arose from all that drilling.

Now your support beams are done!

Step 4: Assemble the ladders

Before you assemble the ladder - sand the dowels if you want/need to. It will be much harder to sand them once the ladders are assembled. Use sand paper (not a power tool).

Using the two short support beams together (and the two long support beams together), insert a dowel into the recesses of each beam to make a ladder. If your recesses are exactly the same width as your dowels, you'll need to leverage clamps to force the dowels into the recesses. This clamping process is iterative across the ladder and is really annoying. I don't recommend it. If your recesses are slightly larger than your dowels, you should be able to assemble the ladder by hand and clamp it together - just to hold it in place while you drive screws into the beams.

You will use your 2" construction screws to secure the ladder together. Here's how: Once clamped, use a bit slightly smaller than your screws to drill a pilot hole through your small pilot hole (in the support beam) and into each dowel. Then use your countersink bit to make a small recess for the screw head (don't countersink too deep or you'll run into your other recess!). Then drive a screw into the pilot hole in order to hold the support beam and the dowel together. You will see your screw heads on the outside of each side of the ladder. All of the strength of the Pikler Triangle comes from the dowel sitting in the recess you cut out - so don't worry about torquing your screws too hard. If you over-torque them, you may split the support beam at the point the screw is located. See figures 4.1, 4.2, and 4.3 for a visual representation. All those wood blocks between the clamps and the ladder are just there to protect the ladder from getting the indent of a clamp pressed into it.

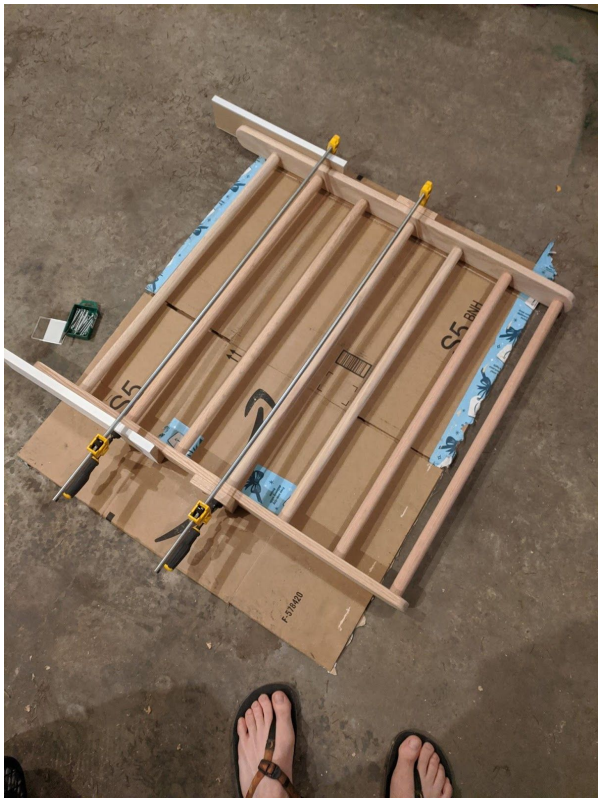

Figure 4.1

Figure 4.2

Figure 4.3

Step 5: Cut your triangles

Precision is once again important on this step. These two triangles need to be exactly the same. The cut angle itself doesn't have to be particularly precise, but each triangle needs to present the same angle.

On one of the short sides, measure to the center of your 9" x 10" board. Using your compound mitre saw, make two, 30-degree cuts from the top-center of the board. The result should be an isosceles triangle. Repeat this process for the other board. See figure 5.1 for an in-process view into this step. My mitre saw is too small to make this cut happen in one-shot, so I had to carefully flip the boards over and match the blade. This step could be done with a circular saw and a steady hand as well.

Figure 5.1

Using your compass, round off the less acute corners in a uniform way (two corners on each triangle). Using your jigsaw, cut off the sharp corner based on your rounded pencil mark. This rounding is purely aesthetic, so it does not need to be precise. See figure 5.2 for a before- and after-cut image.

Figure 5.2

Using your compass, draw a rounded corner to soften the most acute angle in each triangle. This rounding should be precise - meaning each triangle needs to be exactly the same. The rounded edge should follow roughly the same rounding angle as the rounding on your support beams. If you're close, it will look good. More important than getting close to the support beam rounding is getting the triangles to be the same. See figure 5.3 for a view into how this looked on the Pikler I recently built.

Figure 5.3

When you make these cuts with a jigsaw, they won't be perfect. You need to use your sander to buff all the edges and make the triangles match one another. Figure 5.4 shows a side-by-side of a sanded and rough-cut triangle.

Figure 5.4

Step 6: Assemble the Pikler Triangle

Putting the Pikler Triangle together is tricky, and it's much easier with two people. Start by laying one of your triangle pieces on its side and lining the edges of the short and long ladders up with the edges of the triangle (to emulate its unfolded, finished form - see Figures 6.1 and 6.2). More context around that emulation exercise: The short ladder will be anchored to the triangles using two bolts/screws (those thick ones in the hardware list) on each side - rendering the connection between the short ladder and the triangle rigid. The long ladder will be anchored to the triangle using one post screw on each side - giving it the ability to swing inward in order to collapse the Pikler Triangle for storage. Study Figures 6.3, 6.4 and 6.5 and note how the Pikler Triangle becomes stable when unfolded and the top of the long ladder rests on the top of the short ladder.

Once you have a single triangle and each ladder laid out on top of the triangle to emulate the final, unfolded form (6.1 and 6.2), use clamps (or another human) to hold this half of the Pikler

Triangle in place. Beginning with the short ladder, pre-drill pilot holes for your thick screws. I chose to drill these holes from the **inside** of the Pikler, so that the screws would be largely hidden from view. Such a choice is purely aesthetic. If you look very closely at Figure 6.5, you can spot them near the top (inside) of each ladder. There's nothing wrong with running these screws or bolts in from the outside of the triangle. To make the Pikler extra secure, you could choose to use a steel bolt with a locking nut on the inside instead of a screw. Once your holes are pre-drilled, go ahead and attach the short ladder to one of the triangles using your screws or bolts + nuts.

Once the short ladder is attached to one triangle, line the long side back up. The unfolded version of it should align with the edge of the triangle, and the top of the ladder should rest on the top of the short ladder. Pre-drill a hole through which you'll put your post screws. This hole will go all the way through both the triangle and the ladder. Be careful where you drill this hole. Too high up on the ladder, and the arm won't swing down to allow the Pikler to be folded. Too low and the ladder will fold, but in a somewhat clunky way. As you can see in Figure 6.3, I got lucky. Error on the low side, drill your pilot hole (using a bit the same width as the post screws), and thread the post screw into place.

Repeat the steps above for the other triangle. Now you've got a fully assembled Pikler Triangle! Congratulations. I hope that wasn't too frustrating.

Figure 6.1

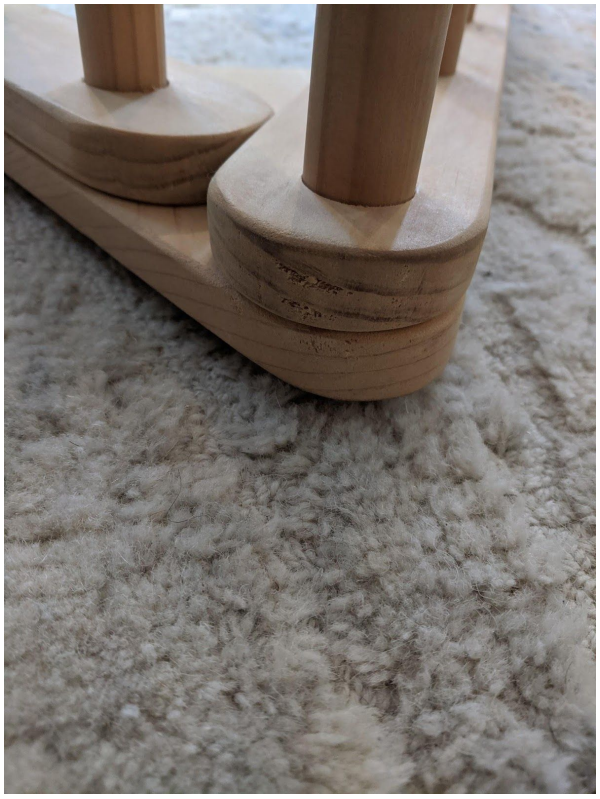

Figure 6.2

Figure 6.3

Figure 6.4

Figure 6.5

Step 7: Assemble the ramp (optional)

If you chose to purchase a stair board, you'll note that one of the long sides has been rounded by a router. Using a table saw (preferable) or circular saw (less preferable), rip off the rounded edge, leaving four square edges on the board. If you chose to simply purchase another wood board (i.e. not a stair), just cut it to the desired length.

The only real assembly work to be done on the ramp is to install the 'hooks' that hold it on the rungs of the Pikler. You should have 4 pieces of Poplar Squares cut to the width of your ramp board. For aesthetic reasons (and to soften sharp edges), I like to mitre the ends of the Poplar Squares by 45-degrees. See Figure 7.1. Place two of your Poplar Squares on one end of the ramp board. Using a piece of scrap wood on the top and bottom, gently clamp them into place. Again, see Figure 7.1. Don't worry about precision just yet - we'll get them perfect in a second.

Take a couple of scrap pieces of dowel and lay them inside the two Poplar Squares (see Figure 7.2), ensuring that the dowels fit snugly and the distance from the end of the board to the first Poplar Square is consistent across the width of the ramp board. Once you've set it up and it looks good, tighten your clamps to hold the Poplar Squares in place.

Using a small drill bit and a countersink bit, drill pilot holes into the top of each Poplar Square (2x per Square). Drive your 1 ¼" construction screws into the pilot holes and unclamp (see Figures 7.3 and 7.4).

"Why might I have two more Poplar Squares?" you may ask. You have the option to make the ramp two-sided. We used some scrap wood pieces to create hand-holds on one side of the ramp and preserved the other side as a slide (see Figure 7.5). I've seen others install holds from a climbing gym on one side. Make it up! Or just leave out those last two Poplar Squares and set up the slide to work as a slide only.

Figure 7.1

Figure 7.2

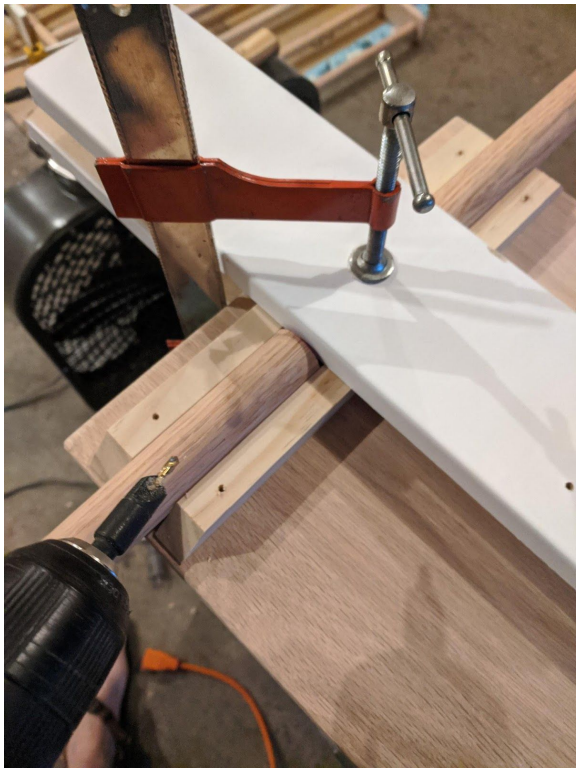

Figure 7.3

Figure 7.4

Figure 7.5

You’re done!