Material List for X-Stepstool

Loring Chien

Jan 4, 2025

Qty	***Description***	
1	2x4 x 6 ft (1-1/2" x 3-1/2" x 72" actual size)	legs
1	1x6 x 72" pine board (alternately 5/8" x 6" x 6' fence picket)	Top steps
4	#10 x 3" deck screw	ends
8	#6 x 1-1/2" deck screw	top
1	Nylon/Polyester rope 3/8" x 15" long	handle

Instructions for X-Step stool

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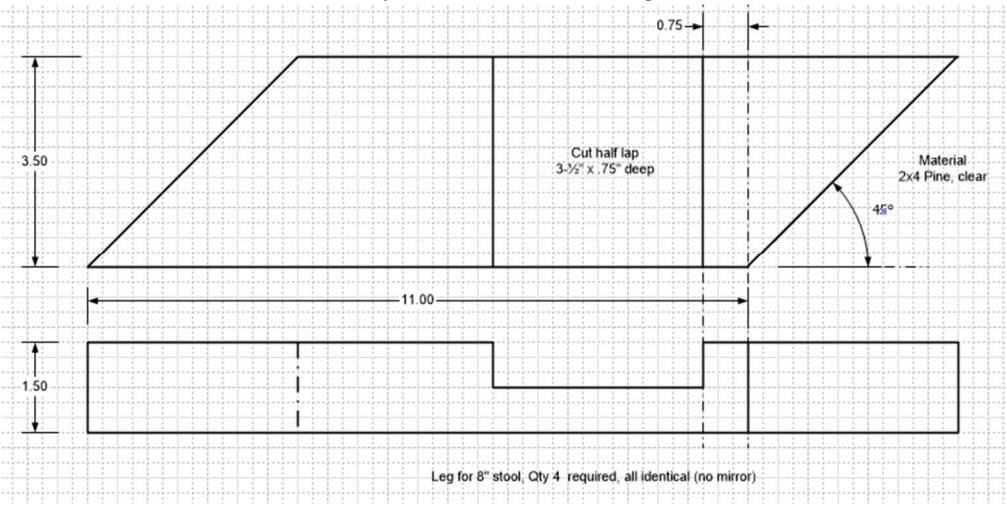
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General comments:

- This stool is relatively easy to make, I use a miter saw and a table saw and a drill press although probably a hand drill can be used.
- The advantages of this stool is that is got enough weight to help keep it steady. Also the base is a little wider than the top to help keep it stable and tipping if the user stands on the edge.
- It can be made taller fairly easily and the base gets wider as it gets taller ensuring stability.

General Instructions (8-inch height stool):

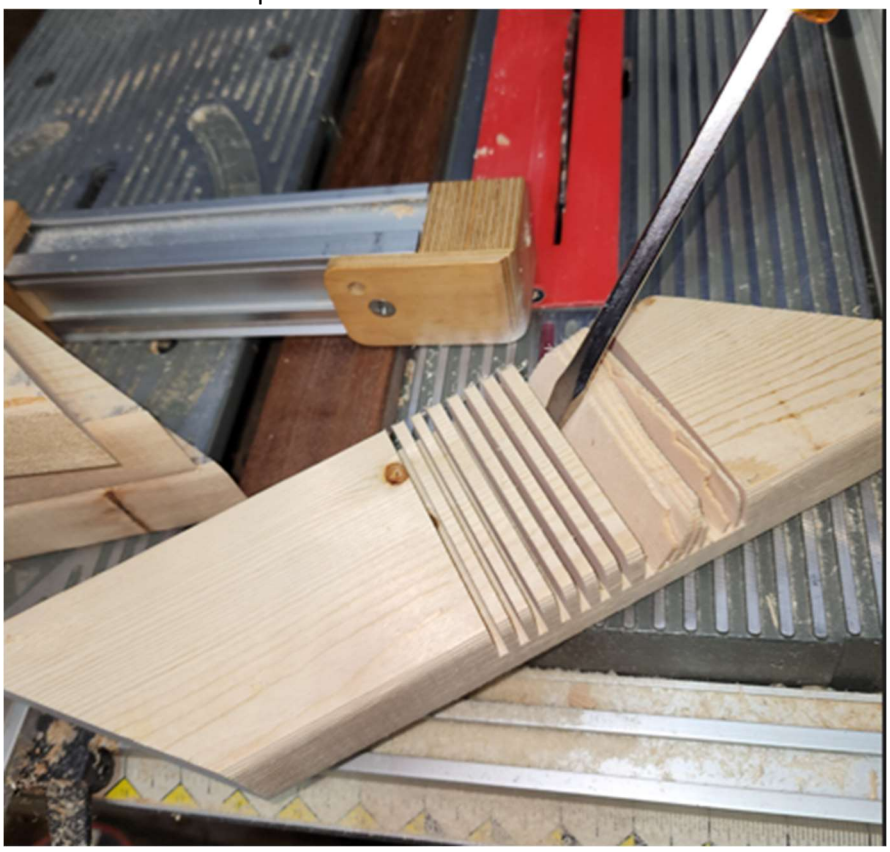
1. Cut the four legs from the 2x4. Its most efficient to cut a 45° miter, then cut four leg portions with the same miter cut, then square off the remaining stock for further use.



   a. Cut a half lap recess in each of the four legs as shown. All four are identical, no mirroring required for left or right sides. The half lap should be 3.5” wide by 0.75” deep (3-1/2” x ¾”) or the width of the leg by half the thickness if not standard 2x4 lumber.
   b. My method of cutting half laps is to use the table saw miter fence set square to the blade and raise the blade exactly 0.75 inches.
   c. Mark the end points of the half lap and cut to the ***inside*** of this line on both side of the half lap. You may wish to mark and make these two cuts on all four legs using appropriate stop blocks
   d. Then cut a series of parallel cuts about one blade widths away from each previous cut. Approximate:



e. Break off the thin strips at the base with a screwdriver or other tool:

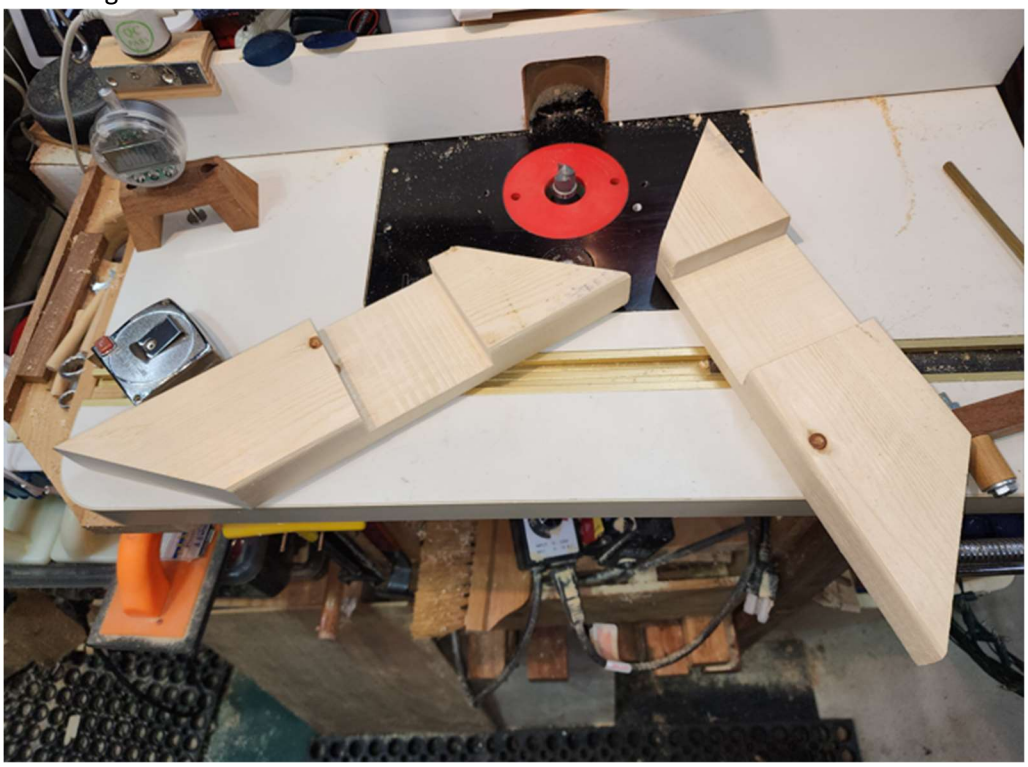


f. Looks like this:

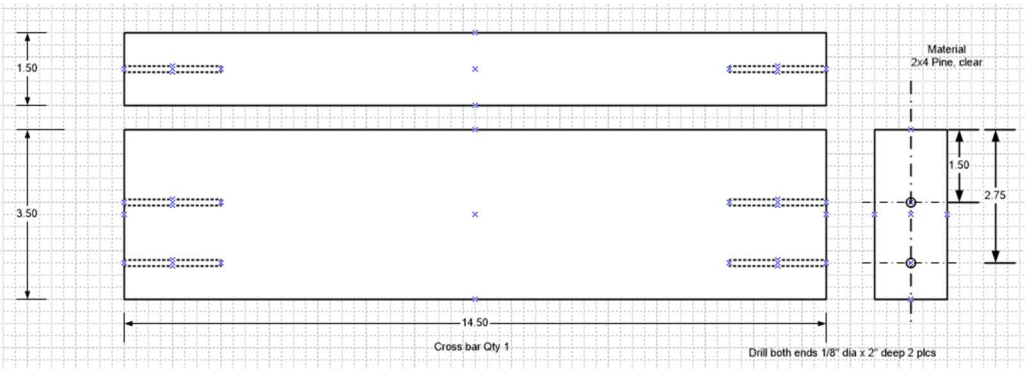


g. Use a rasp or rough file to smooth the rough parts flush to the bottom of the cuts. If you have a router table a short (1/2” top bearing) flush trim bit can be used to make the entire bottom nice and flush, but in reality no one see this. Before on left, Routed piece

on the right.

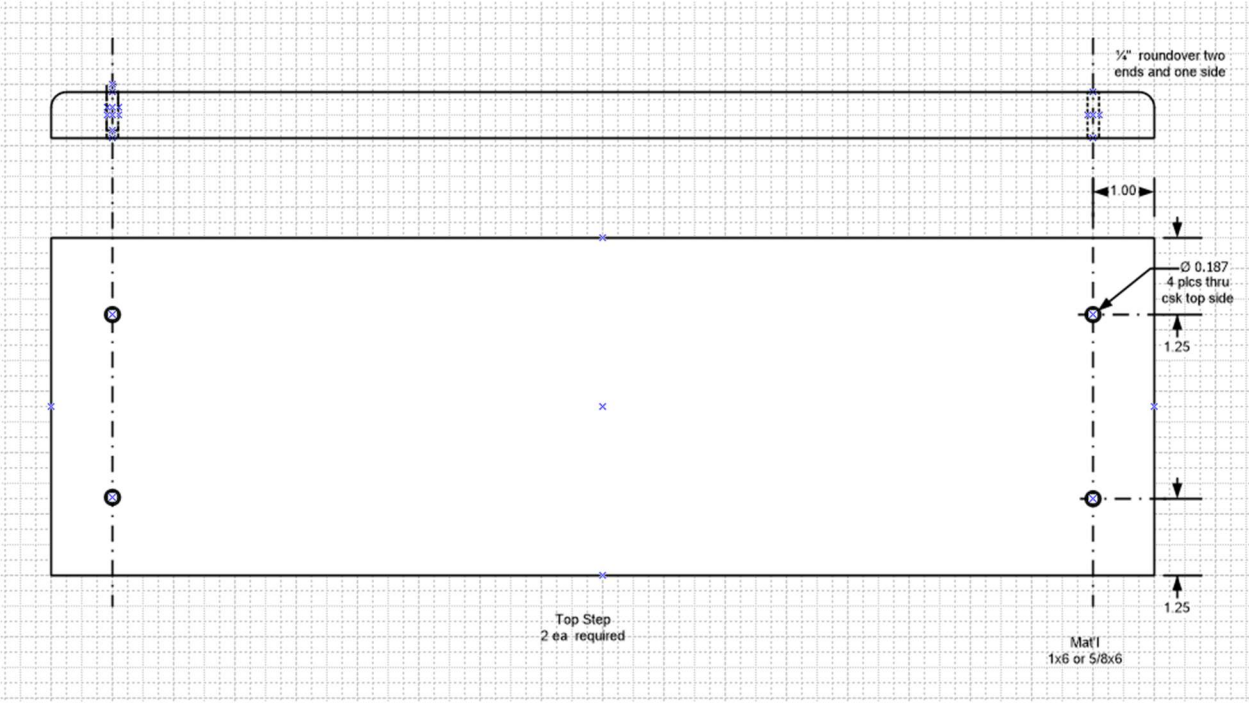


2. Cut the cross bar 14.5 inches long from the 2x4:



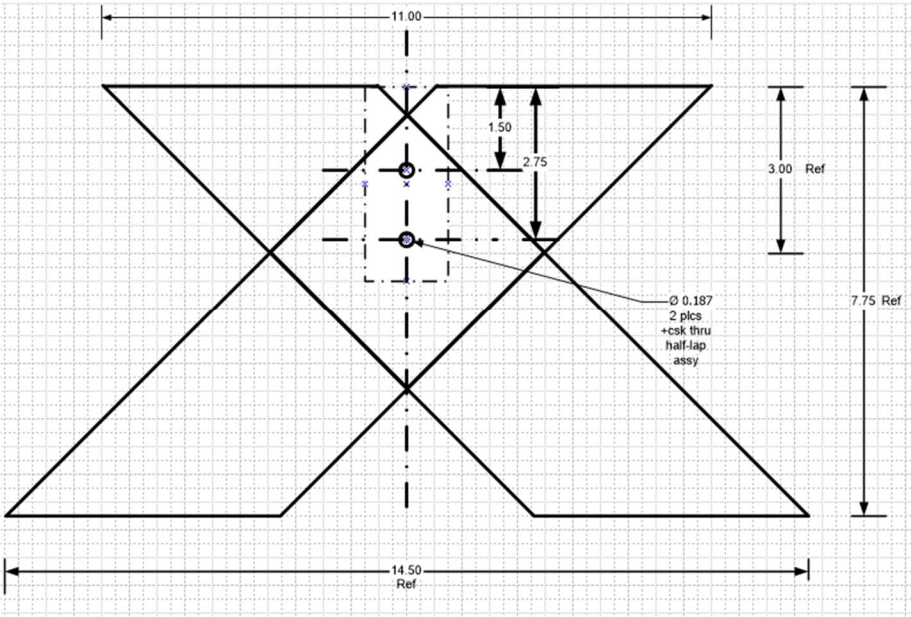
   a. Drill the six 1/8” diameter holes 2 inches deep in the ends of the cross bar.

3. Cut the 1x6 to make the two top steps. I used a 5/8” x 5.5 actual cedar plank I had around. The step stool actual height vary if you use 5/8” or ¾” stock.



   a. Drill four 3/16” Dia. holes in each as shown and countersink the top side.
   b. If you wish optionally do a roundover on one long side and two ends using a router table or handheld router and a ¼” radius roundover bit.

4. Assemble the two pairs of leg assemblies.

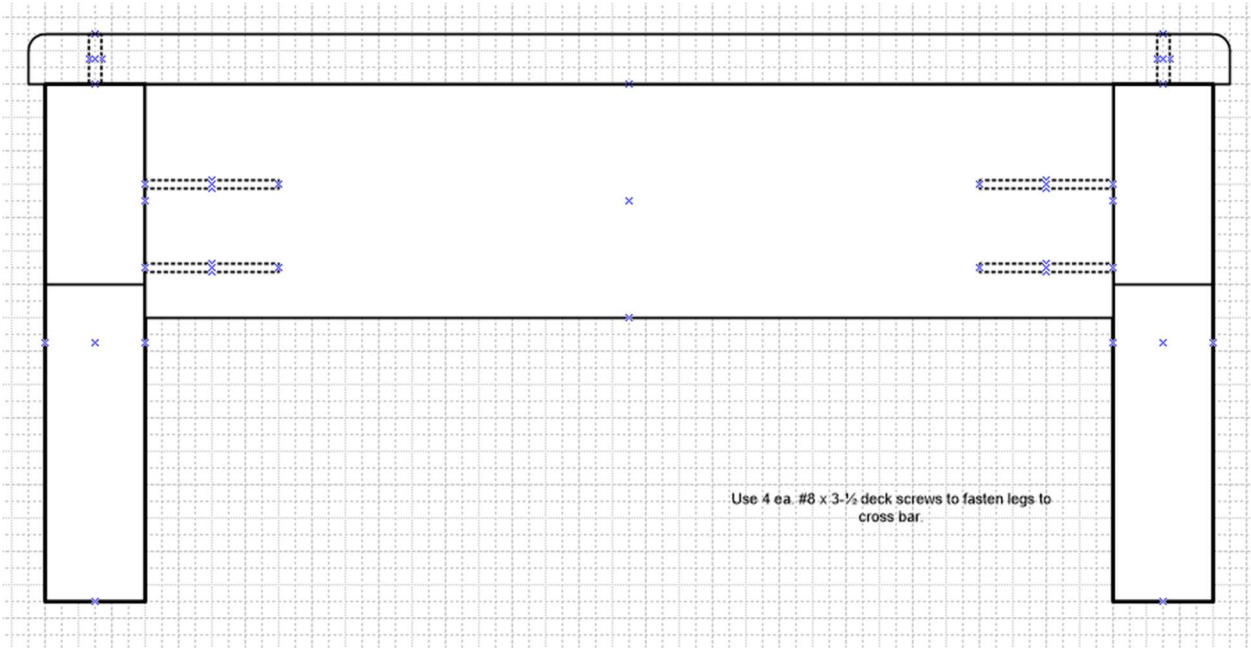


   a. Two legs should overlap each other if the half laps are correct. Mark the two hole locations on each assembly to drill through both legs.
   b. A drill press should be used which will make sure the holes enter and exit at the same location. If you only have a handheld drill, you should mark the inside of the legs where

they match the holes in the cross bar. The outside of the legs should be countersunk. The hole should be ¼" diameter to clear a number 10 screw.

c. I don't glue the leg assemblies together, although it won't hurt.

5. Once both ends legs assemblies are made, attach them to the crossbar using four #10 x 3" screws, two from each end.
6. You may now locate the top steps on top of the legs. The edge with no roundover goes to the center. A 1/2-inch gap is left between them. Locate the two steps with about ¼" overhang over the ends of the legs and the points of the "X".



a. Use a punch or one of the screws to mark the locations in the top of the legs. Then drill the 8 holes using a 3/16" drill bit about ¾" deep. A hand held drill suffices for this.

b. Fasten the two top steps to the legs with the screws.

7. An optional carrying handle makes this easy to carry, otherwise it's a bit awkward to handle with one hand.

a. Find the balance point of the stool using a small strip of wood:



b. Mark and drill two holes for a rope handle



8. Completed Stool



9. Additional options
    a. Wider stool – the crossbar length and top step can easily be lengthened. The design as show has a top width of 18” with a cross bar length of 14.5”. Basically you can make any length top and make the crossbar 3.5 inches shorter.
    b. Taller stool – the stool can be made taller with the benefit that the taller you make it the proportionally wider the stance will be to make it more stable against tipping. Here is a table of leg height (stool height less the thickness of the top step)

Alternate leg lengths

Leg Length	Leg Height	Base width
11	7.75	14.5
13	9.25	17.5
15	10.6	20.25

Basically the leg height is 1.414 times the leg length.

Author: Loring Chien, of Katy TX
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