

# WOODWORKING BASICS

## Build a Simple Step Stool

By WJ Staff

Practice making square cuts with a handsaw, boring mortises and joining parts to create this practical step stool.

SEE PAGE 5  
for a list of  
supplies and  
lumber



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To watch a video of the building of this stool or to download a PDF plan for it, please visit [woodworkersjournal.com](http://woodworkersjournal.com) and click on "More on the Web" under the Magazine tab.



These few tools will allow you to build this step stool (and many other projects). The basic procedures involved with using them here are building blocks that may lead you into ever more challenging woodworking.

Woodworking can seem a bit overwhelming if you have no knowledge of the craft and are simply looking at a final project, like this step stool. But similar to other crafts or hobbies such as sewing or cooking, there are varying levels of competence and complication required. Still, simple projects can be easy to build and satisfying.

This project is not only designed to be a sturdy and useful step stool, it's also an entry point for getting into woodworking. Whether it is used by a parent or grandparent to introduce children into the craft, or as a step-by-step

opportunity for an adult to teach themselves woodworking, it will effectively serve all three goals. We used the bare minimum of tools in our process. A handsaw and a drill/driver do most of the work. We further simplified it by selecting wood that is sold in specific dimensions through Rockler Woodworking and Hardware, so you only need to worry about the length of each piece rather than needing to machine it to thickness and width, too. The plywood top is the only exception.

Those with woodworking experience can make their own decisions as to which tools in their shop to use and how to do the joinery. But our step-by-step photos and captions will allow just about anyone to make it.

### Cutting the Legs and Aprons Square and to Length



Photo 1: Square the end of the leg stock. Draw a line around three edges and cut along those lines. Start as shown in the photo, then rock the saw back along the top line. Be careful to keep the saw on the marked lines.



Photo 2: Mark the squared-up leg stock to the length of the legs found in the Material List. It specifies the length of each piece. The width and thickness of this stool's parts are determined in the dimensioned stock.



Photo 3: Use the same technique shown in photo 1 to cut off the first leg. It is important to keep each cut square. Make the other three legs.



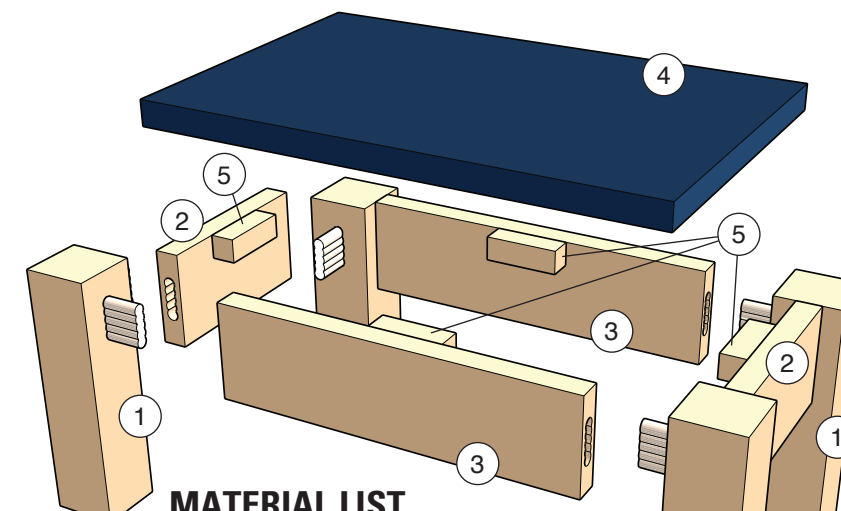
Photo 4: The Material List (below) also provides the length for the long and short aprons. Each piece must have square-cut ends to fit properly.

### The Basics

There are three basic woodworking joints (how you join or stick two pieces together securely) when you are making something from solid wood: edge-to-edge or butt joints, mortise-and-tenon joints and dovetails.

Edge-to-edge glue-ups – butt joints – are very strong. But if you try to glue the end of a board to the side of a board, like an apron to a leg in the same manner, you get a very weak joint.

Mortise-and-tenon joints (where a tenon – a piece of wood designed to fit into a mortise – and a mortise – a hole cut or chopped into the edge of a piece of wood, say a leg), on the other hand, are a



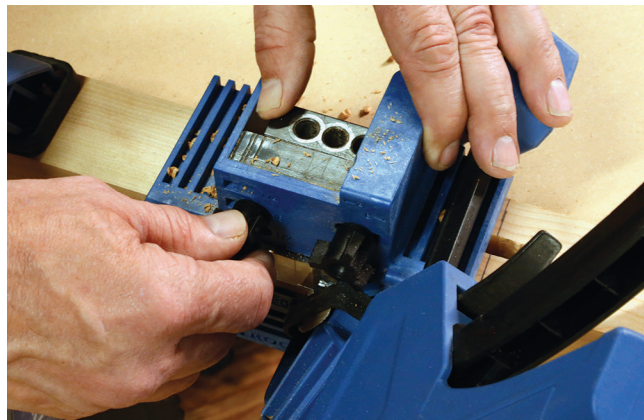
### MATERIAL LIST

	T x W x L
1 Legs (4)	2" x 2" x 8"
2 Short Aprons (2)	3/4" x 3" x 5 5/8"
3 Long Aprons (2)	3/4" x 3" x 11"
4 Top (1)	3/4" x 9 5/8" x 15"
5 Glue Blocks (4)	3/4" x 3/4" x 2 1/4"

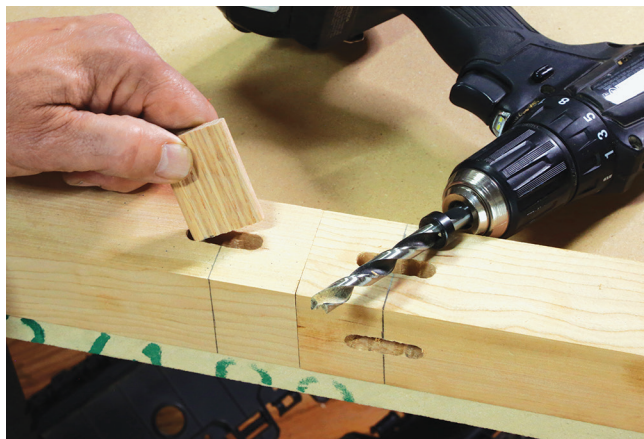
## Drilling the Beadlock Mortises into the Legs and Aprons



**Photo 5:** Mark a line 1½" down from the top of each leg on two adjacent faces. Prepare the Beadlock with two spacers and the 3/8" drill guide set in the "A" position. Bore three holes to their proper depth (see Sidebar).



**Photo 6:** Slide the drill guide to the "B" position and bore the two connecting holes. For this 2"-thick leg stock, the drill guide is positioned by adding spacers, so the mortise is centered on the leg's width.



**Photo 7:** Even the best systems can underperform at times. So check the fit of the Beadlock tenons in the mortises. Use the drill bit to remove any wood that is keeping the tenon from fitting. Make mortises in all four legs.



**Photo 8:** Remove the spacers from the Beadlock jig and remount the drill guide. It is sized correctly to center the mortises in 3/4"-thick stock such as these aprons. Align the jig to a line marked 1½" from the edge.

super-strong way to join end grain to edge grain. For this project, we will use a loose tenon system called Beadlock (see below).

To get started, follow the steps beginning with photo 1 on page 21. Cutting square ends onto the legs and aprons is one key to a successful

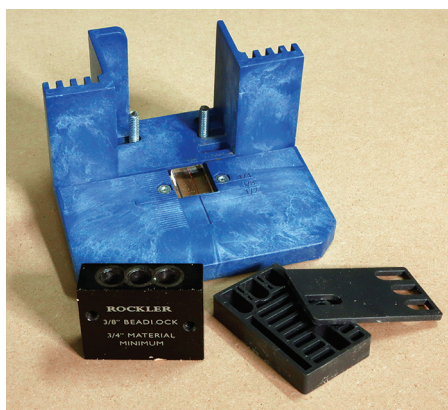
build. When the legs and aprons (pieces 1, 2 and 3) are cut to size, it's time to employ the Beadlock. Starting with the legs, you'll need to mount two spacers (1/2" and 1/8") into the jig in order to position the mortise in the center of the 2" x 2" legs. That means you will need to add a spacer kit to the basic jig.

The mortises are centered 1" in from the edge of the leg. They are also located 1½" down from the top of the leg (half of the 3" width of the apron stock). Clamp the Beadlock jig in place and follow the directions in photos 5 through 7. Notice in photo 7 that a second leg is placed in

This jig allows you to use a drill bit to form a uniquely shaped mortise (a hole that accepts a tenon). The depth of the borings are controlled by a stop collar on the drill bit (photo below). The drill guide slides side to side inside the jig to connect the drilled holes together by boring two more holes. A Beadlock loose tenon (a piece of wood that fits into a mortise) is shaped to fit the mortise made by the jig.



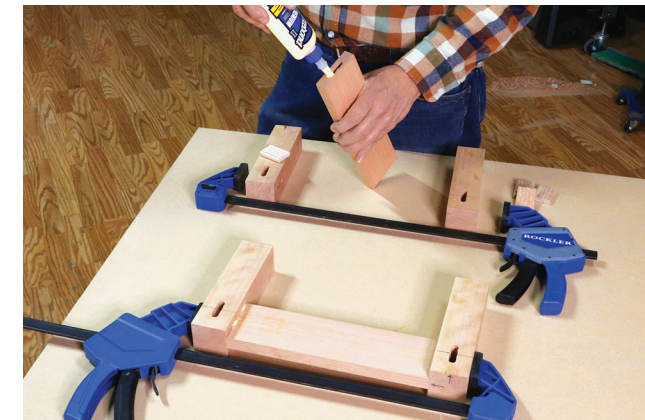
## Beadlock Jig: Simple Loose Tenon Joints



## Test-fitting the Parts and Gluing Up a Subassembly



**Photo 9:** Clamp all the parts together, but without glue, to make sure that all the pieces fit together well. Take the pieces apart. The Beadlock tenons may be difficult to remove; you may need a pliers to get them out.



**Photo 10:** Put glue on the tenons and into the mortises. Glue up two sub-assemblies of legs and the long aprons, as shown here. Allow the glue to cure and then glue and clamp the short tenons between the assemblies.

## Cutting out the Top, Making Glue Blocks and Attaching the Top



**Photo 11:** Place the leg/apron subassembly on a piece of plywood and mark its shape. Extend those lines to draw the rectangular shape of the top. This is the one piece that may differ a bit from the Material List.



**Photo 12:** Cut the top to shape, following the marked-out lines carefully. Then sand the edges of the top to remove any splinters and smooth the edges of the plywood. Fill any edge voids with wood putty.



**Photo 13:** Mark the piece of leftover stock, as shown in the photo above. Saw down each of the long lines. Cut across the piece to free the four glue blocks. The exact size of these pieces is not critical.



**Photo 14:** Place the leg and apron subassembly on the top as shown. Apply glue to two faces of the glue blocks. Install them where shown, rubbing each block back and forth until you feel the glue grab (or tack). Let it dry.

line with the leg being drilled. This keeps the jig level. Form mortises in all four legs. Now remove the spacers and bore mortises in the aprons. Follow the rest of the photo sequence

to complete the stool. We used Howard Butcher Block Conditioner on the cherry lumber and General Finishes Blue Moon Milk Paint on the plywood. See *More on the Web*

at [woodworkersjournal.com](http://woodworkersjournal.com) for a downloadable PDF version of this plan and a complete list of Rockler products for making the stool.

*Here is a list of the tools and lumber used to build the Simple Step Stool project.*

## **Simple Step Stool Supplies**

### **Tools and Supplies**

<b>Rockler One-Handed Bar Clamp 24" Long (2) #89232 .....</b>	<b>\$27.99 ea.</b>
<b>16 Feet Centerpoint Tape Measure (1) #90700 .....</b>	<b>\$21.99 ea.</b>
<b>Rockler Beadlock Joinery Jig with 3/8" Drill Guide Kit and Case (1) #54318 ...</b>	<b>\$99.99 ea.</b>
<b>Z-Saw Cross Cut H-250 Japanese Handsaw (1) #65276 .....</b>	<b>\$44.99 ea.</b>
<b>Titebond® II Premium Wood Glue, 8 oz. (1) #70151 .....</b>	<b>\$5.99 ea.</b>
<b>Spacer Kit for Rockler Beadlock Joinery Jig (1) #50917 .....</b>	<b>\$19.99 ea.</b>

### **Lumber**

<b>Cherry Turning Blank, 2" x 2" x 36" (1) #48706 .....</b>	<b>\$19.99 ea.</b>
<b>Cherry by the Piece 3/4" x 3" x 24" (2) #31806 .....</b>	<b>\$12.99 ea.</b>

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