



Leaning tower of shelves

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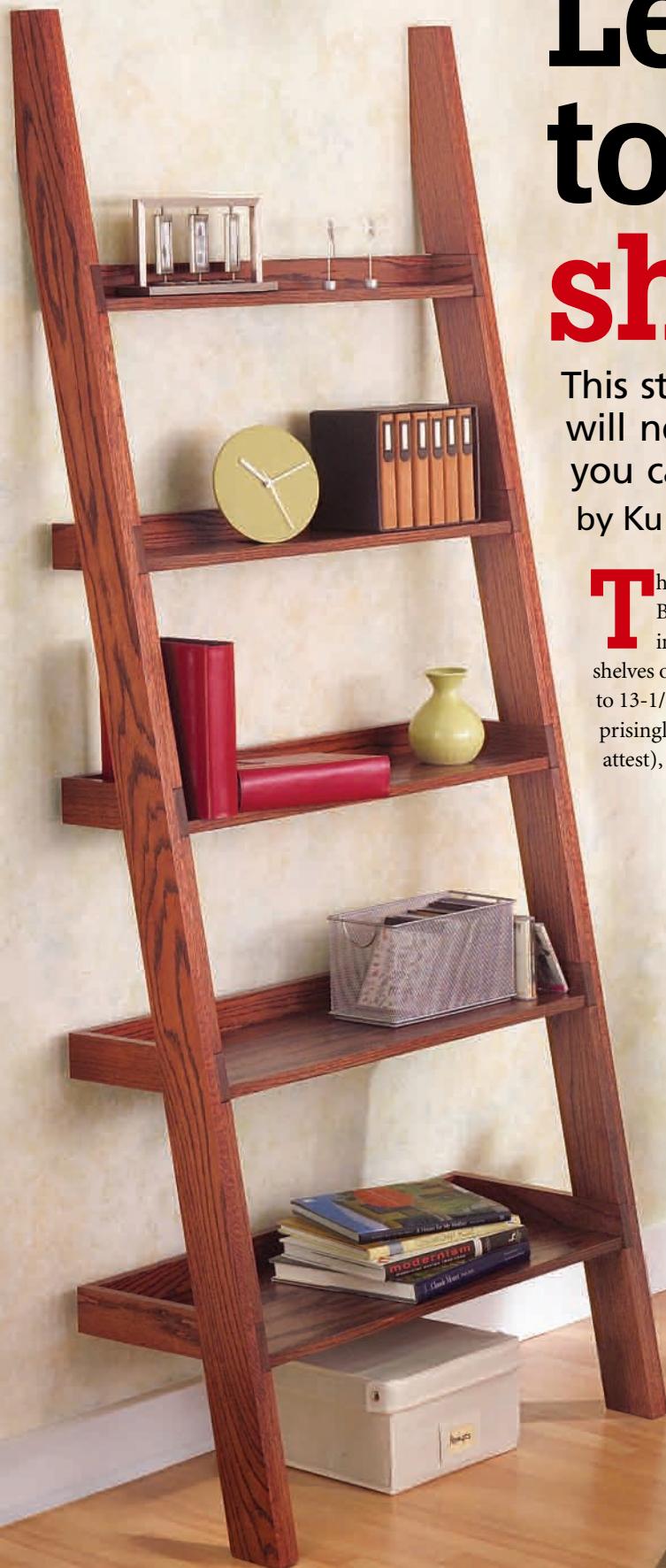
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Leaning tower of shelves

This stylish but sturdy shelf unit will neatly hold your stuff—and you can build it in a day

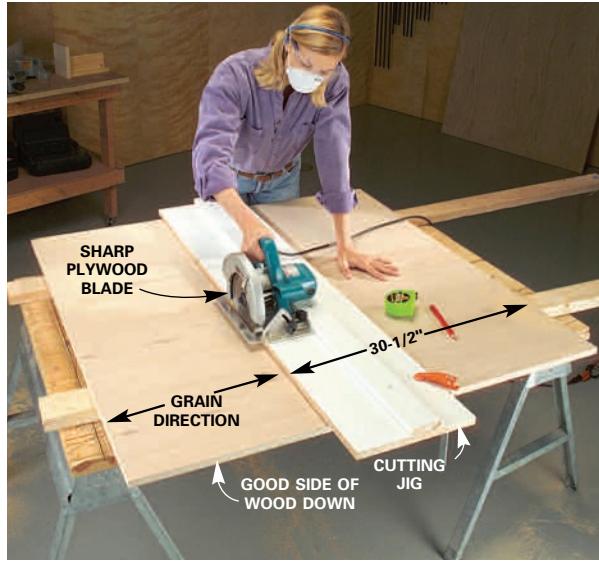
by Kurt Lawton

This shelf unit may look lightweight and easy to topple. But don't be fooled. It's a real workhorse. The 33-1/2 in. x 82-3/4 in. tower features five unique, tray-like shelves of different depths to hold a wide variety of items up to 13-1/4 in. tall. Despite its 10-degree lean, the unit is surprisingly sturdy (as our office woodworker pros will attest), and its open design won't overpower a room.

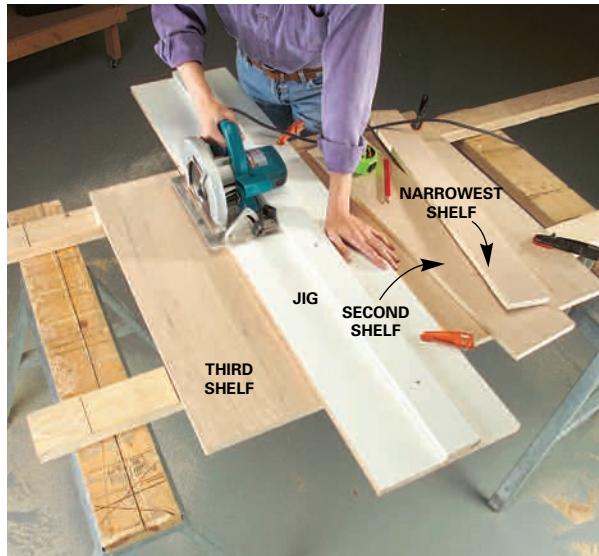


Modular Shelving

1 Cut 3/4-in. shelf plywood to width first, using a circular saw and a home-made jig (see p. 39) for exact cuts. Use a sharp plywood blade and cut with the best side of the wood facing down to minimize splintering.



2 Cut the individual shelves, beginning with the narrowest, using the jig for perfectly straight cuts.



3 Cut both shelf uprights to length with a miter saw. Clamp to sawhorses. Mark the 10-degree angle at the top (dimensions in Figure B), then cut with a circular saw.



Whether you choose to make this piece more functional, as in this office setting, or place it in a family room to showcase treasures, the basic construction is the same. You select the type of wood and stain or paint to dress it up or down to fit the look of any room.

All the materials can be purchased in home centers or lumberyards. The only special tools you'll need are a power miter box for crisp angle cuts and an air-powered brad nailer for quick assembly and almost invisible joints. And you'll have to rustle up an old clothes iron for applying oak edge-banding material. Once you've gathered all the material, you can build the shelf unit in one afternoon.

Buying the wood

We built our unit with red oak and oak veneer plywood and finished it with two coats of red oak stain. The beauty of this project is that any wood species will work. If you plan to paint it, select alder or aspen for the solid parts and birch for the plywood.

One note when buying boards: Use a tape measure to check the "standard" dimensions of 1x3s and 1x4s. They sometimes vary in width and thickness. Also check the two full-length 1x4s you plan to use as the uprights to be sure they're straight, without warps or twists. And always examine the ends, edges and surface for blemishes or rough areas that won't easily sand out.

Cut plywood shelves first

Lay a couple of 2x4s across sawhorses (**Photo 1**) to cut the half sheet of 3/4-in. plywood cleanly and without pinching the saw blade. Since all five shelves are 30-1/2 in. wide, cut this width first, making sure the grain will run the long way across the shelves. Remember to wear safety glasses, earplugs and a dust mask. Make a homemade jig to fit your circular saw

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Modular Shelving

Figure A Modular Shelf Assembly

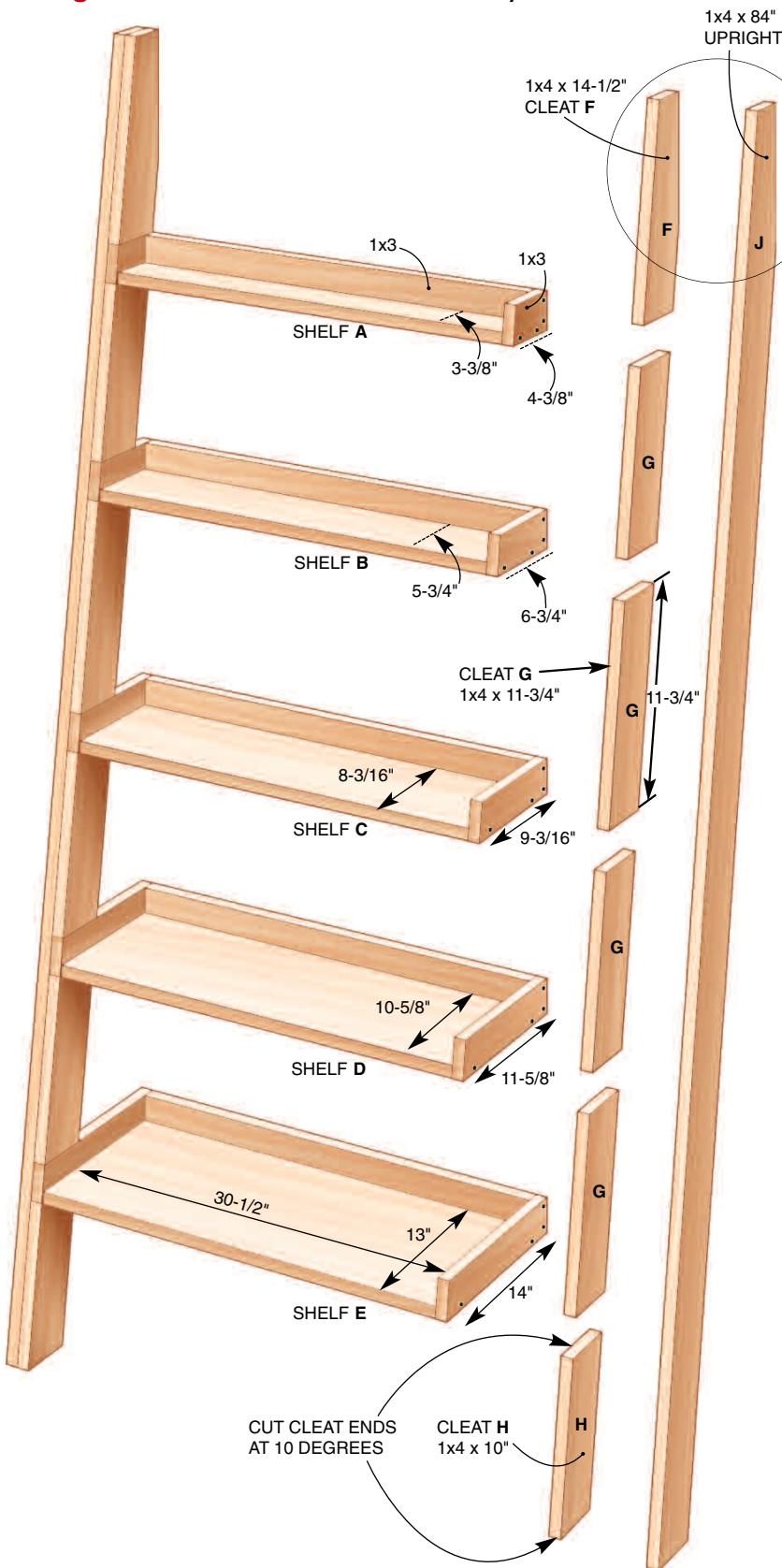
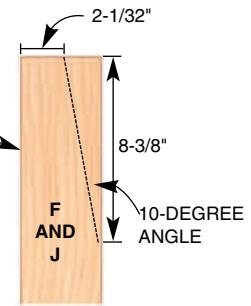


Figure B
Top of Upright



Cutting List

PCS.	SIZE & DESCRIPTION
1	3/4" x 3-3/8" x 30-1/2" oak plywood (shelf A base)
1	3/4" x 5-3/4" x 30-1/2" oak plywood (shelf B base)
1	3/4" x 8-3/16" x 30-1/2" oak plywood (shelf C base)
1	3/4" x 10-5/8" x 30-1/2" oak plywood (shelf D base)
1	3/4" x 13" x 30-1/2" oak plywood E (shelf base)
2	3/4" x 2-1/2" x 4-3/8" oak (shelf A sides)*
2	3/4" x 2-1/2" x 6-3/4" oak (shelf B sides)*
2	3/4" x 2-1/2" x 9-3/16" oak (shelf C sides)*
2	3/4" x 2-1/2" x 11-5/8" oak (shelf D sides)*
2	3/4" x 2-1/2" x 14" oak (shelf E sides)*
5	3/4" x 2-1/2" x 30-1/2" oak A - E (shelf backs)
2	3/4" x 3-1/2" x 14-1/2" oak shelf cleats F (cut with 10-degree angles)
8	3/4" x 3-1/2" x 11-3/4" oak shelf cleats G (cut with 10-degree angles)
2	3/4" x 3-1/2" x 10" oak shelf cleats H (cut with 10-degree angles)
2	3/4" x 3-1/2" x 84" oak uprights J (cut with 10-degree angles)

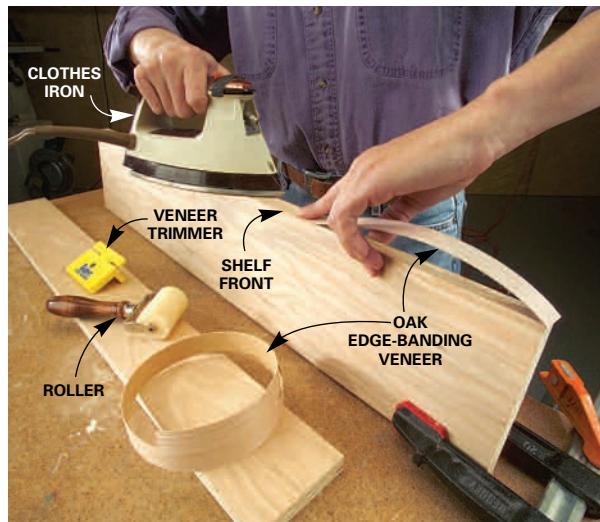
*Front part of side cut at 10 degrees

Shopping List

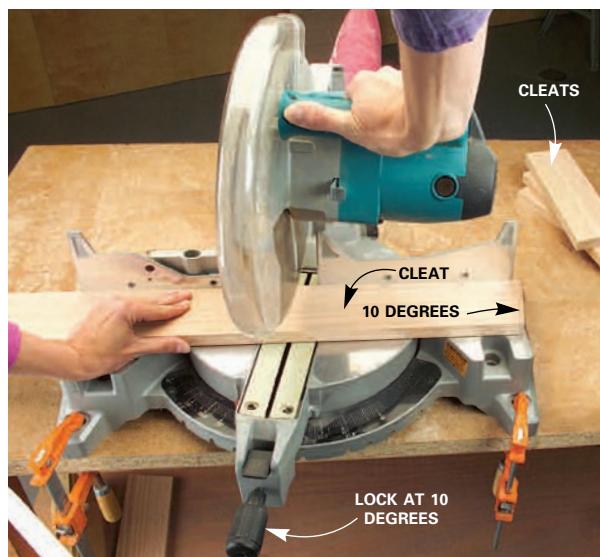
- One half sheet (4' x 4') of 3/4" oak plywood
- Three 8' oak 1x3s
- Four 8' oak 1x4s
- One package (25') of 7/8" oak iron-on veneer (Band-It brand, The Cloverdale Co., www.band-itproducts.com, 800-782-9731, purchased at Home Depot)
- Veneer edge trimmer (Band-It brand; see above and click "Retail," "Related Products")
- Wood glue
- 1-1/4" brad nails
- Foam pads (1 pkg. of Ace brand 3/4" round, self-adhesive non-skid pads from Ace Hardware)

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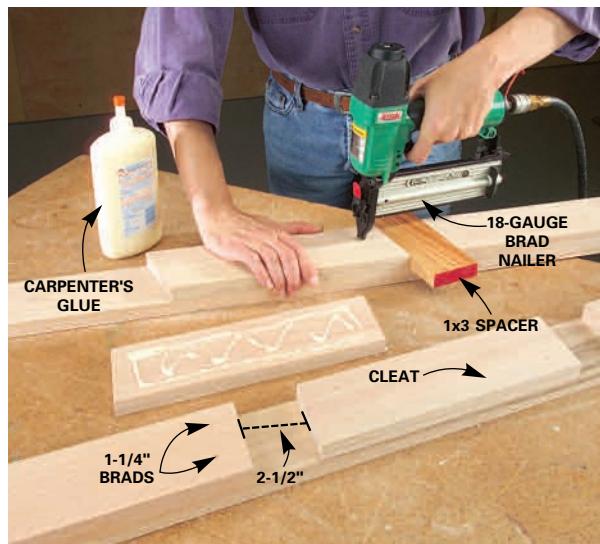
4 Iron edge-banding veneer to the front edge of all five shelves. Roll the entire surface to ensure a solid bond, and trim the edges.



5 To maintain accuracy, lock the miter box at 10 degrees, then cut all angled pieces—uprights, cleats and one end of shelf sides—without changing the table.



6 Glue and nail the shelf cleats to the uprights using a 1x3 spacer. Hold each cleat tight to the spacer.



and clamp it to the plywood. (See p. 39 to learn how to construct a jig.)

Next, cut all five shelf depths, starting with the smallest shelf (3-3/8 in.) first. Cut smallest to largest so you'll have enough wood to clamp the jig.

Important: Make sure you account for the width of your saw blade when you cut each shelf.

Now mark and cut the top of all four 1x4 uprights (the end that rests against the wall), according to **Photo 3** and the two dimensions provided in **Figure B**. Use a sharp blade in your circular saw to prevent splintering. Then stow the sawhorses and move to the workbench.

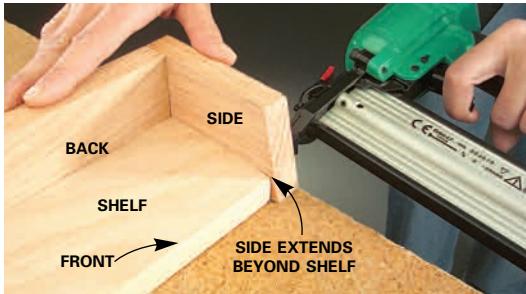
Select the best front of each plywood shelf, clamp it to the bench on edge and sand it smooth with 150-grit paper on a sanding block. Then preheat a clothes iron to the “cotton” setting and run it over the top of the edge-banding veneer, making sure the veneer extends beyond all edges (**Photo 4**). Roll it smooth immediately after heating. Let each shelf edge cool for a couple of minutes before trimming and sanding the edges. (See pp. 39 and 40 for further veneer application details.)

Cut the uprights and shelf frame next

Now enter the miter saw, which you use to make all the 90-degree straight cuts first (five shelf backs and 10 shelf sides; see Cutting List). **Important:** Remember that one end of each shelf side has a 10-degree cut, so we recommend first cutting them square at their exact length, then cutting the angle carefully so the long edge of each piece remains the same.

Next, rotate the miter saw table to the 10-degree mark and cut all the angle pieces. First cut the bottom of both uprights so each upright rests flat against the floor and wall (see **Figure A**). Then trim the top of the upright to match the bottom, being

Modular Shelving



7 Glue and nail the shelf backs, then attach the sides to the plywood shelves. Position the sides to overlap the shelf base as shown.



8 Clamp the shelves into one upright. Spread glue in the shelf notches of the other upright, position it flush with the front of the shelves and nail. Flip the unit over and attach the other upright.

careful to maintain the 84-in. total length. Next, cut the cleats based on the Cutting List dimensions, which are measured edge to edge (**Photo 5** and **Figure A**). Leave the top cleats long and cut them to exact fit during assembly. Then, to speed finishing, use an orbital sander with 150-grit sand-paper to smooth all pieces before assembly.

Assemble uprights first, then the shelves

To begin assembly, lay out both uprights and all cleats to ensure that the angles are correct so the shelves will be level when the unit is against the wall. Then glue and nail the first cleat flush with the base of each

upright (using five or six 1-1/4 in. brads) on each cleat. Work your way upward using 1x3 spacers (**Photo 6**). Make sure the spacer is the exact same width as the shelf sides! Set these aside to dry.

For shelf assembly, first glue and nail on the shelf backs. Next, apply the sides with glue and nails (**Photo 7**).

For final assembly, lay one upright on 2x4s, then clamp on the shelves as shown in **Photo 8**. Apply the glue, position the second upright on top flush with the front edge of the shelves, then sink four 1-1/4 in. brads into each shelf from the upright side. Carefully turn the unit over and repeat the process to attach



9 Set the shelf unit against a straight wall, check for squareness and apply three bar clamps until the glue dries.

the second upright. Work quickly so the glue doesn't set. Lift the ladder shelf and place it upright against a straight wall. Check it with a framing square and flex it if necessary to square it up and to make sure that the uprights rest flat against the floor and wall (assuming your floor is level). Attach three bar clamps as shown in **Photo 9** while the glue dries.



The shelf is highly stable as designed, but once you've stained or painted it, you can add self-adhesive foam gripping pads to the bottom of the uprights. And if you don't feel secure having it on a slippery floor, the unit's width is perfect for screwing the top of the uprights into wall studs.

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