THE FAMILY Handyman

GET ORGANIZED!

THE FAMILY Handyman

GET ORGANIZED!

Edition 8

- Under-cabinet drawers
- 3 Bath vanity upgrades
- Triple your closet space
- 20 Storage solutions
- Stackable shelves
- Space-saving tool storage
- Bonus section:
  Hang anything on any wall

The Family Handyman is a registered trademark of The Reader's Digest Association, Inc.
Copyright 2012 Home Service Publications, Inc.

Under-cabinet drawers

Get more kitchen storage in one weekend

Installing drawers under cabinets sounds like a tough job, requiring fussy planning, the skills of a cabinetmaker and child-size hands to work in that cramped space. But this project is amazingly easy. To simplify the whole process, we designed self-contained drawer units that you can assemble in your shop and then slip into place. To simplify

Don't let all this space go to waste

To gain storage space, you usually have to give up space somewhere else. Not in this case. Hidden under almost every kitchen cabinet, there's a cavity containing nothing but air. This low, shallow cavity isn't prime storage space for everyday items, but it's perfect for bakeware, cleaning supplies, pet dishes and more.

Art Direction MARCIA ROEPKE • Photography TOM FENENGA • Illustration FRANK ROHRBACH III

1 Break out the toe-kick backing to open up the spaces under the cabinets. Just drill a hole near the center, cut the backing in half and pull it out.

2 Build super-simple drawer boxes. Just glue and nail the sides, front and back together, then glue and nail on the plywood bottom.

planning, we'll show you three basic measurements that let you size these drawers to fit under any cabinet. Even if you've never built or installed a drawer before, you can do it. This project is economical, too. Our total materials cost for these three drawers was about $100. A cabinetmaker would have charged at least $350 to build and install them. The number of drawers is up to you; install them under all your cabinets or just one.

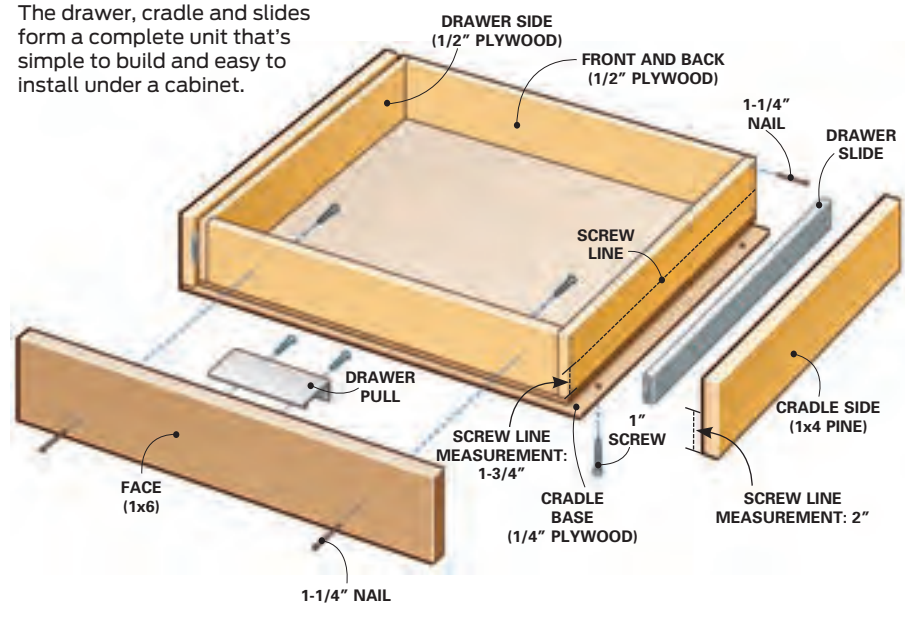
Will it work with my cabinets?

The vast majority of kitchen cabinets are similar to the ones we show here, with sides that extend to the floor (see **Photo 1**). But there are a few rare exceptions. Some cabinets, for example, stand on legs rather than the cabinet sides. Open the cabinet doors and take a look at the bottom of the cabinet box. If you see screw heads or holes near the corners, your cabinets probably stand on legs rather than the cabinet sides (the screws or holes allow for height adjustment). In that case, installing drawers will require different steps than we show here.

If your cabinets are constructed like ours, you can install drawers just as we did. There are just a few things to keep in mind:

Figure A
Drawer unit

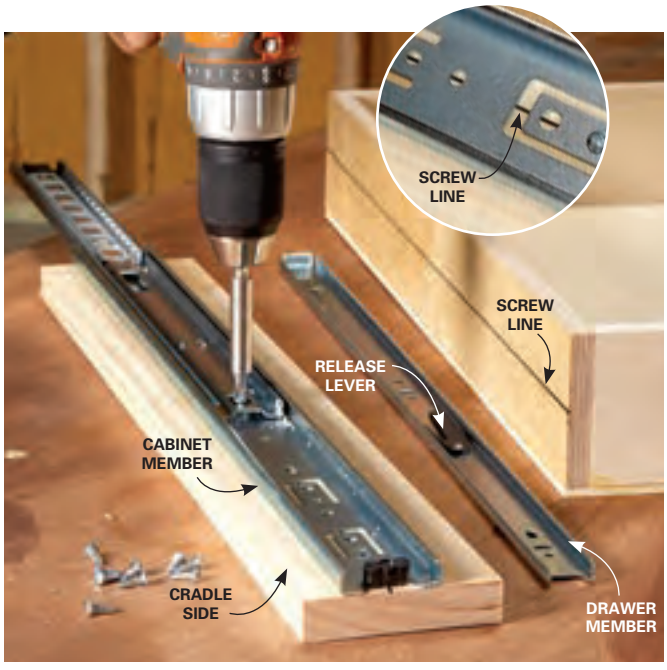
The drawer, cradle and slides form a complete unit that's simple to build and easy to install under a cabinet.



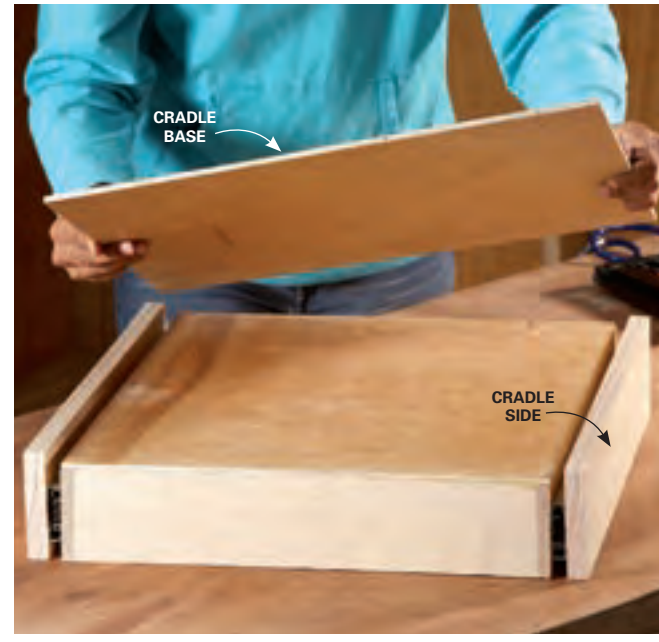
- If the cabinet is more than 30 in. wide, consider installing two drawers rather than one. Wider drawers tend to bind as you slide them in or out.
- Your drawers will be shallow; don't expect to store kettles in them. A 4-in.-high toe space will give you storage space that's about 3 in. deep.
- You can install drawers under a sink cabinet (or a bathroom vanity). But if the sink's plumbing runs through the bottom of the cabinet, the drawers will have to be shorter.

Tools and materials

You could build the drawers with nothing but hand tools and a circular saw, but a table saw and miter saw will give you faster, better results. A nail gun is another big time-saver, though you can hammer everything together with 1-1/4-in. finish nails instead.



3 Mount the slides, centering the screw holes on the screw lines. Press the release lever to separate the drawer member from the cabinet member.



4 Add the cradle base to create a self-contained drawer unit. Fasten the base with screws only; glue could drip down and gum up the slides.

All the materials are available at most home centers. In the hardware aisle, choose "full-extension" side-mount drawer slides (see **Photo 3**). That way, only 3 to 5 in. of the opened drawer will be covered by the overhanging cabinet front. With cheaper "3/4-extension" slides, only about half the drawer will be accessible. If you can't find full-extension slides, or if you want "overtravel" slides that extend even farther, shop the Web. Search for "drawer slides" to find online suppliers. Slides are available in 2-in.-length increments. Most cabinets accept 18- or 20-in. slides.

Choose hardwood plywood like birch or oak for your drawers. Construction-grade tends to warp. Most home centers carry plywood in 2 x 4-ft. and/or 4 x 4-ft. sheets, so you don't have to buy a full 4 x 8 sheet. Pick out straight pine 1x4s for the cradle sides. For the drawer faces, you'll need hardwood that matches your cabinets. If your toe-space height is 4 in. or less, a 1x4 board will do. For a taller toe space, you'll need a 1x6. Most home centers carry only a few types of wood such as oak, cherry, and birch or maple. If your cabinets are made from a less common species, look for a lumberyard that carries a wider selection. Or improvise—with the right stain, you can make birch or maple approximately match the color of just about any wood. The grain may look different, but that difference usually isn't noticeable in the dark toe space. We used maple faces, even though our cabinets are made from cherry.

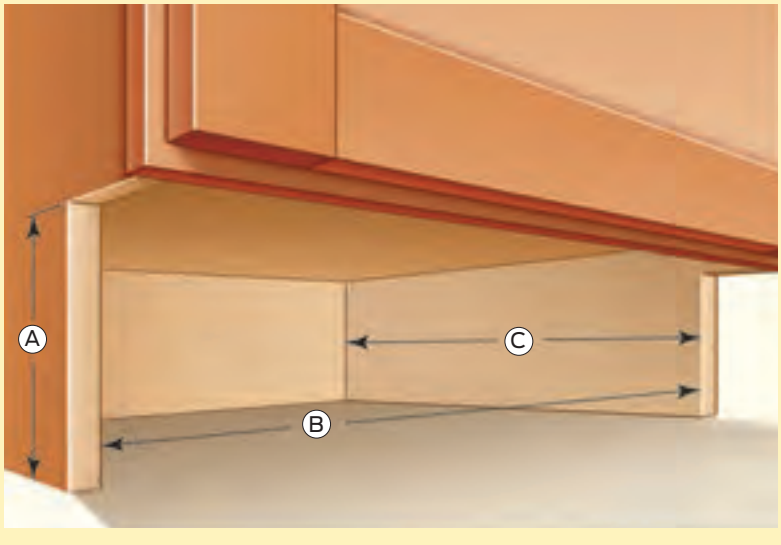


Figure B
Drawer sizing simplified

MEASUREMENT "A"
- Subtract 1-1/2 in. from "A" to determine the width of drawer sides, front and back.
- Subtract 1/2 in. from "A" to determine the width of drawer faces. The length of each face depends on the width of the cabinet.

MEASUREMENT "B"
- Subtract 3-3/4 in. from "B" to determine the length of the drawer front and back. This will make the entire drawer/cradle assembly 1/4 in. smaller than the width of the cavity.

MEASUREMENT "C"
- Subtract 1/4 in. from "C" to determine the length of the cradle and drawer sides.
- This is also the *maximum* length of the drawer slides you can use.

5 Slip the cradle under the cabinet and drive screws through the cradle sides just below the slides. Small hands and a small drill make this part easier.

6 Rest the drawer faces on 1/4-in. spacers. Tack the face in place with two nails, then open the drawer and drive screws into the face from the inside of the drawer box.

Remove the toe-kick and measure

Before you buy materials, open up the cavity under the cabinets so you can take measurements. First, pull off the "toe-kick," the strip of plywood or particleboard in the toe space. Usually, the toe-kick is held by just a few small nails and is easy to pry off. If you don't plan to cover the entire toe space with drawers, be gentle so you can later cut the toe-kick to length and reinstall a section. If layers of flooring have been added since the cabinets were installed, you'll have to pull the top edge of the toe-kick outward first and then pry it up to clear the built-up floor.

Next, remove the toe-kick backing under the cabinets (**Photo 1**). Simply drill a 1-in. hole and cut the backing with a drywall saw. Then grab a flashlight and check for obstructions. Break out any blocking with a chisel or pry bar. Pull out or cut off any nails. Now you're ready to take the three measurements to determine the sizes of the drawers. There's no need for complex calculations—it's all reduced to simple subtraction in **Figure B**.

Build drawers and cradles

If you've ever installed drawer slides similar to the ones we used, you already know how fussy they are. They require a precise 1/2-in. space on both sides of the drawer—build a drawer that's a hair too wide or narrow and you've got a drawer that won't budge. To sidestep that precision work, build each drawer first and then build a "cradle" around it. If you want to install two drawers under one wide cabinet, build a single cradle with both drawers sharing one of the cradle sides and the cradle base.

Our drawers are as easy as they get: Just nail them together (**Photo 2**). If you're using finish nails rather than a nail gun, predrill so you don't split the plywood parts. Remember to place the front and back *between* the sides. Then measure and cut the drawer bottoms. As you install each bottom, be sure the drawer box is square using a large carpenter's square or by using the plywood bottom as a guide (this only works if you've cut the bottoms perfectly square). Cut the 1x4 cradle sides to the same length as the drawer sides. In most cases, you can use 1x4s at full width (3-1/2 in.). But if your toe-space height (measurement "A" in **Figure B**) is less than 4 in., cut the cradle sides to a width 1/2 in. less than the toe-space height.

Next, mark screw lines on the drawer and cradle sides (see **Figure A** for measurements). Pull each slide apart to separate the drawer member from the cabinet member. Then screw them on (**Photo 3**). Our drawer and cradle sides were the same length as the drawer slides—yours may not be. So be sure to position the *front* ends of each drawer member and cabinet member flush with the *fronts* of the drawer and cradle sides. Slip the slides back together, lay the drawer upside down and screw on the cradle base (**Photo 4**). Then flip the whole unit over and inspect your work. Make sure the drawer opens smoothly. When the drawer is closed, the front of it should be flush with the cradle sides, give or take 1/16 in. Any problems are easy to fix by removing screws and repositioning the slides. **Note:** With our drawer units assembled, the cradle sides are exactly the same height as the drawers. Your drawers may come out a bit higher or lower.

Materials List

Here's what we used to build drawers to fit under three 24-in.-wide cabinets. Your quantities may differ.

One 4' x 8' sheet of 1/4" birch plywood

One 2' x 4' sheet of 1/2" birch plywood

12' of 1x4 pine

6' of 1x6 maple

3 pairs of drawer slides

Drawer pulls, wood glue, stain, polyurethane, 1-1/4" brads or nails, 1" and 1-5/8" screws.

Install the drawers

Before you remove the drawers from their cradles, number them to avoid mix-ups later. Each drawer will slide smoothest in the cradle that was built for it. Slip each cradle into place and fasten it to the cabinet with four 1-5/8-in. screws. If you have flooring that's more than 1/4 in. thick, first set scraps of 1/4- or 1/2-in. plywood under the cabinet to support the cradle. The cradle base can be higher than or flush with the flooring, but not lower than the flooring. Position the cradle sides flush with the cabinet sides and tight against one side (**Photo 5**). Screw the cradle to the cabinet, starting with the tight side. On the other side, don't drive in the screws so hard that you distort the cradle. If the drawer doesn't glide smoothly, slightly loosen those screws. Also be sure the drawer doesn't drag on the floor when opened. Load a few heavy objects into the drawer and open it. If it drags, remove the front screws from the cradle and slip washers under it. That will give the drawer a slight upward tilt to clear the floor.

Next, cut the drawer faces to width. When you cut them to length, avoid measuring mistakes by marking them while they're in place. Leave a 1/8- to 1/4-in. gap between neighboring faces. At the end of a row of cabinets, make the face flush with the outer side of the cabinet. The method we used to attach the faces works best with a nail gun (**Photo 6**). Driving nails with a hammer can knock the drawer or cradle out of position. If you don't have a nail gun, stick the faces in place with double-face carpet tape. Then pull out each drawer and attach the face by driving two 1-in. screws from inside the drawer. With the faces attached, be sure they don't drag on the floor. If necessary, raise them with washers as described above.

Finishing up

Remove the drawers from their cradles for finishing. Unscrew the slides from the drawers and sand the drawer faces with 120-grit sandpaper. Also prepare a few stain-testing blocks, using leftover scraps from the faces and sanding them. We removed one cabinet door and took it to a paint store to have matching stain custom-mixed. If you have the patience to experiment, you could buy a couple of cans of stain and mix them to create your own. Either way, apply the stain to your test blocks before you stain the faces. The match doesn't have to be perfect, since the faces will be shaded by the overhanging cabinet fronts. After staining the faces, we finished our drawers—faces and boxes—with two coats of water-based polyurethane. Before reinstalling the drawers, add the drawer pulls or knobs. We couldn't find pulls that closely matched our existing cabinet hardware, so we chose pulls that fit over the tops of the drawer faces and are hidden under the cabinets (see photo). To find similar pulls online, search for "EPCO architectural pull."

1

Swing-out shelf

Get everything within reach! This spacious, double-level shelving unit pivots in and out effortlessly.

Vanity sanity

Three sensible solutions for disorder down under

Most vanities are poor storage spaces because they're designed for the convenience of plumbers, not for you. While that big, open box is nice for installing pipes, it leaves you with jumbled storage and wasted space.

But you can convert that box into useful space by installing any or all of these three upgrades. You'll expand the real estate under your sink and make it easy to find anything in seconds. Even a beginning DIYer can build all three projects in a weekend, at a total cost of about $75.

2

Mini rollout

No more tipping! This rollout has taller sides for taller products as well as full-extension hardware.

3

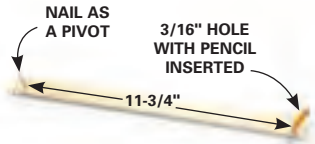
Drawer top trays

Get organized! Make these nifty sliding trays for all your vanity drawers.

1 Swing-out shelf

Here's the answer to all that inaccessible clutter on the floor of your vanity. With one pull, you can bring stored items out of the dark recesses and into easy reach.

Chances are, the measurements shown in **Figure A** won't be best for your vanity. The surest way to determine the right size for your shelf is to cut a quarter circle from cardboard and test the fit. If your vanity has double doors, you can still build this shelf, but you may need to open both doors to swing it out. Here are some tips for building your swing-out shelf:



A homemade trammel is perfect for marking out the curved shelves.

- To make the curved shelves, just mark a half circle and then cut it into two equal quarter circles.
- A pneumatic brad nailer makes assembly a cinch. If you don't have a brad nailer, use trim screws. The awkward shape of the shelves makes hand nailing difficult. Whether you use nails or screws, also use glue.
- We finished our shelf with a couple of coats of polyurethane. A can of spray lacquer is also a good option.
- Piano hinges come in various lengths, but you probably won't find exactly what you need for your shelf. That's OK; you can cut it to length with a hacksaw.

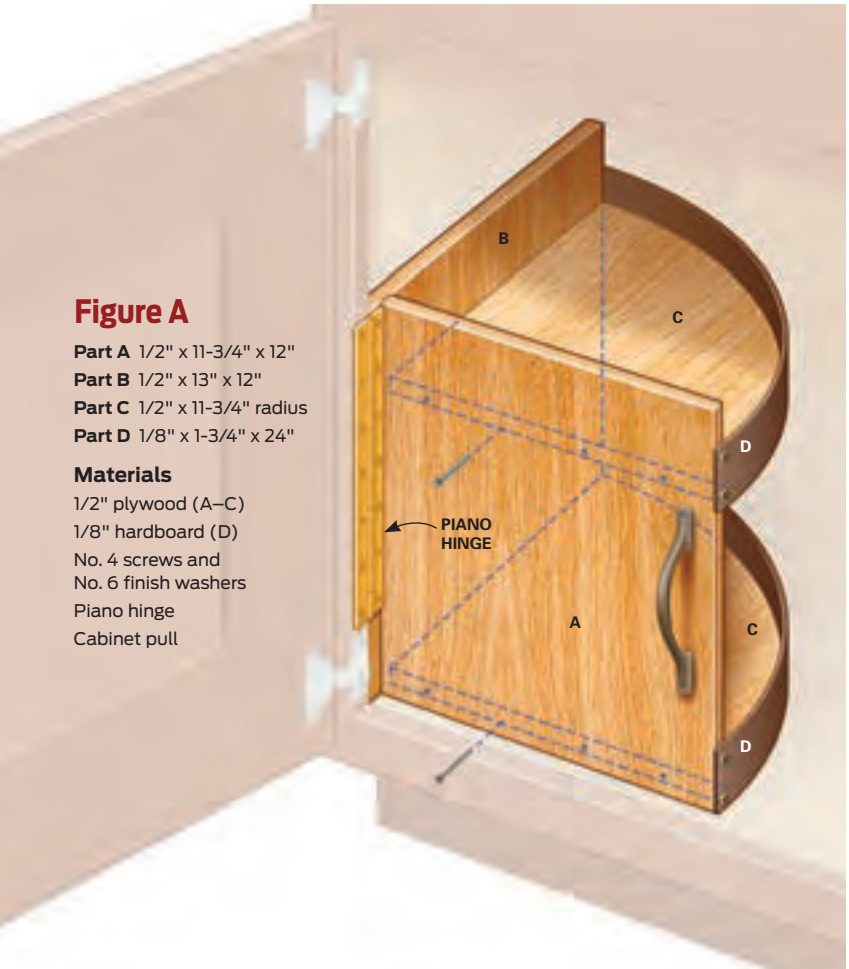


Figure A

Part A 1/2" x 11-3/4" x 12"
Part B 1/2" x 13" x 12"
Part C 1/2" x 11-3/4" radius
Part D 1/8" x 1-3/4" x 24"

Materials
1/2" plywood (A–C)
1/8" hardboard (D)
No. 4 screws and
No. 6 finish washers
Piano hinge
Cabinet pull

1 INSTALL THE EDGING, THEN TRIM IT
Cut the hardboard edging a few inches too long, fasten it with screws and slice off the excess with a fine-tooth saw. Finish washers give the screws a neater look.

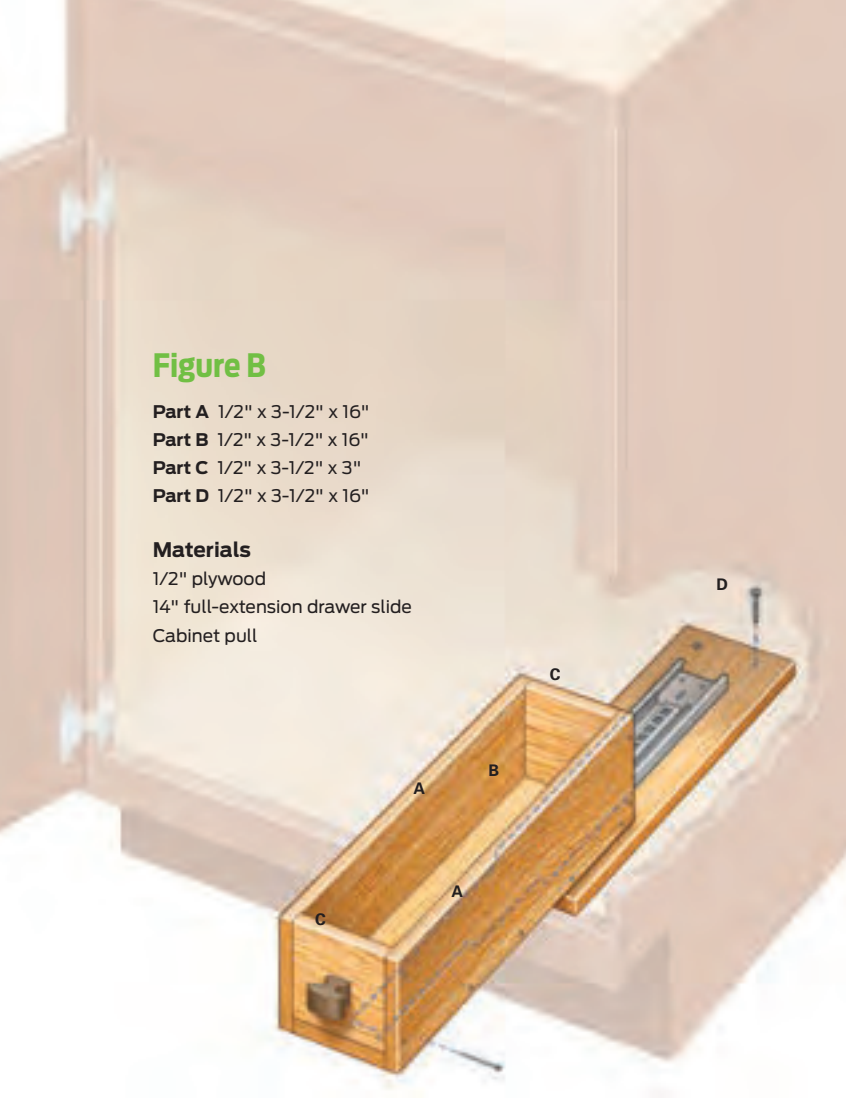
2 HANG IT ON A HINGE
Raise the shelf with spacers and align the shelf back with the inside edge of the face frame. Screw the piano hinge to the shelf back, then to the cabinet. You may have to notch the shelf back to clear the door hinge.

Art Direction BECKY PFLUGER • Photography TOM FENENGA • Technical Art FRANK ROHRBACH III

2 Mini rollout

This handy little rollout has tall sides, fronts and backs to keep bottles and cleaners in place as you open it. Our dimensions are given in **Figure B**, but you can alter the size to suit your needs. Here are some building tips:

- Assemble the drawer boxes with glue plus trim screws, finish nails or brad nails.
- We used a 14-in. "full-extension" drawer slide. This type of slide is typically mounted on the side of a drawer, but it works well as a light-duty undermount slide. If your home center doesn't carry full-extension slides in the length you need, go to any online cabinet hardware supplier. You can use a standard undermount slide, but your tray won't extend fully.
- Finish the rollout with two coats of polyurethane or spray lacquer.
- If you add a cabinet pull as we did, be sure to set the base back a bit so the vanity door can close.



1 MOUNT THE DRAWER SLIDES
Separate the two parts of the drawer slide. Screw them to the tray and the base, aligned flush at the fronts.

2 ELEVATE THE DRAWER SLIDE WITH A SEPARATE BASE
Fasten the tray base to the cabinet floor with No. 6 x 1-in. screws, then slide on the drawer.

3 Drawer top trays

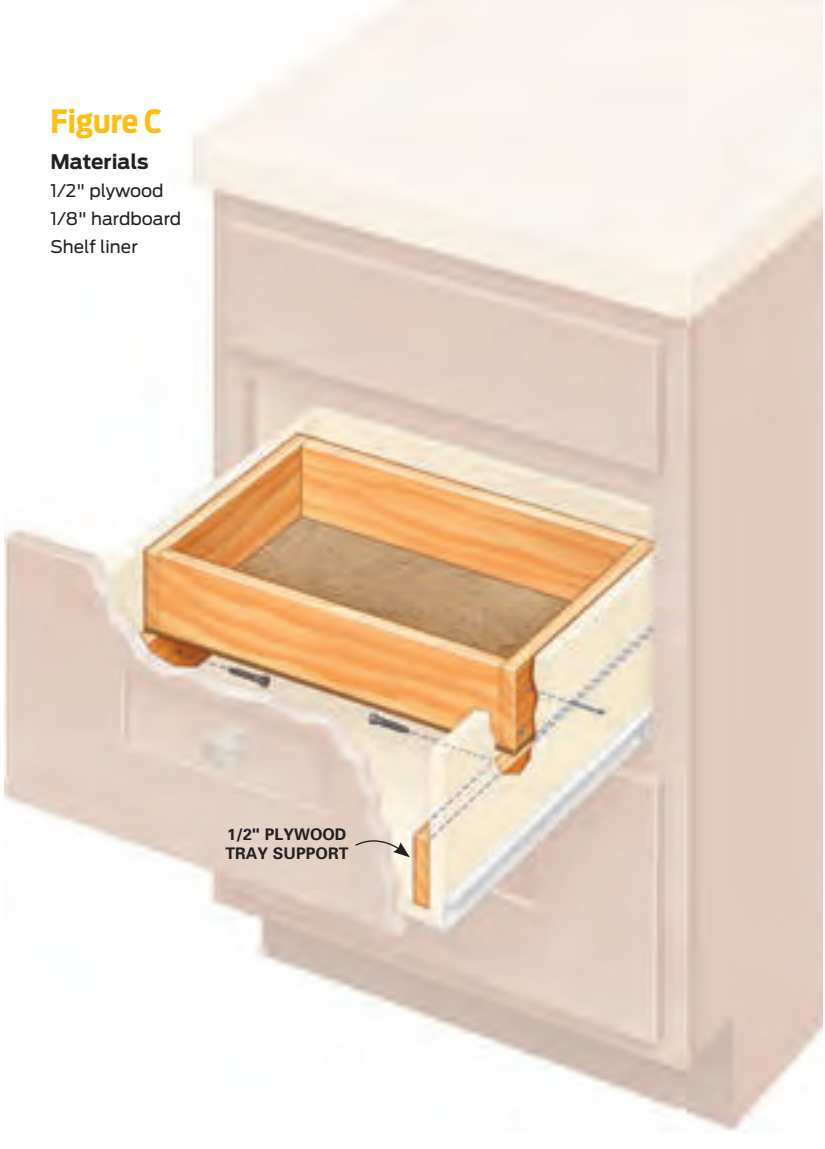
Drawers are often too deep for small bathroom stuff like razors, medicine and cosmetics. That means wasted space. These handy sliding trays reduce that waste and increase drawer real estate by 50 percent.

- To size the tray, measure the drawer: Subtract 1/16 in. from the width of the drawer space and divide the length in half. Cut a piece of 1/8-in. hardboard this size.
- You can make the tray any depth you like. If the opening in the vanity is taller than the height of the drawer, your tray can protrude above the drawer sides.
- Finish the tray with a couple of coats of polyurethane or spray lacquer.
- Stored items tend to slide around in the trays, so we added shelf liner (available at home centers and discount stores).

Figure C

Materials

1/2" plywood
1/8" hardboard
Shelf liner



1 ADD TRAY SUPPORTS
Fasten strips of plywood to the drawer to support the tray. You only need two screws per support.

2 LINE THE TRAYS
Cut shelf liner to fit the trays. Liner helps stored items stay put when you slide the tray.


Triple
your
closet
space
FOR
ANY SIZE
CLOSET!

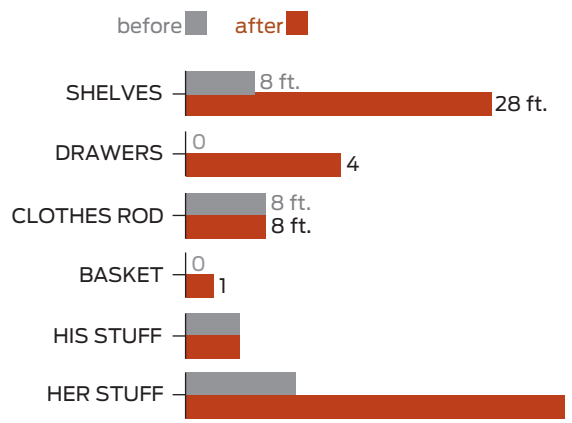
If you have to dig through a mountain of clothes to find your favorite sweatshirt, it's time to take on that messy closet. This simple-to-build system organizes your closet with shelf, drawer and hanging space for your clothes, shoes and accessories. Buying a closet system like this would cost you at least $500, but you can build this one for about half that.

Our system is really just four plywood boxes outfitted with shelf standards, closet rods or drawers. We built it for an 8-ft.-wide closet with an 8-ft. ceiling, but it'll work in any reach-in closet that's at least 6 ft. wide if you adjust the shelf width between the boxes or change the box dimensions.

Three times the storage—and more!

Three times the storage in the same space may sound impossible, but just look at the numbers:

STORAGE SPACE COMPARISON FOR 8-FT. CLOSET



1 Finish now, save time later

Prefinishing gives you a faster, neater finish because you'll have fewer corners to mess with. Apply two coats of polyurethane quickly and smoothly with a disposable paint pad.

2 Preinstall drawer slides

Attaching slides is a lot easier before the boxes are assembled. Position the slides using reference lines and a spacer. Remember that there are left- and right-hand slides, usually marked "CL" and "CR."

3 Gang-cut the standards

Cutting 16 standards one by one with a hacksaw would take hours. Instead, bundle two or more together with tape and cut them with a jigsaw.

Time, money and materials

You can complete this project in a weekend. Spend Saturday cutting the lumber, ironing on the edge banding and applying the finish. Use your Saturday date night to clean everything out of the closet. That leaves you Sunday to build and install the new system.

We built the entire system with birch plywood ($40 per sheet). The total cost, including the hardware for the drawers, shelves and closet rods, was about $250 (see Materials List,). You could use MDF ($30) or oak plywood ($40) instead of birch. Everything you need for this project is available at home centers.

Cut and prefinish the parts

Start by cutting all the parts to size following **Figure C** and the Cutting List. The corner box sides are slightly narrower than 12 in., so you can cut off dings and dents and still cut four sides from a sheet of plywood.

You won't be able to cut the shelves that fit between the boxes to length until the boxes are installed (the shelves need to be cut to fit), but you can rip plywood to 11-7/8 in. and cut the shelves to length later.

Once the parts are cut, apply edge banding (iron-on veneer) to all the edges that will be exposed after the boxes are assembled (**Figure A**). Build a jig to hold the parts upright. Place a part in the jig. Then cut the edge banding so it overhangs each end of the plywood by 1/2 in. Run an iron (on the cotton setting) slowly over the edge banding. Then press a scrap piece of wood over the edge banding to make sure it's fully adhered. Trim the edges with a veneer edge trimmer ($10).

Lightly sand the wood and your closet rod with 120-grit sandpaper. Wipe away the dust with a tack cloth, then use a paint pad to apply a coat of poly-urethane ($6 per half pint) on everything except the drawer parts (**Photo 1**). This $2 pad will let you finish each part in about 20 seconds. Let the finish dry, then apply a second coat.

Art Direction MARCIA ROEPKE • Photography TOM FENENGA • Technical Art FRANK ROHRBACH III

Figure A
Closet storage system

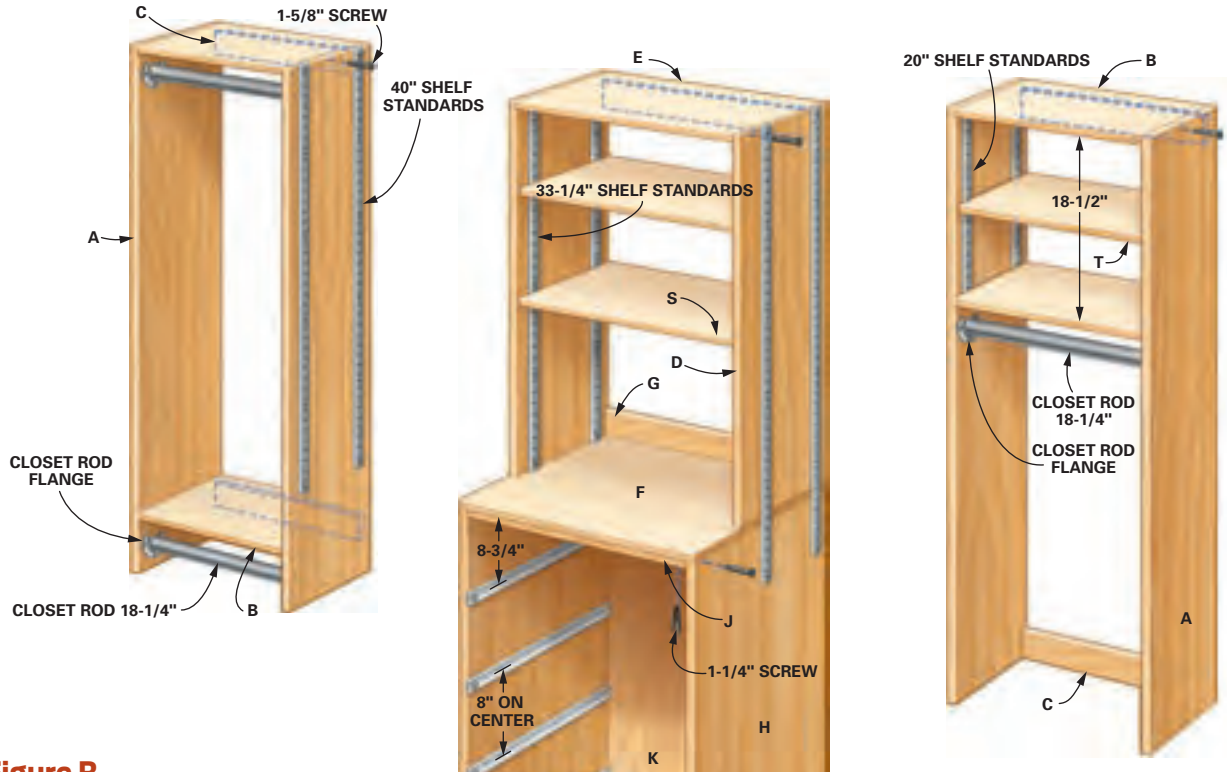
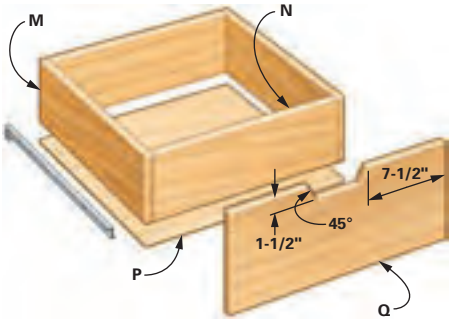


Figure B
Drawer Construction



Attach the hardware

It's easier to install the drawer slides and the shelf standards that go inside the boxes before you assemble the boxes. Use a framing square to draw reference lines on the drawer unit sides for your drawer slides (see **Figure A**). The slides are spaced 8 in. apart, centered 8-3/4 in. down from the top of the box. Keep the slides 3/4 in. from the front edge (this is where the drawer faces will go). Use a 7/64-in. self-centering drill bit ($9) to drill pilot holes and screw the slides into place (**Photo 2**).

You'll need to have your wire basket now (they're available at home centers). Attach the glides for the basket 3 in. below the drawer slides. If your basket is narrower than 22-1/2 in., screw a cleat to the box side so the basket will fit.

Now attach the shelf standards. You can cut them with a hacksaw, but an easier way is to use a metal blade in a jigsaw. Place two or more standards together so the numbers are oriented the same way and the standards are aligned at the ends. Tape the standards together where you're going to make the cut, then gang-cut them with your jigsaw (**Photo 3**).

Screw the standards to the inside

Cutting List

KEY	QTY.	SIZE & DESCRIPTION
A	4	3/4" x 11-7/8" x 52" corner box sides
B	4	3/4" x 11-7/8" x 18-1/2" corner box tops and bottom
C	4	3/4" x 2-1/2" x 18-1/2" corner box screw strips
D	2	3/4" x 13-7/8" x 34" shelf unit sides
E	1	3/4" x 13-7/8" x 22-1/2" shelf unit top
F	1	3/4" x 21" x 24" shelf unit bottom
G	2	3/4" x 2-1/2" x 22-1/2" shelf unit screw strips
H	2	3/4" x 20-3/4" x 44" drawer unit sides
J	1	3/4" x 20-3/4" x 22-1/2" drawer unit top
K	1	1/4" x 24" x 44" drawer unit back
L	1	3/4" x 2" x 22-1/2" drawer unit cleat
M	8	1/2" x 6" x 19" drawer sides
N	8	1/2" x 6" x 20" drawer fronts and backs
P	4	1/4" x 20" x 19" drawer bottoms
Q	4	3/4" x 7-3/4" x 22-1/4" drawer face
R	8	3/4" x 11-7/8" adjustable shelves, cut to length (not shown)
S	2	3/4" x 13-7/8" x 22" adjustable shelves for shelf unit
T	1	3/4" x 11-7/8" x 18" right corner box adjustable shelf
U	1	3/4" x 14-1/4" x 96" top shelf (not shown)

4 Nail first, then screw

If you have a brad nailer, tack the boxes together to hold the parts in position. Then add screws for strength.

5 Square the drawer boxes

If the boxes aren't square, the drawers won't fit right or glide smoothly. Drawers take a beating, so assemble them with nails *and* glue.

6 Center the drawer faces perfectly

Stick the faces to the boxes with double-sided tape. Then pull out the drawer and drive screws from inside the box.

of the box sides, 1 in. from the edges. Keep the standards 3/4 in. from the top (that's where the box tops go). Be sure the numbers on the standards are facing the same way when you install them—this ensures the shelves will be level.

Assemble the boxes

Use a brad nailer to tack the boxes together following **Figure A** and **Photo 4**. If you don't have a brad nailer, use clamps. Then screw the boxes together. We used 1-5/8-in. trim screws ($5 for a 1-lb. box) because the screw heads are small and unobtrusive (we left the screw heads exposed). Here are some tips for assembling the boxes:

- Attach the screw strips to the box tops first, then add one side, then the bottom shelf, and then the second side.
- Drill 1/8-in. pilot holes to prevent splitting. Stay 1 in. from edges.
- If your cuts are slightly off and the top, bottom and sides aren't exactly the same width, align the front edges.
- The boxes will be slightly wobbly until they're installed in the closet, so handle them with care.
- The middle bottom box has a back. Square the box with the back, then glue and tack the back in place.
- After the corner boxes are assembled, screw shelf standards to the side that doesn't abut the wall (it's easier to install the standards before the boxes are installed).

Build the drawers

Cut the drawer sides and bottoms (see Cutting List, p. 30). Assemble the sides with glue and 1-in. screws. To square the drawers, set adjacent sides against a framing square that's clamped to your work surface. Glue and tack the drawer bottom into place (**Photo 5**). Then set the drawer slides on the drawers, drill pilot holes and screw the slides into place.

Install the drawers in the box. Getting the drawer faces in their perfect position is tricky business. If the faces are even slightly off-center, the drawer won't close properly. To align them, place double-sided tape over the drawer front. Starting with the top drawer, center the drawer face in the

opening (**Photo 6**). You should have about a 1/8-in. gap on both sides and the top. Press the face into the tape. Take out the drawer and clamp the face to the drawer to keep it stationary. Drive two 1-in. screws through the inside of the drawer into the face.

Hang the boxes in the closet

Now install the boxes. Start by drawing a level line in the closet, 11 in. down from the ceiling. This will give you just over 10 in. of storage space above the closet system after the top shelf is installed. Then mark the stud locations on the wall with tape.

Don't assume your closet walls are plumb—they're probably not. So you can't just place a box in a corner without checking for alignment. Hanging the boxes is a two-person job, so get a helper. Start with the corner boxes. Align the top of the box with your level line on the wall. Have your helper plumb the box with a level while you drive 2-1/2-in. screws through the screw strip into the wall at the stud locations (**Photo 7**). Attach the other corner box the same way.

Find the center of the wall, then make a mark 12 in. on one side of the center mark. That's where your shelf unit will go. Again, have your helper plumb the box while you align it with your marks and screw it to the wall.

Prop up the drawer unit on spacers so it's tight against the shelf unit. Align the edges, then clamp the boxes and screw them together (**Photo 8**). Drive screws through the screw strip into the wall.

Then place the top shelf over the boxes. We could just barely fit our shelf into the closet to lift it into place. If yours won't fit, you'll have to cut it and install it as two pieces. Make the cut near one end, over a corner box, so it's not noticeable. Screw the shelf to the box tops with 1-1/4-in. screws.

Then attach shelf standards along the sides of the shelf and drawer units (**Figure A**). Cut the adjustable shelves to length to fit between the corner boxes and the middle boxes. Finally, screw the closet rod flanges into place, cut the closet rod to size and install the rods.

7 Plumb the shelf boxes

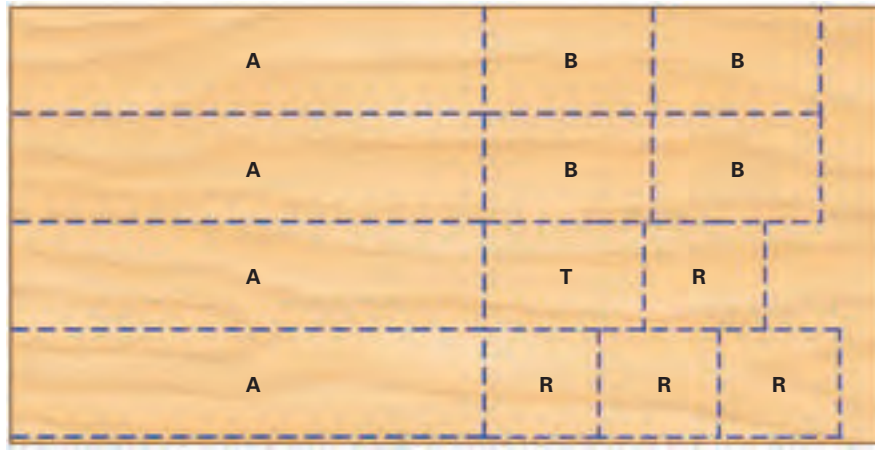
The corners of your closet may not be plumb, so check the box with a level before you screw it to the studs. Mark stud locations with masking tape.

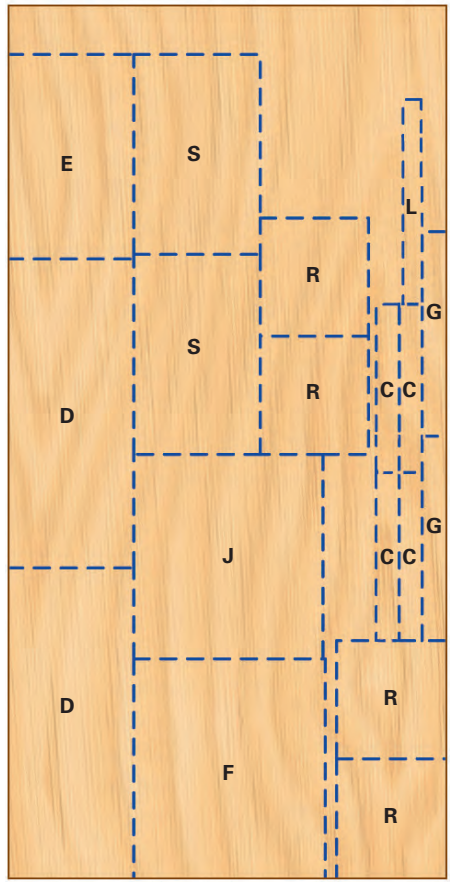
8 Install the center unit in two parts

The center unit is big and clumsy, so install the shelf unit first, then prop up the drawer unit with spacers and screw it to the shelf.

Figure C
Closet storage cutting diagrams

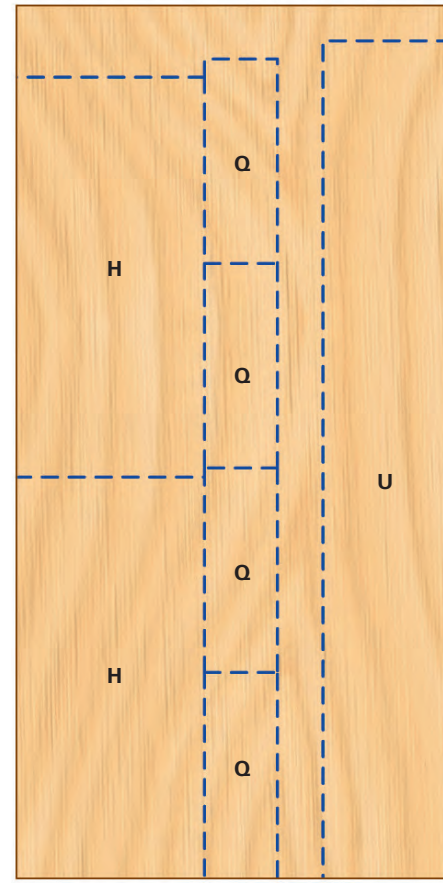
We're showing only the 3/4-in. plywood here. The 1/2-in. and 1/4-in. plywood sheets are for the drawers and back.





Materials List

ITEM	QTY.
4' x 8' x 3/4" plywood	3
4' x 8' x 1/2" plywood	1
4' x 8' x 1/4" plywood	1
8' closet rod	1
Edge banding (iron-on veneer)	2 pkgs.
20" drawer slides	4 prs.
6' shelf standards	10
Closet rod flanges	10
Wire basket	1
2-1/2" screws	1 box
1-5/8" trim screws	1 box
1-1/4" screws	1 box
1" screws	1 box
Wipe-on poly	1 pint



20 Storage Solutions

for hard-to-store stuff

Camping gear, magazines, boots... they can take over your house and garage! Read on for some really clever ideas from our readers and editors for storing your most challenging stuff.

Patio cushions and camping gear

Extra-large Ziploc bags (about $2 each at home centers and online) are great for storing camping gear, patio cushions and out-of-season clothes. Here's a slick trick for getting all the air out of the bag before you seal it. Put your items inside and push out all the air you can by hand. Then seal the bag but leave an opening large enough to fit a drinking straw. Use the straw to suck out the remaining air and then finish sealing the bag.

Mountains of magazines

Raise your hand if you have an ever-growing stack of magazines stashed somewhere in your house. Can you actually find anything in that heap? Here's a great way to archive magazines, a method that one of our editors has been using at work for years. All you need is a bunch of hanging folders and a drawer that's set up for hanging them. Cut off the bottom of each folder about an inch below the rod. Drape your magazine over the rod and hang it in the drawer. The spines are easy to read, so you can find what you need quickly.

Molding and other long stuff

A roll of shrink wrap is essential in any shop. Use it to bundle up pipe, trim, anything that's long and skinny.

Extra electrical cords

Ever wish you had one more garage wall to hang stuff on? Well, you do. Your garage door is a perfect place to store lightweight items like extension cords. (Yes, they'll stay put when the door opens and closes.) Install screw eyes diagonally about 8 in. apart and thread bungee cords (with the ends cut off) through them. Now you have a perfect bungee "corral" to hold your extra extension cords.

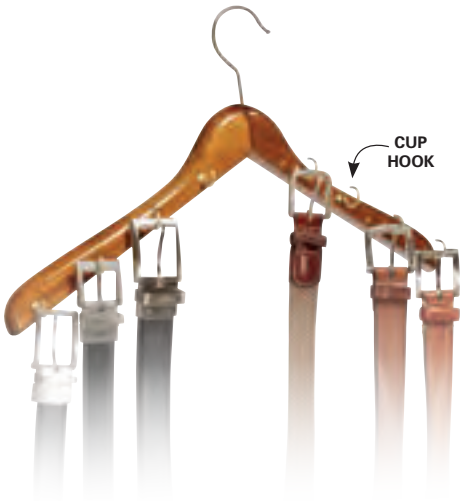
"This is a great way to wring even more storage space out of your garage—use your garage doors too!"
Chris Taylor

Art Direction VERN JOHNSON • Photography TOM FENENGA, EXCEPT WHERE NOTED

Extension ladder

An extension ladder has to be one of the most difficult things to store. When you need to use it, it has to be easy to get to. But there are long stretches when it just gets in the way of everything else in your garage. Here's a good solution: Mount it on your garage ceiling on sturdy racks made of scrap 2x4s that are screwed into the ceiling joists. Use two 3-1/2-in. screws at each joint to make the rack secure. These racks make it easy to slide the ladder out when you need it. Just make sure to position the racks where they won't interfere with your garage door.

"These racks are easy and inexpensive to build and extremely sturdy. I built mine in 2003 and have been using them ever since." **Art Lockett**



Belts and other hang-ups

Where do you store your belts? At my house, the answer is: (A) on the floor, (B) over a chair, (C) stuffed in a drawer and (D) all of the above. Thanks to one of our readers, I can now choose (E)—on an inexpensive and easy-to-make belt holder. All you need is a wooden hanger and some cup hooks. If some of your belts have unusually thick buckles, just widen the cup hook slightly with a needle-nose pliers. This is a great way to hang small handbags, too.

"I made one for myself and now the lady of the house wants one too!" **Steve Virgilio**

Musical instruments

If you occasionally put your hammer down to strum a guitar or banjo, you know how tricky it can be to store them. Floor stands are pricey and they leave your instrument accessible to curious children, rambunctious pets and people who can't carry a tune. It's a better idea to hang your instruments on the wall, but instrument wall hangers cost $20 a pop. Instead of hitting the music store, hit the home center. Plastic-coated utility hooks will hold most instruments at a fraction of the cost ($2 to $4), and they're just as tough. And for those of you DIYers who can't carry a tune...maybe you should leave your instruments on the wall and carry that hammer instead.

"Plastic-coated utility hooks work just as well as pricey instrument hooks, and they turn those old banjos gathering dust in the closet into beautiful wall decorations!" **Christopher Kocmoud**

Remote controls

Stick them to the underside of your coffee table with hook-and-loop tape.

Screws, doodads and miscellaneous hardware

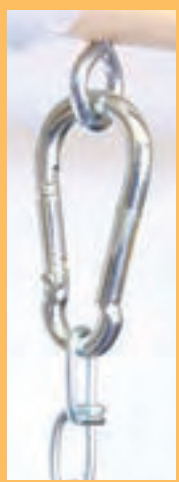
If you have lots of small hardware on hand, constantly opening drawers or containers to find what you need is a pain. Here's how one of our ultra-organized readers solved the problem. He stores his hardware in small, sturdy zippered craft bags (thicker than sandwich bags and available at hobby stores). He punches a hole in the bag and hangs it on the pegboard in his shop. The clear bags make finding what you need a snap and keep dust and moisture at bay. If you need to find a matching piece of hardware, just hold it up for a side-by-side comparison.

"The bags make it easy to find things and protect the contents from rust, which can be a big problem here in the Pacific Northwest."
Michael Hemphill

LISA McCLINTICK

Too many clothes for your closet

I don't know anyone who has too much closet space (and if you do, don't brag). Here's an easy way to add space for hanging clothes (or at least clothes that don't require a tall space). Hang a second clothes rod from the upper rod with lightweight chain. Attach the chain to screw eyes directly or use S-hooks or carabiners. Carabiners make adjusting the height of the extra rod a snap. This system works well in kids' closets since they grow quickly (and their clothes grow along with them). It also works well in an adult closet—you can hang pants on one rod and shirts on the other.



Basketballs (and other dangerous items)

If you have kids, you have balls—basketballs, soccer balls, rubber balls and other round objects that roll around underfoot. Here's a perfect way to use that narrow gap between a pair of garage doors (if you're blessed with such an awkward spot). Just install angled "ball ramps" made from scrap wood. The balls fit neatly in the gap, and because the ball ramp is right there at the edge of the garage, kids are more likely to use it on their way back from the hoop.

"My husband, Bob, came up with this brilliant idea. It takes advantage of an awkward space, and the kids don't leave their balls rolling all over the garage floor."
Lisa McClintick

Shop and garage supplies

Hang inexpensive metal shelves upside down from your ceiling joists. Install the shelves high or low (use lag bolts) and trim the shelf posts with tin snips.

Vacuum gear

It seems like the vacuum cleaner always ends up in one closet and the vacuum cleaner bags in another, and the attachments get shoved in a corner or spread all over the floor. Here's a simple tip that will keep everything together and out from underfoot. Screw a hook to the door of your storage closet and hang a mesh or cloth bag on it. You can store all your vacuum cleaner bags and attachments in one place, and the bag lets you carry everything you need from room to room or up and down the stairs in one trip.

Yard tools

Store them in an old golf bag with a cart so you can haul your tools wherever you need them.

Wet hats, gloves and mittens

If you don't have radiators, finding a good spot to dry wet hats and mittens can be tough. Tossing them into a plastic bin gets them out of the way, but they never dry and it's no fun putting on damp mittens in the morning. This simple back-of-the-door glove and cap rack allows wet things to dry and keeps easily misplaced items organized. Just string clothespins on aluminum wire (it won't rust) and stretch it between screw eyes on the back of a closet door. This also works great out in the garage for drying garden and work gloves.

Garage odds and ends

Who couldn't use a few more shelves in the garage? You probably already have shelves in the obvious spots, but what about in the corners? This nifty corner shelf unit takes advantage of existing studs, and it's fast, easy and cheap. Use scrap plywood or oriented strand board to make shelves that fit snugly between the corner studs and support them with 1x1 cleats. These corner shelves are perfect for storing smaller items such as glues, oils, waxes and polishes, which get lost on larger shelves.

"I built these shelves in all four corners of my garage and turned useless space into something a lot harder working."

Steve Ferlindes

Basement junk

OK, I don't mean junk. I mean luggage, camping gear, the ugly vase Aunt Martha gave you for your wedding ...stuff you need to keep but don't use all the time. If your house has a set of stairs with a sloped closet underneath, you have a huge amount of space that's mostly wasted. Here's how to get the most out of that black hole. Build a custom rolling cart that fits perfectly in the closet. This one is built like a shelf unit and rides on fixed casters so it slides straight out to keep things organized and accessible. When Aunt Martha comes to visit, just roll it out, grab the vase and you're golden.

Tape and ribbon

A toilet paper holder can hold duct tape, masking tape & more.

Wet #@*% boots!

What do you get when you mix boots and winter weather? A dirty, slippery floor (and wet socks). Make life neater and safer for everyone in your house by building this simple boot tray. All you need is a plastic tray or a large metal baking sheet with a lip. Put a layer of medium-size stones in the tray so the boots can drain. To keep the stones in place and give the tray a handsome finished look, build a 1x2 frame around the tray and paint it the same color as the trim in your entryway.

"I've tried a lot of different ways to store my fishing rods, but this works the best!" **Thomas Doty**

Fishing rods

This is for all you fishing addicts out there. When the season ends and the gear comes out of the truck, where do you store your rods? You can buy a fancy storage rack or make one of your own. But either way, you're giving up precious wall space until spring. Here's a quick solution: Screw short sections of wire shelving to your ceiling. If the handles don't fit, just clip out some of the wire with bolt cutters. Your rods will be safely out of the way until your next fishing trip.

Stackable shelves

Project facts

Cost
$250

Time
2 weekends

Skills
Beginner to intermediate

Special tools
Circular saw
Jigsaw
Clothes iron
Fine file
Laminate edge trimmer

A shop-made jig makes this project simple to build and a snap to assemble

If you need shelving, storage, a desk or a work surface, check out this modular system. It's got lots of storage space for your electronic gear and books and a nifty recess to accommodate a stool. And you can easily customize this system to suit your storage needs and wall space.

The T-shaped standards (**Photo 5**) are simple to cut and glue. (We used Baltic birch because we liked the look of the multiple laminations on the edges, but any 1/2-in. hardwood plywood will do.) We chose sturdy, easy-to-clean 3/4-in. Melamine for the horizontal shelves because it has a tough, plastic-like surface, but you can use plywood, MDF (medium-density fiberboard) or particleboard and paint it any color you wish.

Stackable **Shelves**

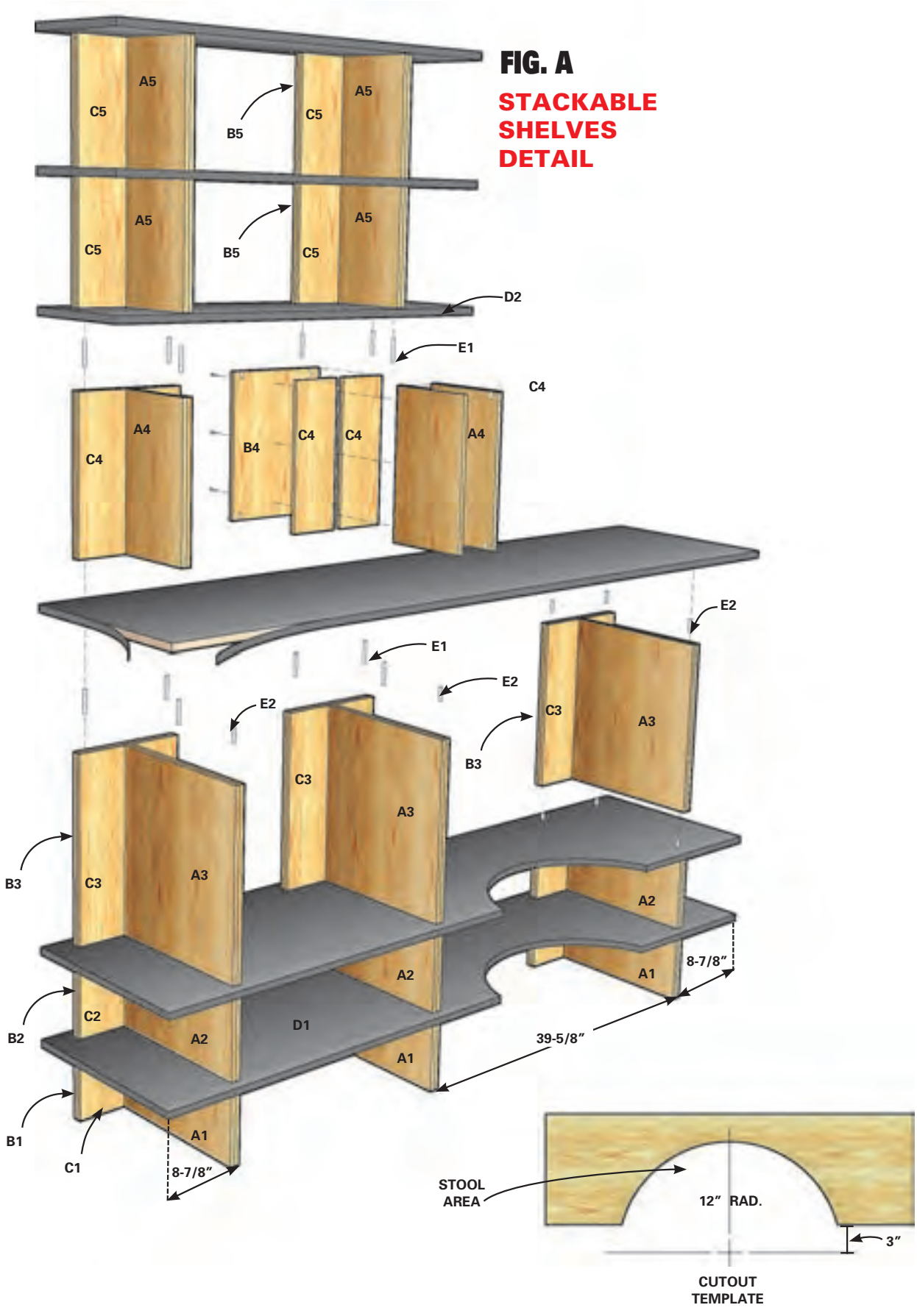


FIG. A

STACKABLE SHELVES DETAIL

1 **RIP** your 1/2-in. plywood into pieces to make the standards, then cut the lengths with a circular saw. Cutting large sheets with a straightedge guide and a circular saw is easier than wrestling large sheets through a table saw.

The plywood standards and the shelves are drilled precisely with a homemade jig (**Photos 4 and 6 and Fig. B**) and are held together with 3/8-in. dia. steel pins. The pins slide through the shelves and into the standards, so putting this together is sort of like stacking blocks or Lego pieces.

2 **GLUE** together the two pieces that make up part A of the standards. Nail the two pieces together at two corners with 3/4-in. brads once you've aligned them. This keeps them from drifting apart when you clamp them.

Glue the front pieces together for each standard and then 'sandwich clamp' them

We went to all the trouble of gluing the 1/2-in. plywood standard fronts together to create a more stable, 1-in. thick support. This thickness also allows us to use 3/8-in. pins in the assembly for more strength and sturdiness. It would take you a month of Sundays and dozens of

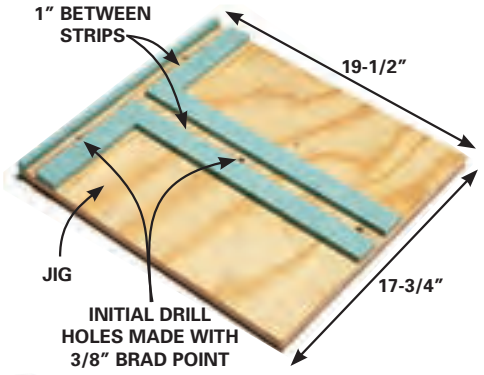
3 **CLAMP** three laminated pairs (A) together using 2x4s to help distribute the pressure evenly across the sheet surface. Leave the assembly clamped for at least two hours.

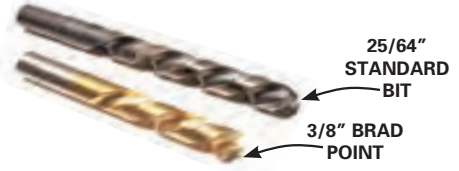
4 **GLUE AND SCREW** the 1/2-in. plywood back (B) to the laminated part A to form the T-shape of the standard. Be sure to center the standard and make sure everything is aligned. The jig will help with the correct alignment.

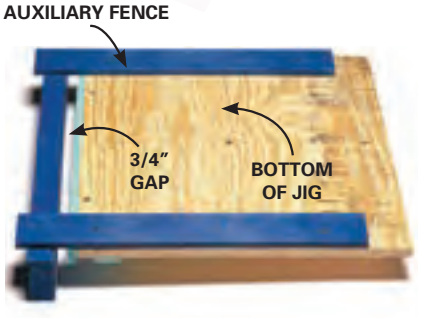
5 **GLUE AND CLAMP** parts C to each standard. Be sure to glue around the perimeter of each piece and also run a bead of glue along the inside corner. Use as many clamps as necessary. For tall standards you may need up to four clamps per side. Remove the standard from the jig and glue another standard together while the glue sets.

DRILLING JIG DETAIL

FIG. B



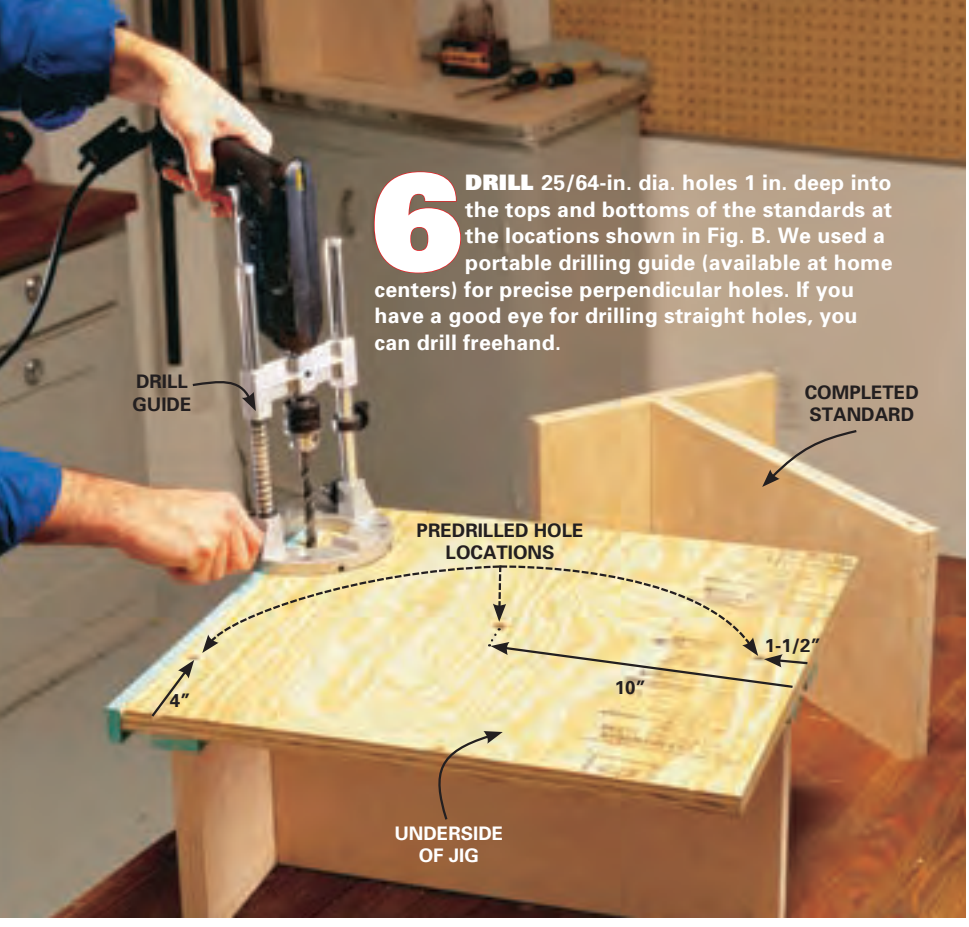




BUILD A JIG TO ASSEMBLE AND DRILL THE T-SHAPED SHELF STANDARDS

You can't successfully build this project without maintaining exact consistency. This handy jig will help. You make the jig by gluing and nailing 1/2-in. plywood strips to a 3/4-in. scrap plywood base. Use a square to lay out everything precisely as shown in Fig. B. This jig helps you assemble the parts of each standard precisely. And you can flip it over and use it to accurately drill the pin holes (Photo 6).

The jig will also be your guide for drilling the holes into the horizontal shelf boards, which need to perfectly align with the standards (Photo 8). All you need to do is screw an auxiliary fence to the jig to maintain the proper overhang on the front and back of each shelf.



6 **DRILL** 25/64-in. dia. holes 1 in. deep into the tops and bottoms of the standards at the locations shown in Fig. B. We used a portable drilling guide (available at home centers) for precise perpendicular holes. If you have a good eye for drilling straight holes, you can drill freehand.

clamps to individually clamp all the standard fronts together. Instead, get all your pieces cut and ready to glue and then clamp three or four pairs together at one time as shown in **Photo 3**.

Measure the height and width you need for each shelf

If you plan to alter this project to suit your personal stuff, establish the height of each shelf so you can cut the plywood for the T-shaped standards. Measure the heights of things you plan to display, like a TV, stereo equipment, computer or books. Also, leave some room from the top shelf to the ceiling.

7 **CUT** the assembly pins from 3/8-in. rod using a hacksaw. File the burrs on the cut edge to make the pins easier to slip into the holes.

8 **DRILL** the pin holes in the shelves using the same 25/64-in. drill bit and an accessory fence screwed to the jig. The auxiliary fence positions the jig automatically to ensure consistent overhang from the standards. Be sure to set the depth stop on your drill so you don't drill through the top piece of your shelving unit, which is located on the bottom of the stack as shown.

Stackable **Shelves**

9 **IRON** the preglued strips onto the edges of the shelves. Use a medium to high setting on the iron. When the glue has set, use a special edge trimmer (available at home centers) for perfect edges. After trimming the edges, sand the edges lightly with 220-grit sandpaper or a fine mill file.

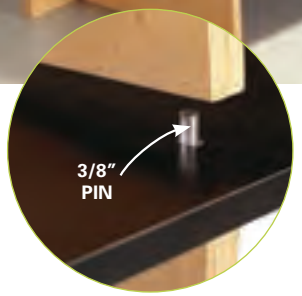
10 **CUT** your Melamine or plywood using a 60-tooth carbide blade in your circular saw. Cut with the good side down to minimize chipping. If you're using black Melamine, you can hide minor chipping with a permanent marker.

Choosing materials

Melamine is tough to cut without chipping. If this is one of your first projects, you may want to consider using a different shelf material. In some areas, the black will be difficult to find unless you have a full-service lumberyard special-order it. White Melamine, however, is sold in 3/4-in. thicknesses in most home centers.

Hardwood plywood with iron-on wood edging or MDF (medium-density fiberboard) are excellent substitutes for 3/4-in. Melamine. You can sand the edges of MDF easily, and it paints beautifully because it's so smooth. Plywood is readily available as well, but you'll need either 1/4-in. glue-on strips or iron-on wood edging to cover the exposed edges. You can then stain, varnish or paint the plywood.

Baltic birch may also be tough to find in some areas. It's usually sold in 5-ft. square sheets. We used nine-ply sheets because the cut edges look great when sanded and finished. Each layer, or ply, stands out. And unlike with other plywood choices, there are no voids. You can buy Baltic birch with one good side and the other made from lower-quality veneer. This makes the most sense for this project because you can hide the bad side. You can substitute any hardwood plywood, but you may need to glue hardwood strips over the edges to hide voids.



11 **ASSEMBLE** the standards and shelves one tier at a time. Begin by positioning the bottom standards, then align the shelf and tap the pins through the shelf and into the standard.

Cutting List

KEY	PCS.	SIZE & DESCRIPTION
A1	6	8″ x 18″ 1/2″ plywood (first-tier standard pieces)
A2	6	9″ x 18″ 1/2″ plywood (second-tier standard pieces)
A3	6	19-3/4″ x 18″ 1/2″ plywood (third-tier standard pieces)
A4	4	16″ x 9-1/2″ 1/2″ plywood (fourth-tier standard pieces)
A5	8	12″ x 9-1/2″ 1/2″ plywood (fifth- and sixth-tier standard pieces)
B1	3	8″ x 11-3/4″ 1/2″ plywood (standard T-end backs)
B2	3	9″ x 11-3/4″ 1/2″ plywood (standard T-end backs)
B3	3	19-3/4″ x 11-3/4″ 1/2″ plywood (standard T-end backs)
B4	2	16″ x 11-3/4″ 1/2″ plywood (standard T-end backs)
B5	4	12″ x 11-3/4″ 1/2″ plywood (standard T-end backs)
C1	6	8″ x 5-3/8″ 1/2″ plywood (standard end blocks)
C2	6	9″ x 5-3/8″ 1/2″ plywood (standard end blocks)
C3	6	19-3/4″ x 5-3/8″ 1/2″ plywood (standard end blocks)
C4	4	16″ x 5-3/8″ 1/2″ plywood (standard end blocks)
C5	8	12″ x 5-3/8″ 1/2″ plywood (standard end blocks)
D1	3	21″ x 84″ 3/4″ Melamine or other sheet good
D2	3	12-1/2″ x 44-3/8″ 3/4″ Melamine or other sheet good
E1	36	3/8″ x 2-1/2″ steel pins
E2	11	3/8″ x 1-1/2″ steel pins

You don't want your new shelves to sag, so don't exceed a span of 29 in. between the rear wings of the standards. The span is measured from the closest points between the T-shaped standards (**Photo 11**). For example, if the front edges of your standards are 38 in. apart, the rear wings of the T-shaped standards will be close to 27 in. apart—well within the limit.

Pegboard tool-go-round

Build this handy rotating tool caddy with $35 for the wood at a home center and $15 for the hardware at a home center or Rockler Hardware, 800-279-4441, rockler.com.

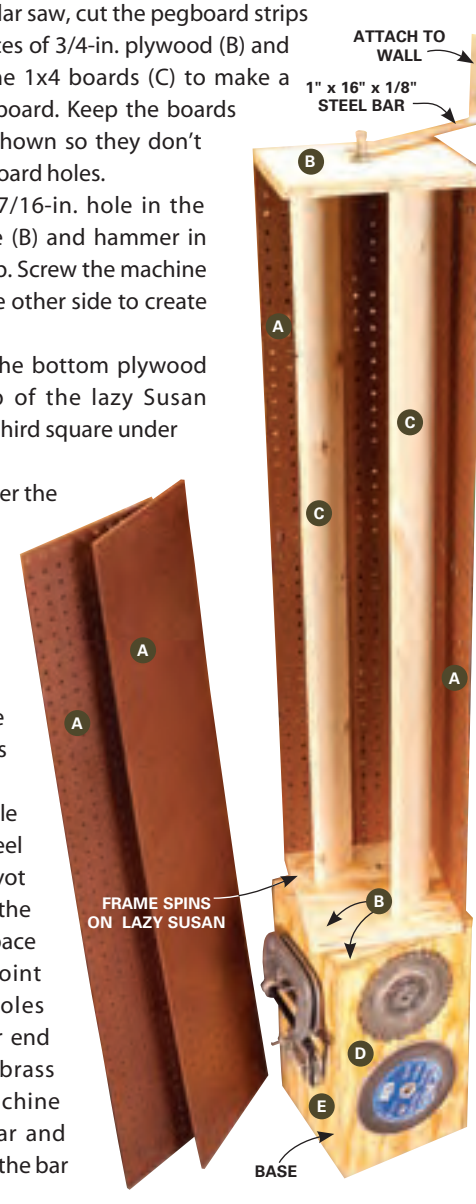
With a table or circular saw, cut the pegboard strips (A). Cut the square pieces of 3/4-in. plywood (B) and nail two of them to the 1x4 boards (C) to make a stiff frame for the pegboard. Keep the boards toward the center as shown so they don't interfere with the pegboard holes.

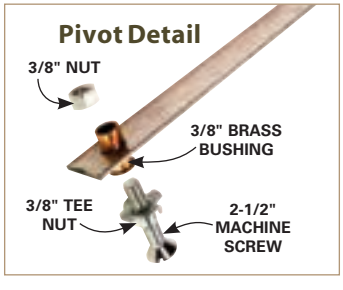
Center and drill a 7/16-in. hole in the upper plywood square (B) and hammer in the tee nut from the top. Screw the machine screw through from the other side to create the pivot point.

Center and screw the bottom plywood square (B) to the top of the lazy Susan bearing and screw the third square under the bearing.

Nail or screw together the 3/4-in. plywood base from parts D and E, then nail or screw the third plywood square (B) on top of the base to join the spinning frame to the base. Screw the 10-in. pegboard strips to the frame.

Drill a 1/2-in. hole in one end of the steel bar for the upper pivot bushing, then bend the bar to create a 10-in. space between the pivot point and the wall. Drill holes for screws in the other end of the bar, slide the brass bushing onto the machine screw, slide on the bar and attach the other end of the bar to the wall.





Materials list

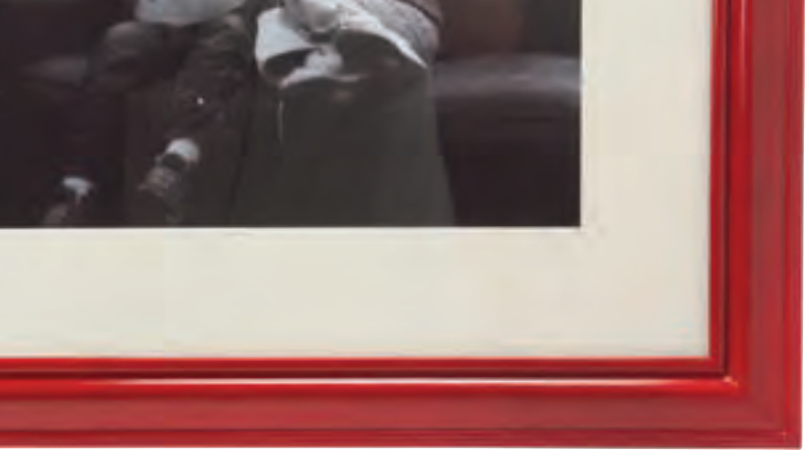
- 2 2' x 4' x 1/4" pegboard sheets
- 2 1x4 x 4' pine boards
- 1 2' x 4' x 3/4" plywood
- 1 9" round lazy Susan (rockler.com, part No. 18531, $6)
- 1 3/8" tee nut
- 1 3/8" x 2-1/2" machine screw
- 1 3/8" brass bushing
- 1 3/8" tee nut
- 1 16" length of 1" x 1/8" flat steel bar

Cutting list

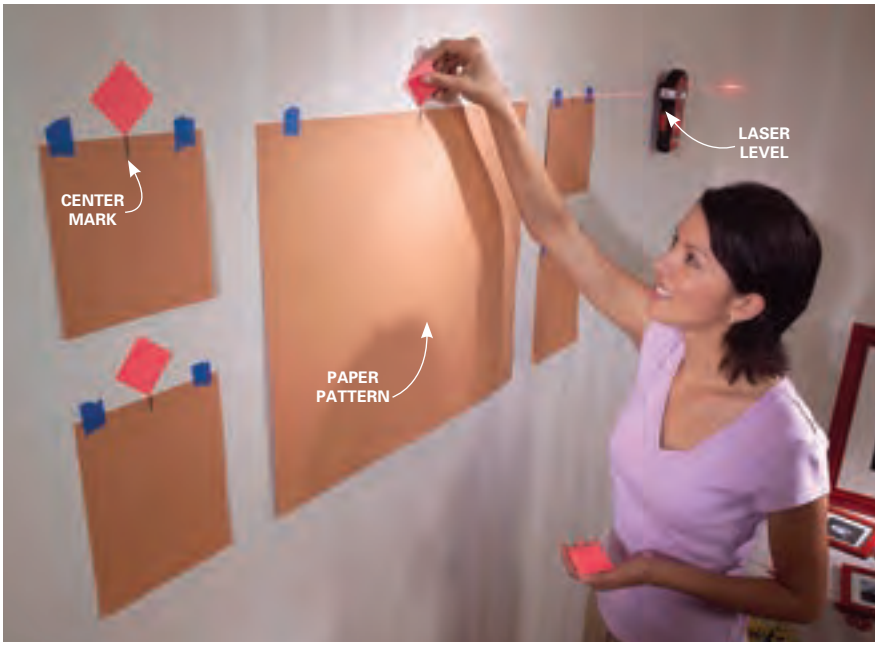
KEY	PCS.	SIZE & DESCRIPTION
A	4	1/4" x 10" x 48" pegboard
B	3	3/4" x 10" x 10" plywood
C	2	3/4" x 3-1/2" x 46-1/2" pine boards
D	2	3/4" x 10" x 20" plywood
E	2	3/4" x 8-1/2" x 20" plywood

Hang it straight, level & solid

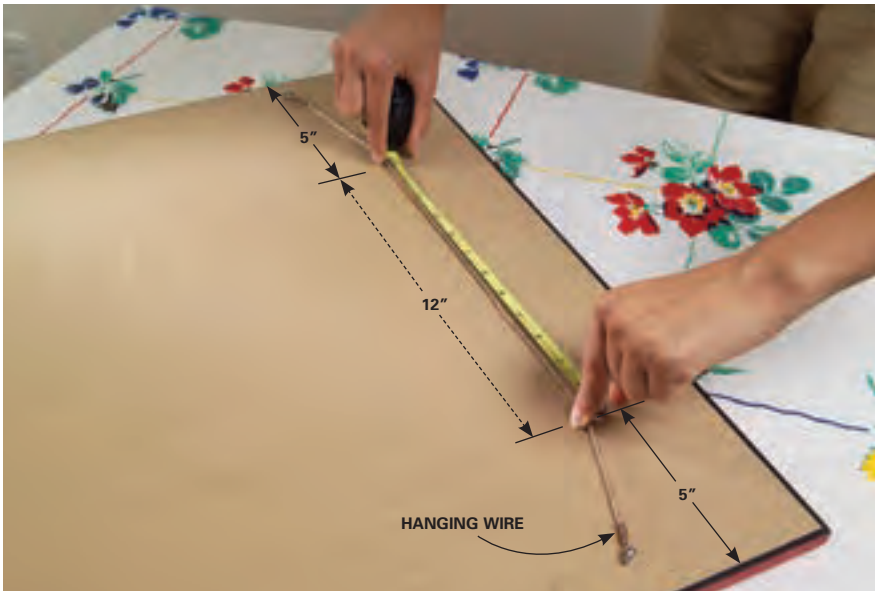
With these four techniques, you can hang just about anything on your walls, and keep it there



Hang Pictures straight and level



1 **Project a level line and tape exact-size paper patterns on the wall. Mark the top center of each pattern with the corner of a sticky note.**



2 **Stretch the hanger wire with two fingers spaced equally distant from the edges of the picture frame. Keep the wire parallel to the top of the frame. Measure the distance between your fingertips.**

The first challenge in hanging a picture is deciding exactly where you want it. It's not so hard with just one picture. You can ask a helper to hold it up while you stand back and judge the position.

Most experts recommend hanging a picture with its center about 60 in. from the floor, or bottom edge 6 to 8 in. above a piece of furniture. Use these heights as a starting point. Then adjust the position of the picture to your liking, and mark the top center with the corner of a sticky note. Use the technique shown in **Photos 2 – 6** to complete the job.

A group of pictures is trickier. First cut out paper patterns and arrange them on the wall with low-adhesive masking tape. The temporary red line from a laser level is helpful for aligning a series of photos level with one another (**Photo 1**). The laser level is ideal because you get a perfectly straight line without having to mark up the walls. A standard carpenter's level will also work.

tip **Before you hang the picture, stick a pair of clear rubber bumpers on the back lower corners of the frame to protect the wall and help keep the picture level. You'll find these with the picture hanging supplies or in the cabinet hardware department (they're called "door bumpers").**

When you arrive at a grouping that's pleasing, mark the top center of each pattern with the corner of a sticky note (**Photo 1**). You'll use the bottom corner of each sticky note as a reference point for locating the picture hangers.

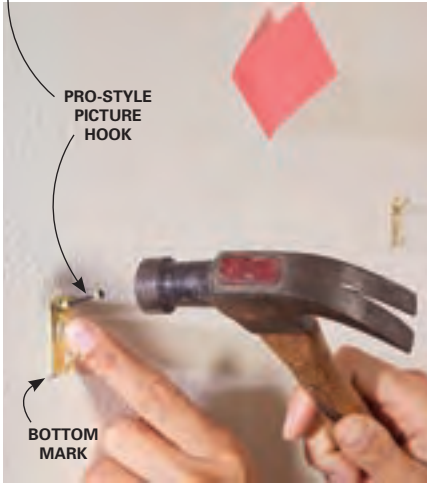
Now you're ready to position the picture hangers (**Photos 2 – 4**). Use two hangers for each picture for extra support and to help

keep the picture from tipping. Choose picture hangers that are rated to support the weight of your art. We recommend professional hangers like the one shown below. They work fine in drywall. These are available at home centers or from most picture-framing shops. OOK is one popular brand. Plaster may not support pictures as well as drywall does. To hang heavier art on plaster walls, use picture hangers with double or triple nails.

Photos 2 and 3 show how to measure the space between the hangers and the distance from the top of the picture frame. The distance between hangers isn't critical. Just space your fingers several inches from the outside edges of the picture frame. Transfer these measurements to the wall (**Photo 4**). An inexpensive level with inches marked along the edge is a great picture-hanging tool (**Photo 4**). Other-wise, just stick masking tape to the edge of a level and transfer measurements to the tape (**Photo 2**). Then line up the *bottom* of the hooks with the marks and drive the picture-hanger nails through the angled guides on the hooks (**Photo 5**).

3 Leave one finger in place and measure from the wire to the top. Use this dimension and the dimension from Photo 2 to position the picture hangers.

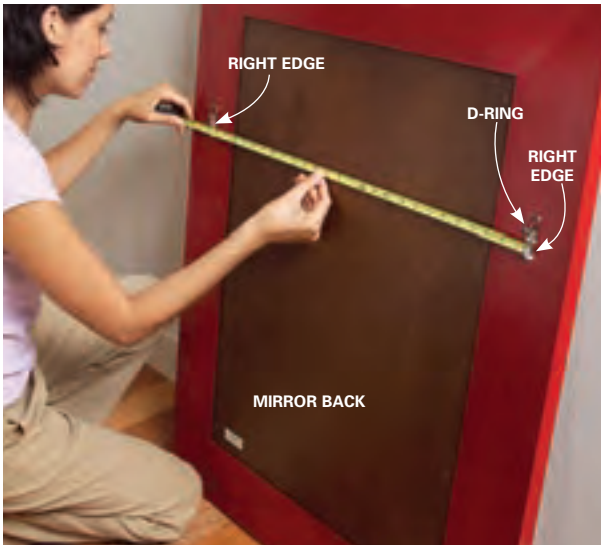
4 Find the hanger positions by measuring down from the sticky note and to each side from center. Keep the hangers level.



5 Align the bottom edge of a picture hook with the mark and drive a nail through the hook's guide.

6 Slip the wire over both hooks. Slide the picture sideways across the wires until it's level. Use the same process to hang the remaining pictures.

Hang heavy mirrors with confidence

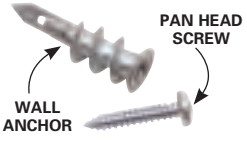


1 Measure from the right edge of one D-ring to the right edge of the second D-ring to find the exact distance between the centers of the hanging D-rings.

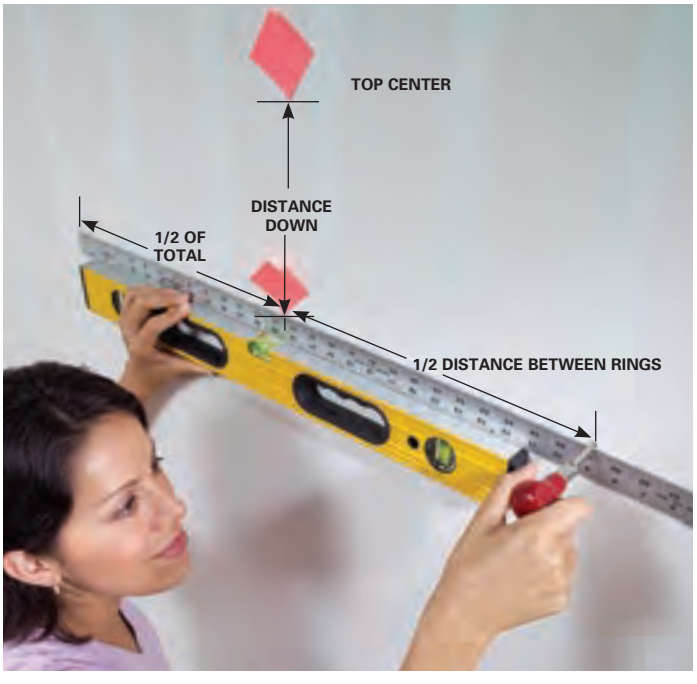
Take extra precautions when you're hanging a heavy mirror. If the mirror has a hanging wire on the back, remove it and instead screw D-rings to the frame (**Photo 1**). (Mirrors without frames should be hung with special mirror hangers.) Locate the D-rings an equal distance from the top of the frame, about one-third of the total height down. Then measure the exact distance between the centers of the D-rings (**Photo 1**). The trick is to hook your tape measure on one edge of a D-ring, and measure to the same edge of the second D-ring. Record this measurement. Then measure down to the top of the D-rings (**Photo 2**).

Photo 3 shows how to transfer the measurements to the wall. But first you'll have to hold the mirror up to the wall and choose the best position. Start with the center of the mirror at about 60 in. from the floor. When you like the position, mark the top center with a sticky note.

Some picture hangers are rated to support heavy mirrors, but it's stronger and safer to install hollow-wall anchors instead. We recommend the screw-in type anchor shown at right.



2 Measure from the top of the D-ring to the top of the frame to determine the distance down.



3 Use a level and a ruler to plumb down the correct distance. Mark the spot with the corner of a sticky note. Then use the level and ruler to find the exact hanger positions.

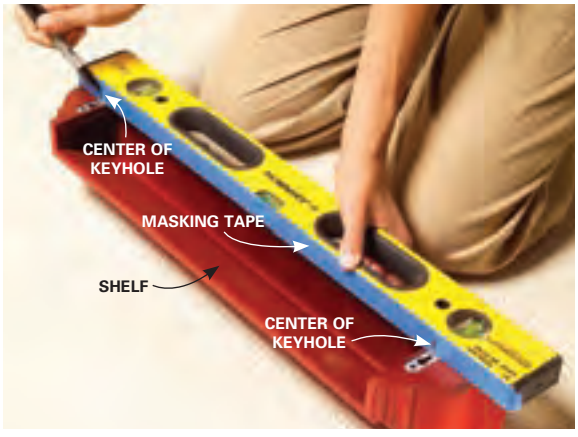
hang it straight

It's rated to support 40 lbs. Weigh your mirror and choose the appropriate type of anchor. Use toggle-type anchors (**Photo 3**) for heavier mirrors. Measure from your reference point to position the anchors (**Photo 3**). Make starter holes with an awl or Phillips screwdriver. If you hit a stud with the awl, simply drive a screw. **Photo 5** shows how to hang the mirror. If the top isn't level when you're done, wrap a few turns of electrical tape around the D-ring on the low side to raise that side slightly.

4 **Drive a wall anchor into the drywall at each hook location.**

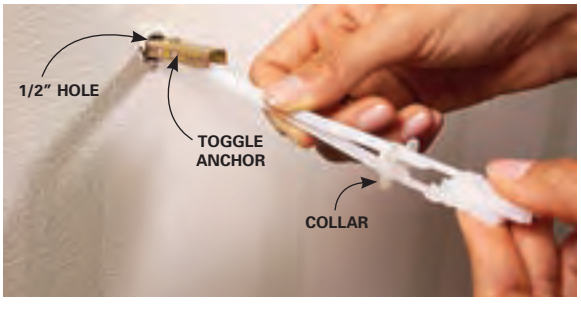
5 **Screw a pan head screw into the anchor. Leave the screw sticking out about 1/4 in. Hook the D-rings onto the protruding screws.**

Align keyhole-slot Shelves



1 Stick masking tape to the edge of your level and mark the keyhole centers on the tape.

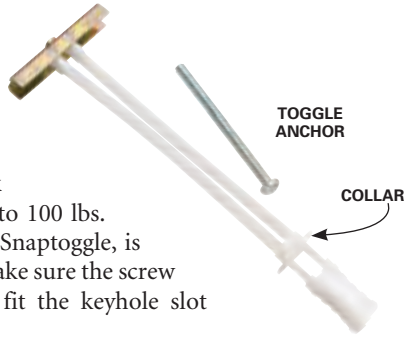
2 Place the level against the wall at the desired shelf height. Adjust it to level it and mark the wall at the two keyhole locations.



3 Drill a hole into the drywall at each mark and slip the toggle through the hole. Push in the plastic collar tight to the drywall.

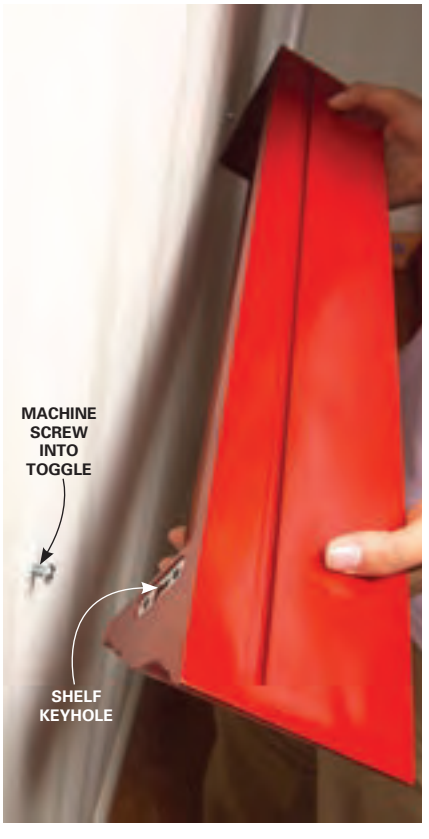
Many light-duty shelves have keyholes in the back. The keyholes slide over protruding screws for support. The trick is to precisely place the screws so they align with the keyholes.

Photos 1 – 5 shows a foolproof method that doesn't require any measuring or math. **Photo 2** shows a trick for transferring the keyhole locations to the wall. If the mounting screw locations don't land over studs, use wall anchors to support the shelf. We're using a slick toggle-type anchor that holds 60 to 100 lbs. and is easy to install. This brand, Snaptoggle, is available at most home centers. Make sure the screw heads supplied with the anchor fit the keyhole slot before you install the anchor. Otherwise go to a smaller size anchor.



Drill holes for the anchors at each mark and mount the anchors in the wall. Let the screws protrude enough for the keyholes to slide over them. Test-fit the shelf by aligning the keyholes with the screws and sliding it down. If the shelf won't slide on or is too loose, remove the shelf and adjust the screws until you get a snug fit.

4 Then break off the straps flush with the collar.



5 Drive the included machine screw into the toggle, letting it protrude about 3/16 in. Test-fit the shelf.

Hang a quilt without damaging it

1 **Sew the loop side of the hook-and-loop to the webbing. Then stitch the webbing to the back of the quilt using a herringbone stitch as shown.**

One good way to display a quilt is to hang it on a wall. But don't just tack it up by the corners or it'll stretch out of shape. Instead, use this method for hanging quilts or other decorative textiles because it distributes the weight evenly for smooth hanging and minimal stress to the fabric. The hand stitching (**Photo 1**) used in this method doesn't damage the quilt because it only goes through the backing, and it's easy to remove when you no longer wish to display the quilt.

Measure the top edge of the quilt and purchase the same lengths of 1-1/2-in.-wide sew-on hook-and-loop fastener strip and 2-1/2-in.-wide cotton or synthetic webbing. We found the hook-and-loop strip at a fabric store and the webbing at an upholsterer's shop. You'll also need a length of 1-1/2-in.-wide pine or poplar, a staple gun and several 2-1/2-in. wood screws.

Photos 1 – 3 show how to prepare and hang the quilt. If the quilt pattern allows, it's best to rotate the quilt 180 degrees every month or so. This relieves stress on the fabric and helps prevent uneven fading. To be able to rotate the quilt, you'll have to sew another strip of hook-and-loop along the opposite edge.

2 Staple the hook side of the hook-and-loop to the wood strip. Determine the best position, and level the wood strip and screw it to the studs.

3 Hang the quilt by smoothing the hook-and-loop tape that's sewn on the back of the quilt along the tape stapled to the wood strip.

Editor's Note

It's usually not hard to hang things on drywall. You can drive nails easily, and studs are simple to locate. Other types of walls present unique challenges. Plaster is harder than drywall and can crumble. But the pros we talked to say as long as you use professional picture hangers like the ones we show here (these have sharper nails and built-in angle guides), and use hangers a little larger than required, you'll usually be OK. In brick or stone, you can often drive a thin nail into the space between the mortar and the brick or stone. In brick, stone and concrete, you want to avoid making large holes because they're virtually impossible to hide if you move the picture. A good method for brick, stone or concrete walls is to drill a hole that's slightly smaller than the threaded part of a drywall screw. Use a masonry bit in a hammer drill and drill the hole at a slight downward angle. Then thread the screw into the hole, leaving about 1/4 in. sticking out for use as a hanger.

THE FAMILY Handyman®

More ways to get DIY jobs done right

The Family Handyman Magazine is North America's top DIY home improvement magazine, with new projects, repairs and tips in every issue. Subscribe and save at FamilyHandyman.com.

The Family Handyman for **iPad**® gives you each issue of the magazine, plus videos and bonus content. Get it on the App Store.

FamilyHandyman.com gives you instant access to thousands of projects, techniques and expert fixes. And it's all free!

We have **books** too! From storage projects to energy saving, get the tips and step-by-step advice you need at shopthefamilyhandyman.com.

Sign up for **FREE newsletters** at familyhandyman.com/freenewsletter. Get DIY tips, projects, expert repairs and more delivered to your inbox every week.

The Family Handyman eBooks cover a huge range of DIY topics, from tool tips and repairs to painting and flooring. Get them for your Nook, Kindle, iPad at familyhandyman.com/ebooks.

Whether you're an experienced DIYer or just getting started, we put know-how at your fingertips.