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2-hour, \$25 bench

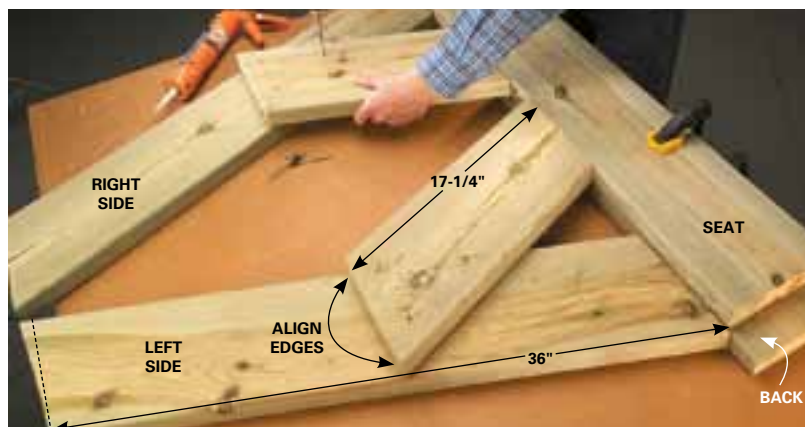
Need outdoor seating in a hurry? This simple bench, based on author and ecologist Aldo Leopold's classic design, can be constructed in a couple of hours. All it takes is two boards and 18 screws, for a cost of less than \$25.

Cut the legs from a 2x8 x 10-ft. piece of rot-resistant wood (Photo 1). Cut the seat and backrest from an 8-ft. 2x8.

Lay out and assemble the sides as mirror images, using the seat and back pieces for alignment (Photo 2). Join the legs with three 2-1/2-in. deck screws and construction adhesive. Pre-drill all the screw holes with a countersink bit to avoid splitting the wood. Finally, set the sides up parallel to each other and glue and screw the seat and back into place. Finish the bench with a coat of exterior oil or stain.

Cutting list

PCS.	SIZE & DESCRIPTION
(All from two 10' 2x8s)	
Rear legs	2x8 x 17-1/4" (22-1/2-degree cuts)
Front legs	2x8 x 36" (22-1/2-degree cuts)
Seat	2x8 x 42"
Back	2x8 x 45"



1 Starting at one end of a 10-ft. board, make the same 22-1/2-degree cut five times to create the four legs.

2 Clamp the seat and back to the workbench as a stop, then pre-drill, glue and screw the rear legs to the front legs.

OUR BEST Weekend Projects

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LOVE YOUR KITCHEN!

2
weekends

Paint your cabinets



New-looking cabinets in 3 steps:

- 1 Prep
- 2 Prime
- 3 Paint



You don't need to spend thousands of dollars on new cabinets to give your kitchen a stunning new look. If your cabinets are in good shape, you can give them a fresh face with paint. Everything you need to give your drab cabinets a silky smooth painted finish costs less than \$250—including the sprayer.

Professional painters typically spray-paint doors because it produces an ultra-smooth finish. Here you'll learn how to spray-paint your doors and drawers. There's just a short learning curve to use the sprayer effectively. You could also spray the cabinet frames, sides and trim, but masking off the cabinet openings (and the rest of the kitchen) takes a lot of time, so just use a brush for those areas.

You should know, there are downsides to a painted finish. The paint isn't as tough as a factory finish, and even if you're careful, you can still end up with paint runs and

have brush marks on your cabinet sides.

All the materials you need to paint your cabinets are available at home centers and paint stores. Plan to spend four or five days to complete the job—you'll have to let the paint dry overnight between coats, and you can only paint one side of the doors per day.

Is painting right for you?

Not all cabinets are worth painting. They must be structurally sound—paint obviously isn't a cure for doors that are falling apart or don't close properly. If your cabinets are oak or some other species with coarse grain and you want a smooth finish, you'll have to fill the grain on the door panels, cabinet frames and cabinet sides with spackling compound. That nearly doubles the length of this project because sanding the compound takes a long, long time (but if you don't



Shown here is a Wagner Control Spray Double Duty spray gun (model No. 0518052; \$70 at home centers and amazon.com). The high-volume, low-pressure (HVLP) sprayer gives the doors a thin, even coat of paint and makes quick work of painting. Here, 18 doors and four drawers were sprayed in less than 90 minutes per coat. The sprayer occasionally "spits" paint, but the Floetrol that you mix in levels out the finish. You can clean the sprayer in about 10 minutes.

Paint experts say you can get a nice-looking finish with non-HVLP sprayers too. But the advantages of an HVLP sprayer are that the low pressure produces little overspray, so most of your paint ends up where you want it—on the doors—and the spray is easy to control.

LOVE YOUR KITCHEN!



1 Wash off years of kitchen grease with warm water and dish detergent. Clean away all the grease or the primer and paint won't adhere. Rinse clean with water.



2 Tape off the walls, ceiling and flooring, and cover the countertops with rosin paper. Wrap appliances and the vent hood with plastic sheeting or masking paper.



3 Fix scratches, holes and dings with spackling compound. Work the compound into the damaged area with a putty knife. Fill in holes from handles and hardware if you're replacing the hardware and need holes in different places.



4 Prime the doors and cabinet frames with stain-blocking primer. The primer covers any stains and seals in cooking odors. Prime one side of all the doors, let them dry while you prime the cabinet face frames and sides, then come back and prime the other side of the doors.

mind a coarse finish, you can skip this step).

If you like the style of your cabinets and they're in good shape, and you're willing to invest the time to paint them, this project is for you.

Wash, rinse, tape, repeat

As with any successful painting project, preparation is the key—and the most time-consuming step. Start by removing the cabinet doors and drawers as well as all the hardware. Label the doors as you remove them so you'll

know where to reinstall them. Writing a number in the hinge hole (for Euro hinges) or where the hinge attaches works great—it's the only part that's not painted.

Take the doors and drawers to the garage or another work area and spread them out on a work surface. It's surprising how much space doors and drawers eat up—even if you have a small kitchen. An extension ladder placed over sawhorses gives you a surface to set the doors on. Wash the front and the back of the doors and the drawer fronts to remove grease (Photo 1). Then stick tape in the



5 Sand the doors and cabinets with fine-grit sandpaper. Sand with the grain. Be careful not to round over corners. Wipe the surface clean with a tack cloth.



6 Start in a corner to paint the cabinet frames. Use a high-quality paintbrush to paint an entire rail or stile, including the inside edge, before moving to an adjacent rail or stile.

hinge holes or where the hinges attach to keep out the paint.

Wash the grease off the cabinet frames in the kitchen, too. Then tape off everything that abuts the cabinet frames (Photo 2). Use plastic sheeting (\$13 for six 9 x 12-ft. sheets of 1-mil plastic) or brown masking paper (\$3 for 12 in. x 60 yds.) to cover appliances. Use rosin paper (\$12 for 3 ft. x 167 ft.) for countertops—it's thick enough to resist tears and won't let small paint spills seep through.

Give cabinets a fresh start with primer

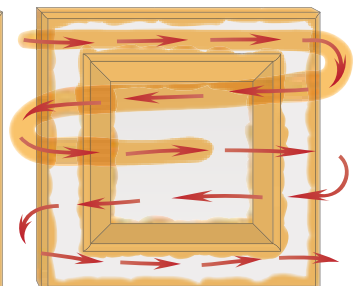
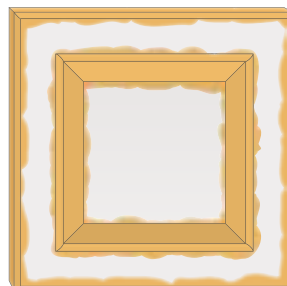
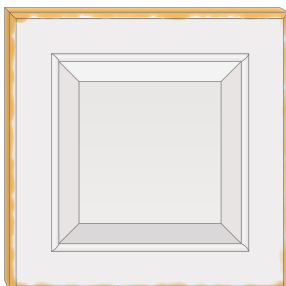
Some cabinets, have a catalyzed lacquer finish that's very hard. Primer won't form a good bond to this surface unless you scuff it up first. First sand any damaged areas on the doors or cabinet frames with 320-grit sandpaper to remove burrs or ridges, then fill the areas with spackling compound (Photo 3).

Lightly sand the doors and cabinet frames, trim and sides with 320-grit sandpaper. Sand just enough to take off the shine—you don't need to sand off the finish. Vacuum the dust off the wood using a bristle attachment. Right before you're ready to apply the primer, wipe down the doors and frames with a tack cloth (\$2 for a two-pack). Running the cloth over the surface is enough—you don't need to scrub to remove fine dust particles.

Apply a stain-killing primer (\$20 per gal.; Bulls Eye 1-2-3 and BIN are two brands) with a paintbrush (Photo 4). You can use a cheap brush—even a disposable one—for this. Don't worry about brushstrokes in the primer (you'll remove them later with sandpaper) or getting a uniform finish. The doors and frames don't have to look pretty at this stage. But don't use a roller. It leaves a texture that will affect the finish. Besides, brushing is almost as fast as rolling, and you can use the bristles to work the primer into crevices.

Figure A: Painting doors

Spray the door edges first. Then spray any detail work. Then spray the entire door, starting at the top and sweeping your arm back and forth until you reach the bottom. Keep the angle of the spray gun consistent as you spray.





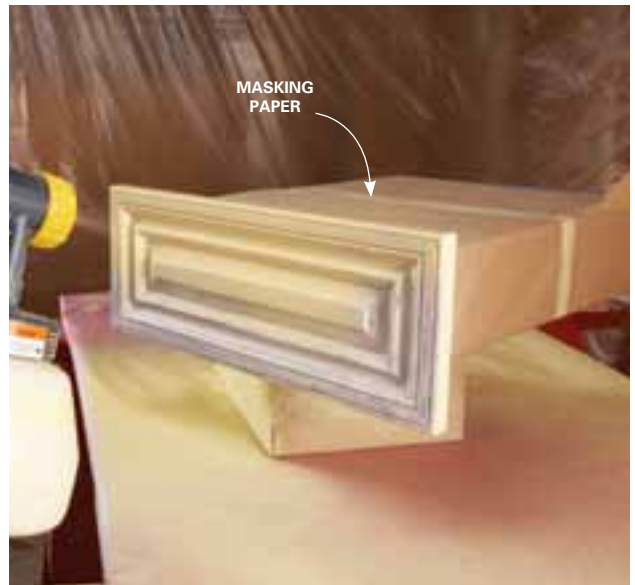
7 Practice spray painting on cardboard. Adjust the nozzle to get a vertical fan pattern. Adjust the flow rate so the paint covers the surface without running.



8 Set the doors on a turntable when spray painting. Then you can stand in one spot and rotate the door to paint each side. Keep the nozzle 10 to 12 in. from the door and maintain a consistent angle while spraying.



9 Paint the edge and detail work on one side, then turn the door to paint the adjacent edges and details. Start the spray before the door, and keep spraying past the edge. Don't worry if you missed a spot. You can catch it on the second coat.



10 Paint the drawers with the sprayer after wrapping the inside with plastic or paper. Paint the backs first, then the edges and then the faces, starting at the top and working down. Start and stop the spray past the sides of the drawer.

Once the primer is dry (just one or two hours), lightly sand the doors and cabinets with 320-grit sandpaper to remove any brushstrokes (Photo 5). Sandpaper works better than a sanding sponge—you can feel the rough spots through the paper, and paper doesn't round over corners like sponges do.

If you have doors with coarse wood grain (like oak) and want a smooth finish, fill in the grain with spackling compound (MH Ready Patch is one brand; \$6 at home

centers). Use a putty knife to skim-coat the door with compound, working it into the wood grain. Wait for it to dry, sand it with medium-grit sandpaper, then prime it again.

Complete the transformation with paint

Use a gloss or semigloss latex enamel paint for your cabinets. Its hard, shiny finish resists stains and fingerprints.

To get started, pour a gallon of the paint into a bucket



11 Fix paint runs with a paintbrush while the paint is still wet. If the paint is dry or tacky, wait until the next day, then sand out the run or imperfection and repaint.

and thin it with half a cup of water and half a quart of Floetrol paint additive (\$9 per qt.). The water and the Floetrol level out the paint when it's applied and slow the drying process, which helps eliminate brush and lap marks. The thinner paint also provides a more even coat when you're spraying.

Paint the cabinet frames with a brush (Photo 6). Paint an entire rail, stile or trim piece before the paint dries, then move on to the next part of the cabinet. Paint any exposed sides of cabinets with a brush. Most light brush marks will disappear as the paint dries (thanks to the Floetrol).

Before spray painting, construct a makeshift booth to contain the airborne spray. Assemble a work surface (putting boards over sawhorses works great), then hang plastic sheeting around the work area. Make sure to ventilate the room—even if it's just a fan blowing out an open window.

Fill the spray container with the paint mixed with Floetrol and water. Wear a mask respirator (\$8) when spray painting. Test the spray pattern on cardboard, keeping the nozzle 10 to 12 in. from the surface (Photo 7). Sweep your entire arm back and forth across the door panel; don't just use your wrist. Practice spraying on cardboard to get a feel for the sprayer. When you're ready to paint, set a block of wood or a cardboard box on the work surface to elevate the doors. Place a lazy Susan turntable (\$8 at discount stores) over the box, then set the door on top of it (Photo 8).

Spray the back of the doors first. This lets you get used to spraying before you paint the front. Start by



12 Reinstall the doors and drawers in the kitchen. Attach the hinges to the doors first, then screw them to the cabinet frames.

spraying the edges. Rotate the door on the turntable to paint each edge so you won't have to change your body position. Move your arm across the entire edge of the door, starting the spray before the paint lands on the door, and keep spraying past the end. Keep the nozzle 10 to 12 in. from the door. After painting all four edges, start at the top of the door and spray in a sweeping motion back and forth, moving down just enough each time to overlap the previous pass by 50 percent until you reach the door bottom.

Let the paint dry overnight. Then give the cabinet frames, sides and trim a second coat. Spray a first coat on the door fronts (Photo 9).

Cover the drawers with masking paper or plastic sheeting so only the paintable surface is visible. Set the drawer face down on the turntable and spray the back. Then place the drawer on its bottom and spray the front (Photo 10). Be careful not to overspray the drawer. It's easy to get runs in the paint on drawer fronts. Don't worry about areas that are lightly covered. You'll give everything a second coat.

If you catch paint runs while they're still wet, gently brush them out with a paintbrush (Photo 11).

Let the doors and drawers dry overnight, then give them a second coat. It's up to you if you want to give the back of the doors two coats. Shown is just one coat on the backs.

When the doors are dry, install the hardware and hang the doors (Photo 12). If any paint seeped into the hinge holes, scrape it out so the hinges will fit snugly.

LOVE YOUR KITCHEN!

Add storage with rollouts

If you're tired of digging through cans and boxes to find a jar of tomato sauce hidden at the back of the cabinet, these rollout bins are the perfect solution. You can size them to fit inside any lower cabinet and customize them to suit the items you want to store.

Here you'll learn exactly how to build them. The bins are simply plywood boxes with adjustable shelves—very easy to build. Sizing the boxes and mounting them on drawer slides can be tricky, but the techniques shown here make those steps nearly foolproof.

3 rollouts in

1
day



Money, time and tools

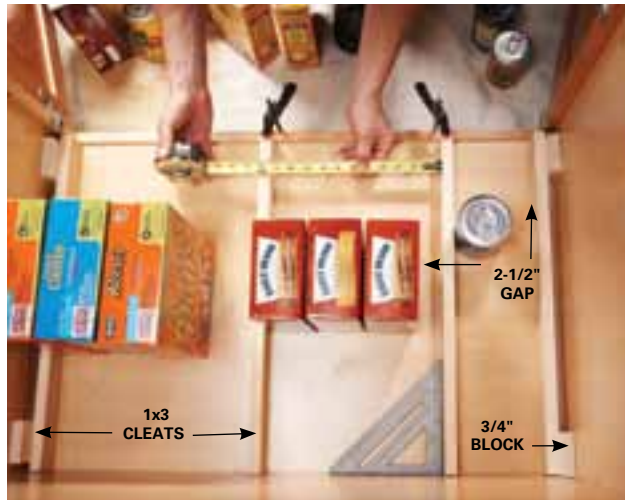
All the materials for these three rollouts cost just under \$100. You could buy and install a manufactured system, but expect to spend about \$80 per rollout.

You don't need advanced cabinet-building skills or tools to make your own rollouts—the joinery and assembly are simple. But a table saw is almost mandatory for fast, accurate, good-looking results. A pneumatic brad nailer will make the job faster and easier, although you can hand-nail or screw the parts together. Ordinarily, the side-mount drawer slides are tricky to install, but this project makes even that step foolproof, so don't let that part intimidate you. You'll be surprised how fast you can build yourself a few rollouts. Put in a full day and you'll be loading them with groceries that evening.

Sizing your rollouts

Everything you need for this project is available at home centers (see the Materials list, p. 13). You'll have to guess at the quantity of rollouts at this point so you can buy the proper number of drawer slides. One sheet of plywood will provide enough material for at least four rollouts. You can roughly figure one rollout for every foot of open base cabinet space you have. You can always return any uncut lumber or hardware you don't use.

To determine the width of your rollouts, gather the items you want to store. Cut the 1x3 cleats to length and space



1 Plan rollout widths by laying out the cleats along with the items you want to store. Space the end cleats with 3/4-in. blocks.



2 Assemble the boxes by gluing and nailing the front, top, back and bottom to the side panel and to each other. Nail the lip to the bottom shelf before assembling.



3 Drill 1-1/4-in.-diameter finger pull holes. Clamp a block against the back side to prevent splintering inside.

Get more storage space—without remodeling

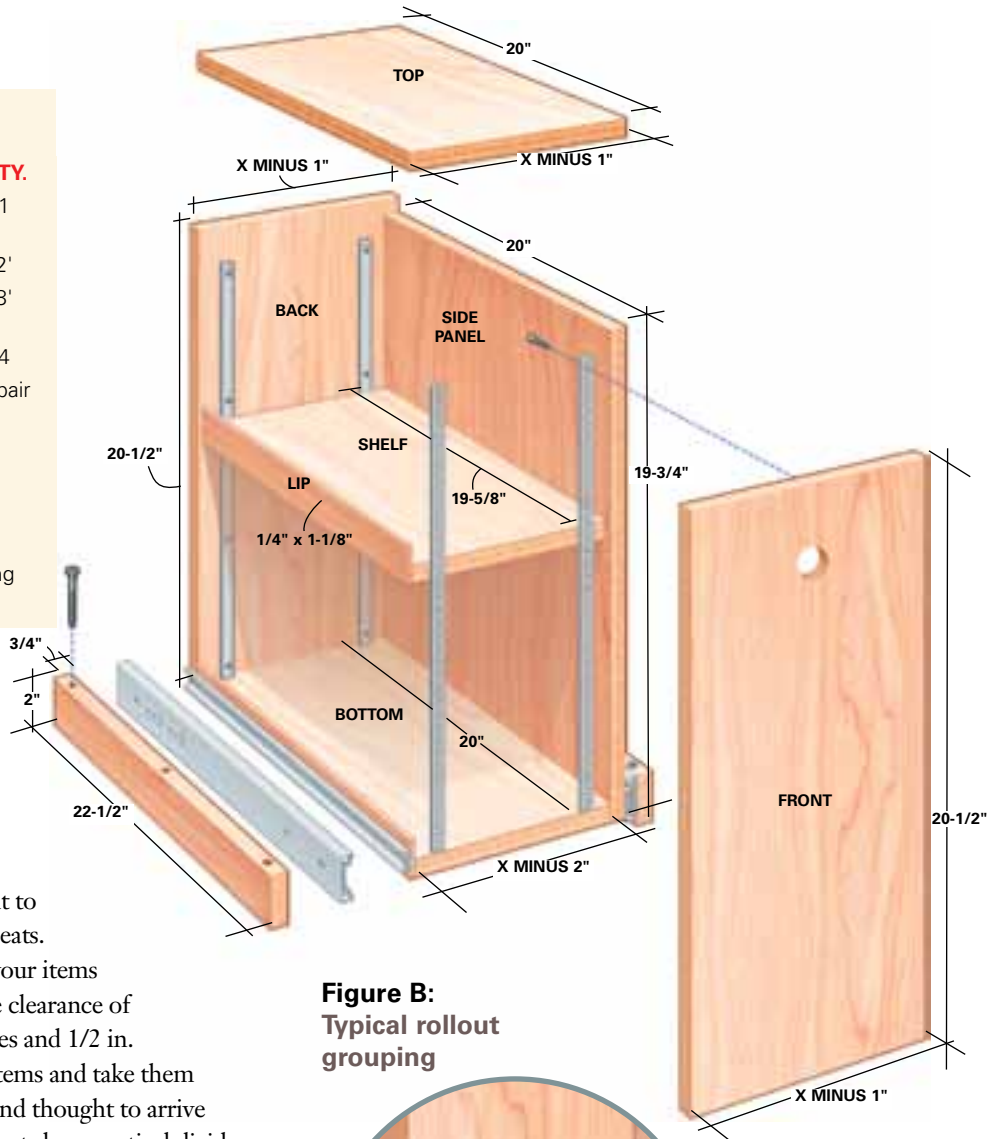
Lower cabinets offer the biggest storage spaces in most kitchens. But according to kitchen designers, the back half of this space is usually wasted—it's packed with long-forgotten junk or left unused because stored items are out of view and hard to reach. Rollout bins let you see and use the whole space.



Figure A:
Typical rollout

Materials list

ITEM	QTY.
1x3 the width of the cabinet (hold-down rail)	1
1x3 (drawer slide cleats)	2'
1/4-in. x 1-1/8-in. mullion (base and shelf front lips)	8'
2' shelf standards with clips	4
90-lb.-rated full-extension side-mount drawer slides	1 pair
1-1/2-in. pneumatic air nailer brads	
Wood glue	
Small box of 3-in. screws	
1-1/4-in. Forstner drill bit (for drilling finger pulls)	



them from each side of the cabinet with 3/4-in. blocks (Photo 1). That space allows the rollouts to clear the doors and hinges later. Then start arranging the items you want to store, separating them with the cleats.

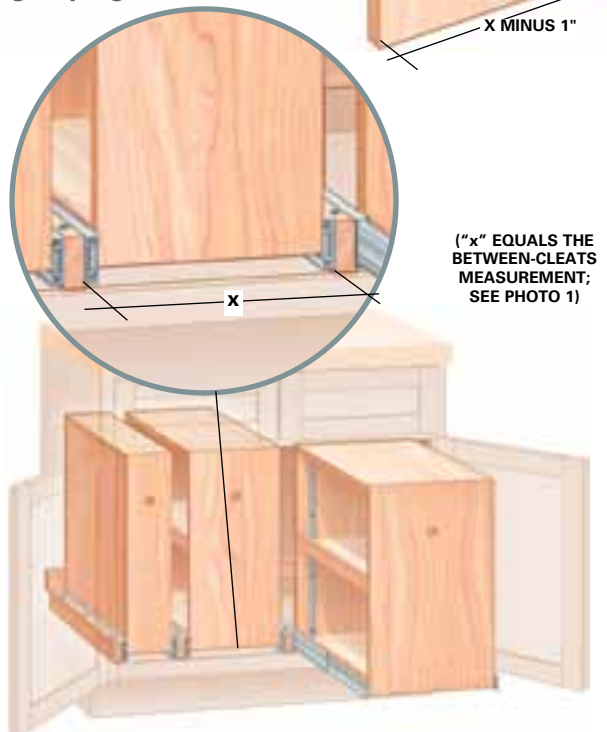
Leave at least 2-1/2 in. between your items and the cleats. This allows for the clearance of wood thicknesses and drawer slides and 1/2 in. extra to make it easy to load the items and take them out. It takes a bit of rearranging and thought to arrive at the best sizes. If your base cabinets have vertical dividers between the doors, give each opening its own rollouts.

You'll probably have some rollouts facing one way and some the other. That's because rollout access may be blocked by neighboring cabinets at inside corners or because some cabinet doors don't swing all the way open. Determine the access direction while you assemble your rollouts. That's as simple as drilling the finger pull hole at the proper end. After the boxes are assembled, they'll work for either orientation.

Choosing the materials

Choose any 3/4-in. veneered interior plywood for your rollouts. Avoid construction plywood; it won't be as flat and may warp later. If you'd like your rollouts to match your cabinets, choose whatever type of wood does the job. The plywood end grain is sanded on these, but if you'd like a more polished look, buy iron-on edge banding to match the wood type and iron it on after assembling the boxes.

Figure B:
Typical rollout grouping



Buy nice, straight, knot-free 1x3s for the cleats—the wood type doesn't matter. Select 22-in. European side-mount drawer slides rated to support 90 lbs. They'll come with their own screws and installation directions that show you how they work.

Cutting the parts

Most base cabinets are 22-1/2 in. deep and have a 21-in.-high opening (measured inside the face frame, not the cabinet interior). If your cabinets match these measurements, use the height and width dimensions shown in Figure A for all of the side panels. Also use Figure A for the lengths of each top, bottom, front and back panel and shelves. If your cabinets have shorter openings or are shallower, subtract those differences from the Figure A measurements to cut your parts. Calculate the rollout widths based on your layout work inside the cabinet (Photo 1). Subtract 1 in. from the distances between the cleats to get the width for each rollout's top, front and back panel. That'll leave the 1-in. clearance needed for the drawer slides. Subtract 2 in. to establish the width for each bottom panel and the adjustable shelves. That'll leave an additional 1-in. clearance for the thickness of the 3/4-in. side panel and the 1/4-in.-thick lip in the front.

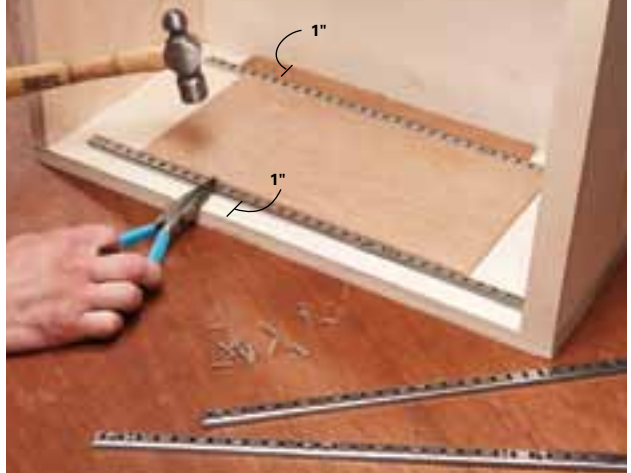
Be especially careful when you lay out the cleats, measure openings and cut the rollout parts. European side-mount drawer slides leave very little room for error. It's best to use a table saw for all of the cuts and to double-check widths and lengths so the boxes will fit together perfectly and engage and operate smoothly in the slides.

Assemble the rollout boxes

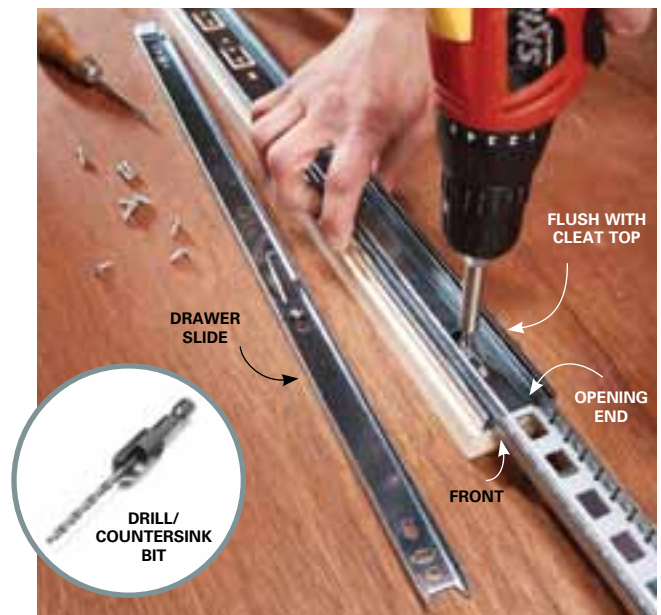
Glue and nail the lip on each bottom panel (and shelves) before assembling the rollouts. A thin bead of wood glue on each edge is all you need. Then hold the edges of each panel flush while you pin them together with 1-1/2-in. brads spaced about every 4 in. (Photo 2). Next, drill the 1-1/4-in.-diameter finger pull hole. A Forstner bit will make the neatest hole, but a sharp spade bit will work, provided you use a block on the back side to prevent splintering (Photo 3). The hole defines each rollout's open side.

Cut the 24-in.-long shelf standards down to 18 in. with a hacksaw. Look at the embossed shelf numbers to determine which end is the top and cut from that end. Nail the standards in place with the brads provided (Photo 4).

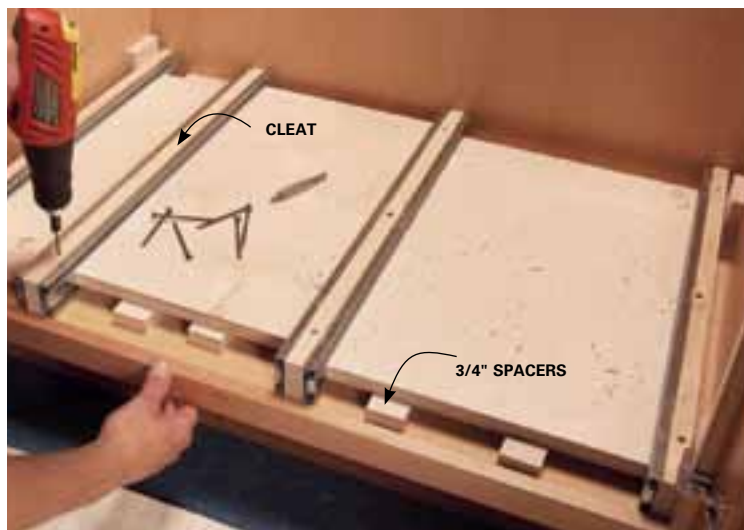
This is the best time to apply the finish of your choice to the rollouts. Lightly sand everything with 220-grit sandpaper and add the finish. These boxes have two coats of water-based polyurethane to protect the wood against dirty fingers and marks from cans.



4 Nail shelf standards to the inside of the front and back of each box. Use spacers to position them.



5 Screw the drawer slides to the cleats. Position each slide flush with the front and top of the cleat.



6 Pre-drill and screw the cleats to the cabinet. Use plywood scraps the same width as the boxes for perfect spacing.

LOVE YOUR KITCHEN!

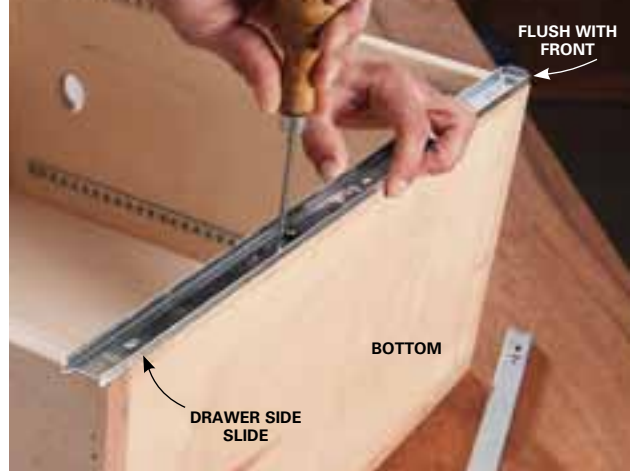


7 Screw the hold-down rail to the cabinet back directly above the cleats with 1-5/8-in. screws.

Install the drawer slides and cleats

Rip the 1x3s down to 2 in. and then screw on the drawer slides (Photo 5). It's easiest to remove the drawer part of the slide to access the anchor holes. Hold the slides flush with the top and front of each cleat while you punch little starter holes with a scratch awl, and then send in the screws. Drive just one screw at a time so you can adjust the placement as you add screws. You'll need right and left sides for the end cleats. Then remove the drawer side slides and lay the cleats in the cabinet.

Begin with one of the end cleats and press it against the temporary 3/4-in. blocks while you drill three 1/8-in. pilot holes. A combination drill/countersink bit works great for this. Then screw the cleat to the cabinet floor with 3-in. screws (Photo 6). Space the next cleat with a leftover scrap from the first rollout top, front or back. That way the spacing between the drawer slides will be perfectly sized for smoothly operating rollouts. Hold the spacer up from the cabinet floor with 3/4-in. blocks so it'll be centered on the drawer slides. Hold the cleat snug, but not tight, against the spacer while you drill and then screw it to the cabinet floor. Repeat that step with the rest of the cleats. Skip the 3/4-in. blocks on the last cleat and just use the rollout spacer. Screw a 1x3 "hold-down" rail to the back side of the



8 Release the drawer slides from the cleat slides and screw them to the side of each box flush with the bottom and the front.



9 Slip the box-mounted slides into the cleat slides and push the box all the way in to fully engage the slides.

cabinet (Photo 7). It'll help hold the rollout cleats in place when you pull out heavily loaded rollouts.

Finally, disengage the drawer side slides and screw them to the bottom of each rollout flush with the bottom and front (Photo 8). Finish up by inserting each rollout, then load them up!

Manufactured kitchen rollouts



Rollouts turn wasted space deep inside cabinets into accessible storage space.

Rollouts are one of the easiest and most satisfying upgrades you can make to your kitchen. They bring everything that's tucked out of sight in the back of cabinets right to your fingertips—you actually gain usable storage space.

If you don't want to pull out the tools to build your own rollouts, you can

shop for moderately priced yet sturdy ones online or at Lowe's and Home Depot. You simply mount them to the existing shelves in your cabinets with four screws.

The biggest mistake is ordering the wrong size. When you measure the opening in the front of the cabinet, be sure to account for the door, hinges and other obstructions.



This two-level rollout fits around the drainpipes under a sink.

1
weekend

Tile your backsplash with Mosaic tile

Nothing packs more style per square inch than mosaic tile. So if your kitchen's got the blahs, give it a quick infusion of pizzazz with a tile backsplash. Because the small tiles are mounted on 12 x 12-in. sheets, installation is fast. You can install the tile on Saturday and then grout it on Sunday.

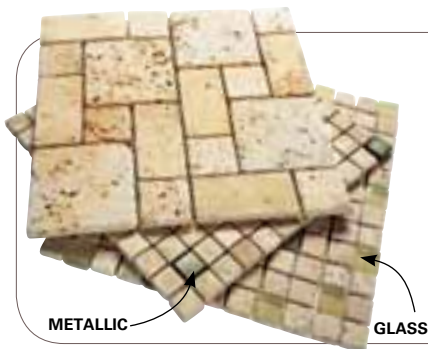
Professionals charge about \$20 per sq. ft. for installing the tile (plus materials), so you'll save \$20 for every sheet you install yourself. The sheets cost \$8 to more than \$20 each at home centers and tile stores.

The total cost for this backsplash was about \$200. The sheets of tile shown cost \$10 apiece plus adhesive and

grout. For an 8-ft. backsplash, you could save about \$45 by using a less expensive tile.

Shown here are slate tiles, which sometimes crumble when you cut them. Other types of mosaic tile, especially ceramic tiles, are easier to cut.

Here you'll learn how to install the tile sheets. You'll need basic tile tools, available at home centers and tile stores, including a 3/16-in. trowel (\$9) and a grout float (\$5). You'll also need mastic adhesive (\$11 for 1 gallon), grout (\$20 for the 17-lb. bag of premium grout shown) and grout sealer (\$10 for 1 qt.). You can rent a wet saw to cut the tiles (\$40 for four hours, or \$55 for the day).



Mosaic tile sheets make it easy to achieve a great backsplash. Layout is a cinch—you can simply cut the mesh backing on the sheets to fit the tile along counters and cabinets. In fact, the hardest part of this or any other tiling project may be choosing the look—the tiles come in a variety of shapes and materials, and many sheets have glass or metallic tiles built in for accents. To add to your options, strips of 4 x 12-in. tiles are available for borders. So you can match the existing look of your kitchen—or try something new!





1 Mark a centerline between the upper cabinets so the tiles will be centered under the vent hood. Screw a ledger board to the wall to support the tile.

Prepare the walls

Before installing the tile, clean up any grease splatters on the wall (mastic won't adhere to grease). Wipe the stains with a sponge dipped in a mixture of water and mild dishwashing liquid (like Dawn). If you have a lot of stains or they won't come off, wipe on a paint deglosser with a lint-free cloth or abrasive pad so the mastic will adhere. Deglosser is available at paint centers and home centers for \$8 for 1 qt.

Then mask off the countertops and any upper cabinets that will have tile installed along the side. Leave a 1/4-in. gap between the wall and the tape for the tile (Photo 1). Cover the countertops with newspaper or a drop cloth.

Turn off power to the outlets in the wall and remove the cover plates. Make sure the power is off with a noncontact voltage detector (\$15 at home centers). Place outlet extenders (\$1.80 at home centers) in the outlet boxes. The National Electrical Code requires extenders when the boxes are more than 1/4 in. behind the wall surface. It's easier to put in extenders now and cut tile to fit around them than to add them later if the tile opening isn't big enough. Set the extenders in place as a guide for placing the tile. You'll remove them later for grouting.



2 Spread a thin layer of mastic adhesive on the wall, starting at the centerline. Spread just enough adhesive for two or three sheets at a time so the adhesive doesn't dry before you set the tile.

On the wall that backs your range, measure down from the top of the countertop backsplash a distance that's equal to three or four full rows of tile (to avoid cutting the tile) and make a mark. Screw a scrap piece of wood (the ledger board) to the wall at the mark between the cabinets.

The area between the range and the vent hood is usually the largest space on the wall—and certainly the most seen by the cooks in the house—so it'll serve as your starting point for installing the tile. Make a centerline on the wall halfway between the cabinets and under the vent hood (Photo 1). Measure from the centerline to the cabinets. If you'll have to cut tile to fit, move the centerline slightly so you'll only have to cut the mesh backing (at least on one side).

Install and seal the tile

Using a 3/16-in. trowel, scoop some mastic adhesive out of the tub and put it on the wall (no technique involved here!). Spread the mastic along the centerline, cutting in along the ledger board, vent hood and upper cabinets (Photo 2). Then use broad strokes to fill in the middle. Hold the trowel at a 45-degree angle to the wall to spread



3 Tap the tile into the mastic with a wood scrap and a rubber mallet. Stand back, look at the tiles and straighten any crooked ones.

the mastic thin—you should be able to see the layout lines where the points of the trowel touch the wall. Have a water bucket and sponge on hand to keep the trowel clean. Whenever the mastic starts to harden on the trowel, wipe it off with the wet sponge.

Place plastic tile spacers on the ledger board and countertop. This leaves a gap so the tiles don't sit directly on the countertop (you'll caulk the gap later).

Align the first tile sheet with the centerline, directly over the spacers. Press it onto the wall with your hand. If the sheet slides around and mastic comes through the joint lines, you're applying the mastic too thick (remove the sheet, scrape off some mastic and retrowel). Scrape out any mastic in the joints with a utility knife.

Eyeball a 1/16-in. joint between sheets of tile (you don't need spacers). After every two or three installed sheets, tap them into the mastic with a board and rubber mallet (Photo 3).

If tiles fall off the sheets, dab a little mastic on the back and stick them right back in place. The sheets aren't perfectly square, so you may need to move individual tiles to keep joints lined up. Move the tiles with



4 Cut tile sheets to the nearest full row to fit around outlets, then fill the gaps with tiles cut on a wet saw.

your fingers or by sticking a utility knife blade in the joint and turning the blade. If an entire sheet is crooked, place a grout float over the tile and move the sheet. You'll have about 20 minutes after installing the tile to fine-tune it.

If you're lucky, you can fit the tile sheets under upper cabinets and around outlets by cutting the mesh backing with a utility knife. If not, you'll have to cut the tile with a wet saw. Nippers and grinders cause the slate tiles to shatter or crumble, although you can use these tools on ceramic tile.

Slice the backing to the nearest full row of tile, install the sheet around the outlet or next to the cabinet, then cut tiles with a wet saw to fill the gaps (Photo 4). Cut the tiles while they're attached to the sheet. Individual tiles are too small to cut (the blade can send them flying!).

Let the tile sit for at least 30 minutes, then apply a grout sealer if you're using natural stone (like slate) or unglazed quarry tile. The sealer keeps the grout from sticking to the tile (it's not needed for nonporous tiles such as ceramic). Pour the sealer on a sponge, then wipe on just enough to dampen the tiles.



5 Force grout into the joints with a float. Scrape off excess grout by moving the float diagonally across the tile.

Grout and clean the tile

Wait 24 hours after installing the tile to add the grout. Use a premium grout that has a consistent color and resists stain. Since the backsplash will be subject to splatters and stains from cooking and food prep, spend the extra money for a premium grout. You can find or special order it at home centers or tile stores. One brand is Prism (custombuildingproducts.com; 800-272-8786). Sanded grout will also work and will save you a few bucks.

Mix the grout with water until it reaches mashed potato consistency, then put some on the wall with a grout float. Work the grout into the joints by moving the float diagonally over the tiles (Photo 5). Hold the grout float at a 45-degree angle to the tile. Scrape off excess grout with the float after the joints are filled.

Ten minutes after grouting, wipe the grout off the surface of the tiles with a damp sponge. If the grout pulls out of the joints, wait another 10 minutes for it to harden. Continually rinse the sponge in a bucket of water and wipe the tiles until they're clean.



6 Rake the grout out of the joints at inside corners and along the bottom with a utility knife so you can fill them with caulk. Keep the dull side of the blade along the countertop.

These slate tiles have a lot of crevices that retain grout. While most of the grout comes off the tiles with the wet sponge, some won't. Most pro installers leave some grout in slate and other rough-surface tile—it's just part of the deal with some types of natural stone. But if you want the tile completely clean, remove the grout from individual tiles with a toothbrush.

After cleaning the wall, use a utility knife to rake the grout out of the joints along the bottom of the backsplash and in the inside corners (Photo 6). These expansion joints allow the wall to move without cracking the grout.

Two hours after grouting, wipe the haze off the tiles with microfiber cloths. Then caulk the expansion joints with latex caulk. Use a colored caulk that closely matches the grout.

After seven days, sponge on a grout sealer to protect the grout against stains.

That's it! Now every time your family and friends gather in your kitchen, they'll be impressed with your custom backsplash.

1
weekend

Tile your backsplash with stainless steel tile

Incredible drama, itty-bitty effort. Stainless steel tiles are easy to install, last forever and don't require grouting. If there's any downside, it's that they cost about \$15 to \$20 per sq. ft. You can install the tile directly over any wall surface that's flat and sound, but clean the wall first so the adhesive will stick.

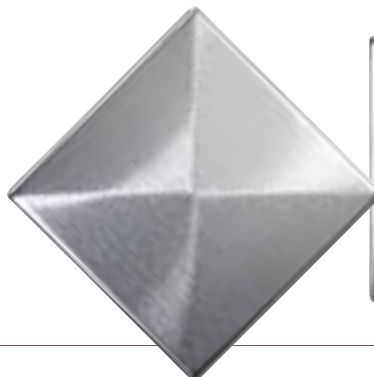
Besides standard carpentry tools, you'll need a rotary tool (\$40 to \$90) fitted with a metal-cutting disc, and a tile-cutting diamond wet saw. You can rent the wet saw (about \$40 a day) or buy a table saw-type wet saw for under \$100.

Order the tile

Stainless steel tile is available from several online sources. The tile shown here is from Aqua Design at stainlesssteeltile.com. Once you find a tile size and style you like, decide on an installation pattern. You can combine different shapes to form a design or install the tiles in a traditional stacked or subway style as shown here. Most stainless steel tiles have a backing that makes them easy to install. Some even have a peel-and-stick back. At Aqua Design, you can choose from cork, hardboard and cement board backing. Cork

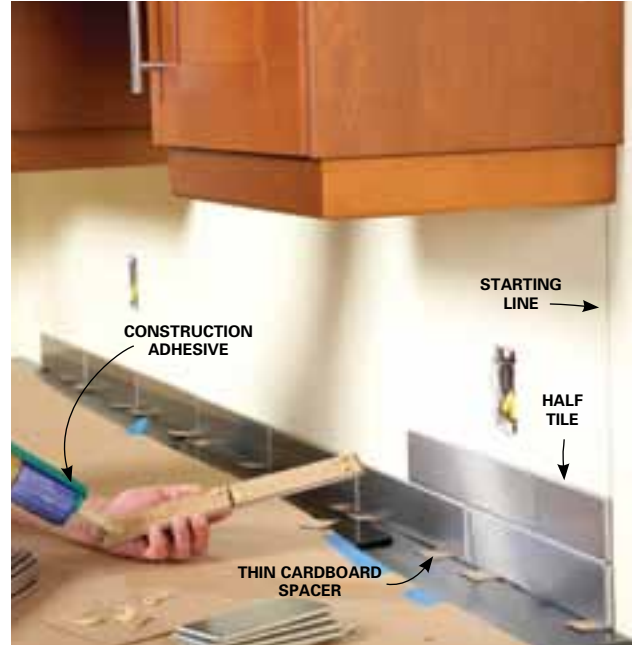


Stainless steel, aluminum and copper tiles are available in many styles, in brushed or shiny finishes. The far right tile is embossed; some tiles are even bowed to create a basket-weave look.





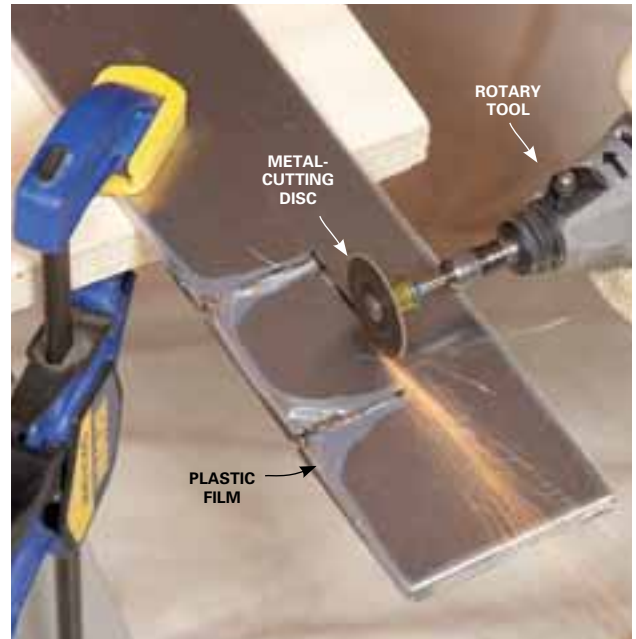
1 Try out the layout. Hang the tiles with masking tape to determine the best layout. By shifting the tiles to the left or right, you can avoid cutting small slices of tile to fill in at the ends.



2 Go light on the glue. All it takes is a small dab at each corner. If you use too much, the glue will squeeze out between tiles. Place cardboard shims under the first course to provide space for caulk.



3 Mark for an outlet cut. Hold the tile in position to mark both sides of the electrical box. Then remove the tile and measure the distance from the tile below to the bottom of the box and mark this on the tile.



4 Notch with a rotary tool. Clamp the tile and cut the notch. Cut notches with a rotary tool. Don't worry about the protective film on the tile; it will loosen along the cut, but it won't melt or burn.

is good for backsplash installations. Use cement board in wet areas like showers.

Use graph paper or a computer drawing program to plan the pattern and calculate how many pieces of each

size of tile you'll need. Order several extra tiles in case you miscut one or miscalculate the amount. Shown is a subway pattern using 12 x 2-1/4- in. tiles. If you have an open end on your wall and you're installing the tile in



5 Mark, don't measure. To avoid mistakes in measuring, hold the tile in place and mark it instead. For accuracy, use a fine-tip permanent marker. Hold a border tile in position and mark where it intersects the next full tile. Draw a level line across the tile at the mark.

a subway pattern, make sure to order half tiles to start every other row (Photo 2).

Prepare for tiling

Before you get started, find a long straight board or metal straightedge and use it to determine whether the walls in the backsplash area are flat. If the walls have humps or depressions, the tile will be uneven. For a great-looking job, you should fix these problems now, either by filling in the low spots with a layer of joint compound or by filling alongside humps and feathering them out to make them less pronounced.

Next, plan the installation to avoid skinny tile cuts if possible. Photo 1 shows one method. You can also make a scale drawing and sketch the layout on paper, or make a template of your backsplash with butcher paper or cardboard and lay the tiles over it. The idea is to adjust the layout for the most pleasing look.

It's dangerous to work around live outlets with metal tiles. Before you begin the installation, turn off the power to the kitchen outlets and lights at the main electrical panel. Remove the outlets and switches in the backsplash area and cap the wires if you want to replace the devices with gray ones. If you plan to keep the same outlets and switches, wrap two layers of wide blue painter's tape around the entire device to cover the face and terminal screws. Then twist the device so that you can push it partially into the box where it will be out of the way. Leave



6 Cut cool with a wet saw. Make straight cuts with the wet saw. A dry diamond or abrasive blade will cut stainless steel, but the heat buildup may damage the tile.

the power turned off while you install the tiles.

Before you reinstall the outlets and switches, add box extensions to bring the face of the electrical box flush to the face of the tile. You'll find plastic box extensions at home centers and hardware stores. Arlington Industries is one manufacturer.

Glue the tiles to the wall

The cork-backed stainless steel tiles shown are held to the wall with construction adhesive (Liquid Nails is one brand; \$2 at home centers). You can leave spaces between the tiles and grout them just like ceramic tiles, but they look better set tight together. Grout lines detract from the metallic look. Peel off the protective plastic coating after you're finished installing the tiles.

The best way to cut stainless steel tiles is with a diamond wet saw. Cut the tile face up so that any lip that forms is on the back of the tile. Handle the tile carefully. The cut metal edges are very sharp. It's difficult to cut notches with a wet saw. A rotary tool fitted with a metal-cutting disc is a good tool for cutting notches and other intricate shapes (Photo 4).

Rest the first row of tile on thin cardboard shims (Photo 2). Cardboard from the back of a legal pad is the right thickness. This leaves a space for caulk under the tiles and allows you a little room to adjust the tile if the countertop isn't perfectly flat. When you're done installing the tile, fill this gap with a very thin bead of clear silicone caulk.



1
day

Dress-up your cabinet doors with glass

A pair of glass doors can add a designer touch to any kitchen. They can turn an ordinary cabinet into a decorative showcase or simply break up an otherwise monotonous row of solid doors. This alteration works only for frame-and-panel cabinet doors (see Figure A), where

you can replace the inset wood panels with glass. Converting the two doors shown here took about two hours.

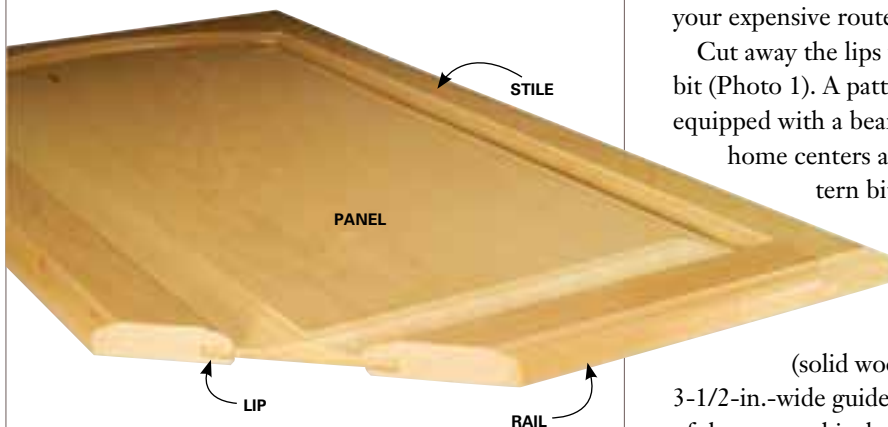
To get started, remove the doors from the cabinets and remove all hardware from the doors. Examine the back side of each door; you might find a few tiny nails where the panel meets the frame. If so, gouge away wood with a utility knife to expose the nail heads and pull the nails with pliers. Look carefully; just one leftover nail will chip your expensive router bit.

Cut away the lips using a router and a 1/2-in. pattern bit (Photo 1). A pattern bit (\$25) is simply a straight bit equipped with a bearing that rolls along a guide.

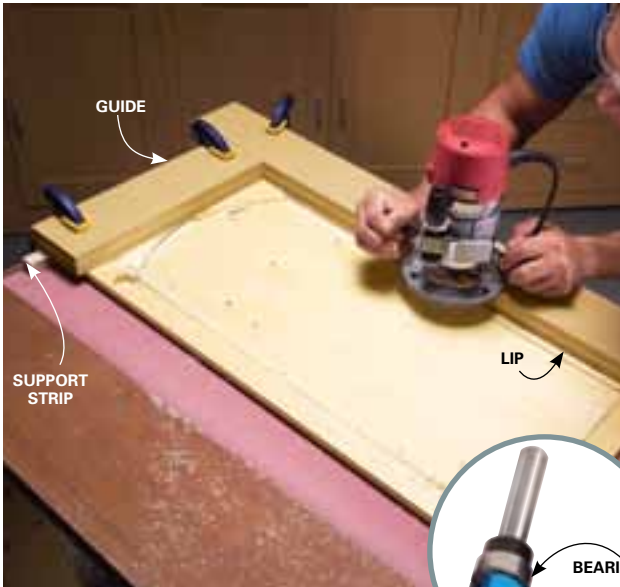
Most home centers and hardware stores don't carry pattern bits. You can order one at eagleamerica.com (800-872-2511). Be sure to choose a bit that has the bearing on the top, not at the bottom.

Use any straight, smooth material (solid wood, plywood or MDF) to make two 3-1/2-in.-wide guides. To allow for the 1-in. cutting depth of the pattern bit shown, layers of plywood and MDF were nailed together to make 1-3/8-in.-thick guides. Position the guides 1/2 in. from the inner edges of the lips and clamp them firmly in place over the door. Support the outer edges of the guides with strips of wood that match

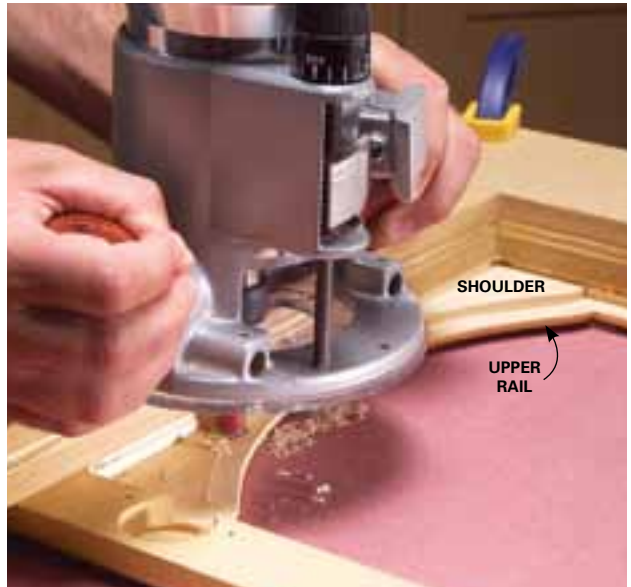
Figure A:
Panel door profile



Most cabinet doors are made like this one: A raised or flat panel fits into grooves in the rails-and-stile frame. To remove the panel, just cut away the lips on the back side of the door.



1 Clamp router guides to the back side of the door. Run a pattern bit along the guides to cut away the inside lips.



2 Lower the router bit and cut away the shoulders on the back side of an arched upper rail to create a square recess for the glass.

the thickness of the door to keep them level (Photo 1). Before you start routing, make sure the door itself is clamped firmly in place.

Set the router on the guide and adjust the cutting depth so that the bit just touches the panel. Cut away the lips on two sides, then reposition the guides to cut away the other two. With the lips removed, lift the panel out of the frame. If the panel is stuck, a few light hammer taps will free it.

If your door frame has a rectangular opening, it's now ready for glass. If it has an arched upper rail, cut a square recess above the arch (Photo 2). This allows you to use a rectangular piece of glass rather than a curved piece (curved cuts are expensive). Then simply lay the glass in and anchor it with glass clips (Photo 3). Clips are available from the glass supplier or at wwhardware.com, (800-383-0130; item No. LAH264; \$4 for 20 clips).

If the glass rattles in the frame, add pea-size blobs of hot-melt glue every 12 in.



3 Set the glass into the frame and secure it with glass clips placed no more than 12 in. apart. Then reinstall the doors.

Buying glass

Most hardware stores carry clear glass (\$3 per sq. ft.) and will cut it for free or a small fee. Ask for 3/16-in.-thick "double strength" glass. Order glass panels 1/8 in. smaller than the recess in the frame. To find tempered, textured or colored glass (\$5 to \$15 per sq. ft.), do a search online for "glass." For the clear textured glass shown here, the supplier charged an extra \$60 to have the two panels tempered. Building codes require tempered glass for locations within 5 ft. of the floor.

1
day

Dress-up your cabinet doors with metal



1 A door panel fits into grooves in the door's frame. To remove a panel, just cut away the lips on the back of the door.

Installing new panels in old cabinet doors can really dress up a kitchen (and new panels are *a lot* cheaper than new cabinets). Insert materials include glass (at left), translucent plastic, copper, metal, fabric, wicker and many others. Adding “feature” inserts to just one or two of your cabinet doors can be striking and very inexpensive.

Remove the panels

To cut away the lips that secure the door panel (Photo 1), you'll need a pattern bit—a straight router bit with a bearing that's the same diameter as the cutting diameter (see photo p. 28). You can buy a pattern bit for about \$25, but most are too long to use with a 3/4-in.-thick guide. You may have to shop online to find a shorter bit. One source is routerbits.com. (Search for “3001” to find a bit with a cutting depth of 1/2 in.)

If you're working with just one or two cabinet doors, the only guide you'll need is a straight board. If you have a stack of doors to rout, a more elaborate guide will save you time (Photo 2). The stops automatically position the guide without measuring, and you can rout two sides without repositioning.

Examine the back of the door before you rout. If you find any nails, pull them out so they don't chip your



2 Run a pattern bit along a guide to remove the lips. Any straight board will work as a guide, but an L-shaped guide with stops speeds up the job.

router bit. Before you start cutting, set your router depth so the bit just touches the panel. After you cut away the lips, simply lift out the door panel. The router bit will leave rounded corners at each corner of the door frame; square them off with a chisel or utility knife.



3 Frame the back of the insert with quarter-round molding to hold the metal in place. If you use a nail gun, aim carefully so you don't shoot through the face of the door.

Install the metal inserts

Prefinish 1/4-in. quarter-round molding and use it to secure the inserts (Photo 3). When you place the insert into the door frame, make sure the punched side is face up (the punched side will feel slightly raised around the holes). Fasten the quarter round with 5/8-in. nails or brads. If you don't have a brad nailer or pinner, you can use a hammer; just be careful not to dent the metal.

Buying metal inserts

Some home centers carry sheets of metal (including perforated) and will cut them for you for a small fee. But you'll find a much bigger selection online. Look for metal in the 16- to 20-gauge range. The metal inserts shown here were purchased directly from McNichols Co. (mcnichols.com) and were ordered over the phone. Their Web site is full of information (and a bit confusing). Look at its "Products" drop-down menu and go from there.

Do your measuring after you remove the cabinet doors to get accurate insert measurements. Order inserts 1/8 in. shorter in both the length and the width so the inserts just fit in the opening. If stainless is out of your price range, consider aluminum or plain steel (called "mill finish"). You can spray-paint your metal any color you want. No matter what finish you order, wash the metal with paint thinner to rinse off the manufacturing oils. If you choose not to paint the steel, spray it with a clear lacquer to prevent it from rusting.



Full Cloverleaf



Grecian



Windsor



Hexagonal

Replace your countertop with granite tile

Gorgeous and tough, granite makes a great countertop material. Unfortunately, greatness has its price: Granite slab countertops start at about \$100 per sq. ft. Instead, budget-conscious builders and homeowners have used granite tile for decades—and now there are granite tiles designed especially for countertops.

Here you'll learn how to install these special tiles. Since a countertop sits just a couple of feet below eye level, minor mistakes are easy to see. So you'll learn how to set your tiles flat, even and perfectly aligned.

Money, time and tools

The materials bill for this countertop and backsplash was less than \$50 per sq. ft., including everything from screws and backer board to the tiles themselves. The number of inside and outside corners has a big impact on the total cost: Corners cost about \$40 each. Standard bullnose tiles cost \$20 and field tiles just \$10 each.

This is a two-weekend project for a typical kitchen. You'll spend about half that time tearing out your old countertop and creating a solid base for the tile. A countertop requires a bit more skill and precision than a wall or floor, so this might not be a good first-time tile

project. In addition to standard tile tools, you'll need to rent a tile saw for a day (about \$50). You can't cut the tiles with a manual cutter. Aside from the tile, all the tools and materials you'll need are at home centers.

Order the tile

A few weeks before you tear off your old countertops, pull out a pencil and pad and calculate the number and types of tiles needed. Measure, then sketch your countertop on graph paper, including the sink. Label the tiles (bullnose, field, corners) to assess what's needed where. To see some sample layouts, go to benissimosystems.com.

When you arrive at a final count, you're almost ready to place your order. Because the tiles are color-matched before shipping, order a few extra to allow for cutting mistakes. Three extra field tiles and two extra bullnose tiles is a safe allowance for a simple job, but for a complex project, you might want extra insurance.

Build a solid base

According to the manufacturer of the tiles shown here, they can be installed directly onto an existing laminate countertop *if the laminate is attached to a 3/4-in.-thick*

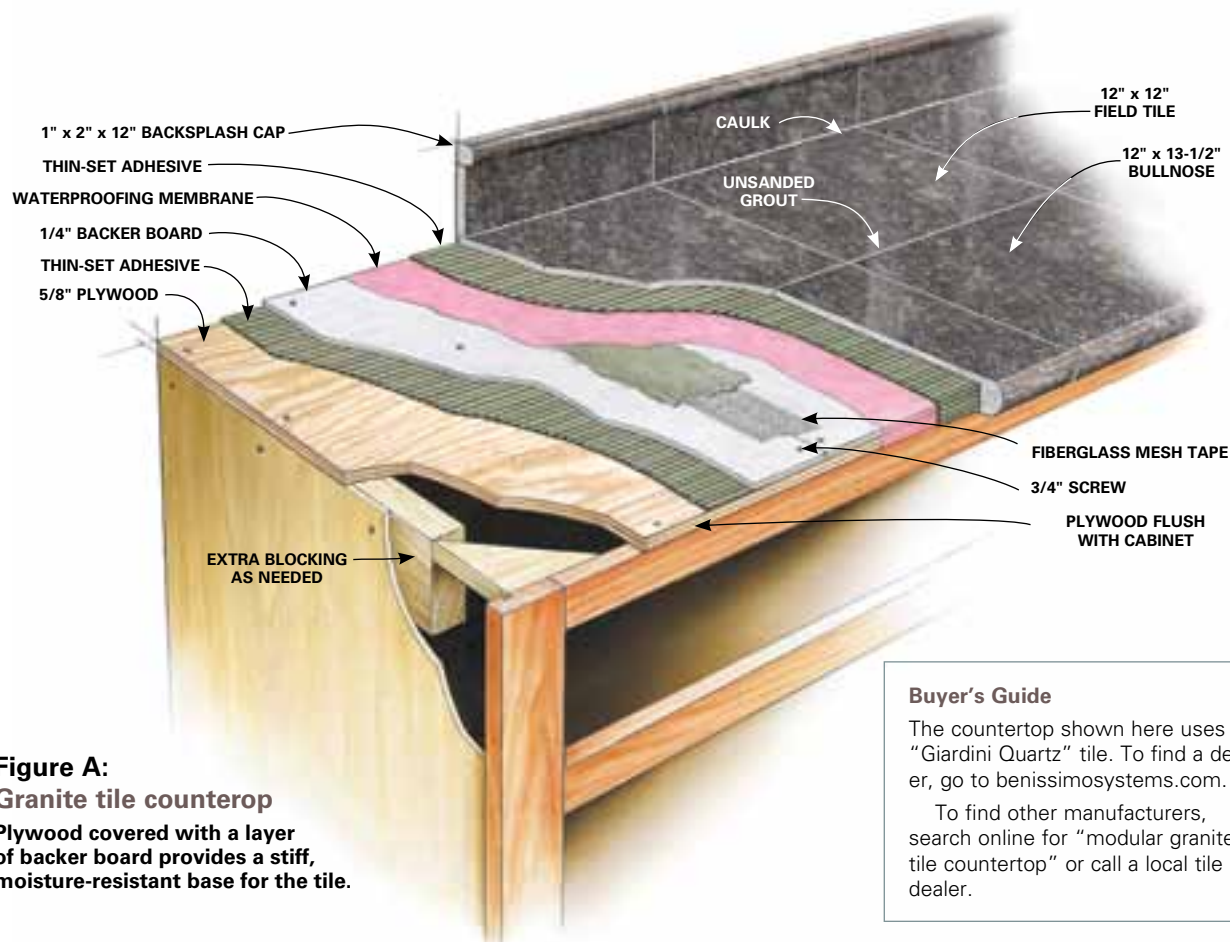


Figure A:
Granite tile countertop

Plywood covered with a layer of backer board provides a stiff, moisture-resistant base for the tile.

Buyer's Guide

The countertop shown here uses "Giardini Quartz" tile. To find a dealer, go to beissimosystems.com.

To find other manufacturers, search online for "modular granite tile countertop" or call a local tile dealer.

plywood substrate. Since the vast majority of countertops have a particleboard core, chances are you'll have to tear out your countertop and start from scratch. For step-by-step instructions on how to remove your old countertop and build a base for the tile, go to our Web site (see p. 35). For construction details, see Figure A. Seal the backer board with a waterproofing membrane (Photo 1) for extra insurance. This coating prevents moisture from passing through the backer board and causing the plywood to swell or delaminate.

Make a dry run first

Once the base is in place, you're set to start laying tile. But first do a dry run. Dry-fitting gives you time to experiment with the arrangement of the tiles so that the natural color and grain variations flow from one tile to the next. A dry run also lets you cut the tiles all at once and minimizes the total rental fee for the tile saw.

The manufacturer recommends setting tiles tightly together and filling the shallow V-shaped bevels between them with grout. Shown here are 1/8-in. gaps between tiles made with tile spacers. That allows a little room for error in cutting and placing tiles and allowed the tiles to conform to this L-shaped countertop, which wasn't perfectly square.

Start the dry run from an inside corner and work out-

ward so that the two mitered inside corner tiles fit together perfectly. Continue working out from the corner, laying a few bullnose tiles and filling in the back with field tiles.

Cutting bullnose tiles with a wet saw isn't any more difficult than cutting regular tiles, except that you'll need to stack a few plywood scraps under the tile so that you can cut the bullnose edge first (Photo 2). To avoid chipping or cracking the tile, guide it slowly and steadily past the blade. It's OK if a wall-facing cut is a little rough, but for visible cuts, smooth the sawn edge and create a slight bevel along the top edge with a honing stone (Photo 3).

After laying out all the tiles, label them and make a simple layout map (Photo 4) so you can set each tile right where it belongs later. Finally, remove the middle tiles and use the remaining end and corner pieces to draw guidelines (Photo 5).

Set the tiles

It's time to mix the thin-set. To prevent the tiles from sinking, aim for a peanut-butter-thick mix. When combed out with a 3/8-in. notched trowel, the thin-set should hold sharp ridges without slumping.

Lay the tiles from the inside corner out (Photo 6), just as you did during the dry run. Instead of fussing over each tile, lay two or three tiles at once, then treat them



1 Protect the tile base against water damage with a coat of waterproofing membrane.



2 Set bullnose tiles on scraps of plywood to cut them. Granite is difficult to mark clearly, so stick on some masking tape and mark the tape.



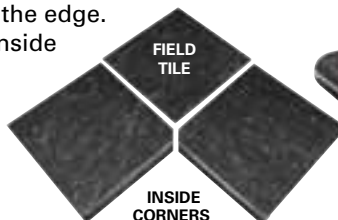
3 Rub cut edges with a honing stone to bevel the edge slightly. Rub in a circular motion to avoid wearing a groove in the stone.



4 Number the tiles and sketch a layout map after the dry run. Remove the tiles and use the map to put each tile back in the correct order later.

Granite tile made just for countertops

The tile shown here has a thick, rounded “bullnose.” That gives the front edge of the countertop a more elegant look than standard tile can and eliminates the slow, fussy task of cutting and installing thin strips of tile to cover the edge. There are outside corners, premitered inside corners and standard bullnose tiles. Special backsplash pieces are available too. The field tiles are just like standard granite floor tiles.





5 Draw a baseline from the inside corner tiles to the end tiles. Use this line as a guide as you set the front row of tiles.



6 Work in small sections, spreading just enough thin-set to set eight tiles. That gives you plenty of time to set and adjust tiles before the thin-set becomes too stiff.



7 Lay tiles perfectly flat using a straightedge. Set a “tester” tile on a spacer to account for the thickness of the thin-set. Run the straightedge from the tester to the tile you’re setting to check for flatness.

Tile setter’s lifesaver

A suction cup tool (\$12) is typically used for handling glass. But it’s also great for tricky tile situations. For this project, you set the front tiles first and then insert field tiles between them and the wall. The suction cup lets you set these tiles perfectly. Without it, you’d have to drop the tiles into place, risking chipped edges.

Better yet, a suction cup saves the day when you notice a sunken tile that’s already surrounded by other tiles. The ability to lift a tile straight up saves you the hassle of removing and resetting several neighboring tiles just to get at one sinker.



as a unit. Once you’ve positioned the tiles, use a straightedge to make sure they’re set flat (Photo 7). At the beginning, you’ll need to place a dry-laid tester tile on top of a 1/8-in.-thick spacer (such as a layer or two of cardboard). As you proceed, rest the level on the first tiles you’ve laid to help gauge the rest. After checking the height, nudge the straightedge against the bullnose edges to be sure the front edge stays straight and lines up with your guideline.

Be careful when adjusting tiles. Granite is tough stuff, but it’s surprisingly easy to crack. To slide freshly set tiles, use your utility knife. Stab the point of the blade into the backer board, then lever the side of the blade against

the bottom edge of the tile. If a tile sinks lower than its neighbors, lift it straight up with a suction cup (see above), scrape off the old thin-set, trowel on a fresh layer, then reset. Trying to tap down a high tile almost always causes a crack. Instead, try gently pressing and wiggling so the excess thin-set can squeeze out an open end. If that doesn’t work, lift the tile and scrape away the excess thin-set. Clean out any thin-set that oozes out between the tiles as you go, before it has a chance to harden (Photo 8).

Thin-set sets quickly, but to be safe, give the counter a few hours (preferably overnight) to harden before starting the backsplash (Photo 10). Make sure your new backsplash



OLD CREDIT CARD

8 Plow out thin-set that oozes up between tiles before it hardens. An old credit card fits into the narrow gaps and won't scratch the tile.



SHIMS

9 Shim the narrow tiles in front of the sink to keep them from tipping forward. Align the tops and fronts of these tiles using a straightedge.



SPACER

10 "Back butter" the backsplash and cap pieces to minimize the mess on the wall. Support backsplash tiles with spacers to leave a 1/8-in. gap for caulk.



11 Seal the tiles with a penetrating stone sealer after the grout has dried. A foam paint roller applies the sealer quickly and evenly.

isn't higher than your outlets before mixing any mortar. To prevent sliders, give your freshly tiled backsplash a day to cure before removing the spacers and packing the grout.

Grout, seal and caulk

Once the granite's in place, this job is like any other tiling project. Use a float to pack grout into most of the lines, but you'll probably need to use your finger to work grout into the curves, such as the bullnose front edge and the backsplash cap. Sponge off the excess when the grout begins to harden. Wait until the grout is fully dry before buffing off the remaining haze with a clean cotton towel. You can now

reinstall the sink, stove and other appliances.

Some foods and cleaners can stain or even etch granite and grout, so apply a stone sealer (Photo 11). Finally, lay a thin bead of caulk along the joint where the counter meets the backsplash.

tip

More help online. For help building a base for tile over your cabinets, plus more on granite tile installation, search for "granite tile countertop." For tips on cutting tile, search for "tile saw." familyhandyman.com

1
weekend



Replace your countertop with laminate

Are your old countertops looking a little worn and outdated? Installing new countertops is a quick and affordable way to give your kitchen a makeover.

Here you'll learn how to take out your old countertops and install new plastic laminate countertops. This countertop installation is a little tricky because the sink section has to fit between two end walls. You have to plan this installation sequence carefully. If your countertop sections are open on one or both ends, your job will be considerably easier. On the other hand, if you have a kitchen with a continuous U-shaped countertop that's enclosed by walls, fitting is more difficult, and you should consider hiring a pro.

If you're handy with power tools and used to precision measuring, you can install your countertops in a weekend. You'll need basic hand tools, a jigsaw, a drill and a belt sander.

These custom-size post-formed countertops were ordered about three weeks before installation weekend.

A few things to check before you order new tops



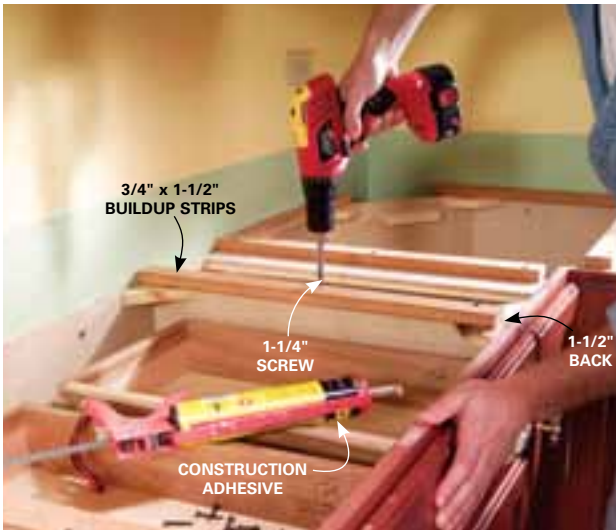
- Measure the depth of your cabinets. Standard 25-1/4-in.-deep countertops are made to fit cabinets that are 24-3/4 in. deep, including the doors and drawers. If your cabinets vary more than 1/4 in. from this, you'll have to order custom-depth counters.
- Compare the height of your existing backsplash with the one you'll be ordering. If the new one is shorter, you'll have to patch or redecorate the walls. If it's taller, watch for conflicts with outlets and window trim.
- Use a straightedge and framing square to check the walls for straightness and to make sure the corners are square. Standard preformed countertops allow you to scribe and cut off up to 1/4 in. to compensate for irregularities. But if your walls deviate by more than 1/4 in. or your corners are way out of square, you may have to order tops extra wide and long to allow for more scribing. Discuss this with a knowledgeable salesperson and order your tops accordingly.



1 Shut off the water supply valves and disconnect the tubes to the faucet. Disconnect the sink drain. Pry up the edge of the sink and slide wood blocks under to provide space for a handhold. Lift out the sink.



2 Inspect the underside of the countertop for screws and remove them. Slice the caulk joint along the backsplash/wall joint with a utility knife. Then lift or pry off the countertops.



3 Glue and screw down buildup strips to the top of the cabinet sides. Hold the strips 1-1/2 in. back from the cabinet fronts. Add strips to support corners.

You can order countertops from a home center, full-service lumberyard or countertop fabricator. Since countertops are bulky and easily damaged in transit, it's best to have them delivered. These countertops cost about \$30 a linear foot. You'll save about \$30 a foot, or about \$600 for an average kitchen, by installing the countertops yourself.

Draw a sketch and measure carefully

Careful measuring is the most critical step in any countertop installation. Countertop fabricators and retailers may ask for different information, so first ask for measuring instructions from your supplier. The most accurate method is to order the countertops from cabinet dimensions. Make a sketch of your kitchen. Then measure the

width and depth of the cabinets and record these dimensions on the sketch. Include the sink, stove and refrigerator locations. The ends of countertops that don't butt into a wall will have to be finished with matching plastic laminate end caps. Indicate where end caps are needed.

The salesperson will be able to convert these measurements to a countertop order and include allowances for overhangs and extra material for scribing to uneven walls.

Here you'll learn how to install preformed (also called post-formed) countertops without a backsplash. Use the same techniques for counters with a backsplash. If your countertop has an inside corner like the one shown here, order your tops with precut miters. It's nearly impossible to cut these accurately yourself. Ask for buildup strips with your countertop order (Photo 3). These should match the thickness of the buildup under the front edge of the countertop.

Start by removing the old tops

First you'll have to shut off the water supply to the sink and disconnect the plumbing (Photo 1). Keep in mind that old plumbing may need new valves or drain parts. You may have to slice the caulk joint along the edge to get it to release. Otherwise, leave the sink in place and remove it along with the countertop.

Some older countertops may be nailed to the cabinets. You'll have to pry these off. Most newer tops like those shown here are screwed or glued down. Remove the screws (Photo 2). Then pry the tops loose. Cut the countertops with a reciprocating saw if it simplifies removal.

Prepare the cabinets for countertop installation by screwing down the buildup strips (Photo 3). The edges will overhang. Later you'll screw through them to fasten



4 Slide the point of the miter into a hole in the drywall (inset photo) and lower the counter into place. With the front overhang even with the cabinet fronts, slide the top against the end wall.

down the top. Pre-drill 3/16-in. clearance holes for the mounting screws (Photo 13). Then screw through them to secure the tops. Ends finished with end caps usually don't need buildup strips under them. Check the construction of your tops to be sure. Use metal L-brackets to secure the tops in these areas. Also hold the strips back 1-1/2 in. from the front edge of the cabinets.

Scribing is the key to a good fit

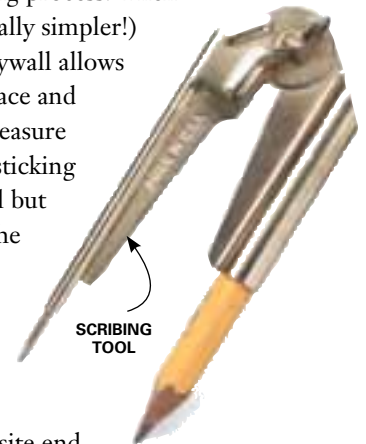
Photos 5 and 6 show the scribing process. Scribing allows you to fit the countertop tightly to uneven walls and out-of-square corners. You'll also scribe a counter to remove excess material, as in Photos 9 and 10. Scribe the entire length of the counter to make the end cap flush with the cabinet side to allow the stove to slip in. Order your tops with an extra 1/4 in. of length and depth to allow for scribing and fitting.

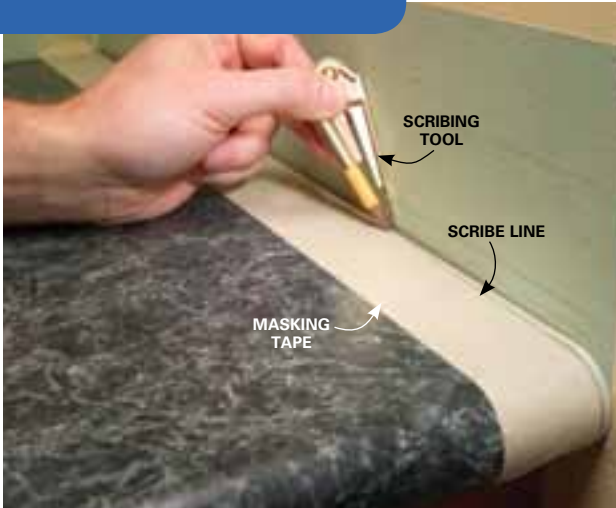
Post-formed counters with backsplashes come standard with a large lip that extends past the backsplash (see "Counters with a Backsplash," p. 40). This is the scribe material that you'll sand to conform to the walls.

Countertops that are sandwiched between two walls are tricky to scribe because initially they're too long to fit in. Photo 4 shows one solution. Study the photos and text

until you understand the fitting process. Then you can adapt it to other (usually simpler!) situations. The hole in the drywall allows you to tilt the counter into place and scribe it. Once it's in place, measure the amount of counter that's sticking into the hole and scribe off all but 1/4 in. of this distance from the opposite end (Photo 5). After you sand to the scribe line (Photo 6), you'll still have 1/4 in. extra, allowing you to scribe the adjoining section for a tight fit at the opposite end (Photos 7 and 8).

Here, the end of the sink counter where it butts the adjoining wall was scribed first. Then the counter opposite this end was scribed and the miter was loosely connected. Finally the assembled counter was slid against the wall behind the sink and both were scribed to get a tight fit to the wall and to move the end cap near the stove flush to the cabinet. If your countertop configuration is different, think about the result each scribe will have on the position of the counters and plan a scribing sequence accordingly.

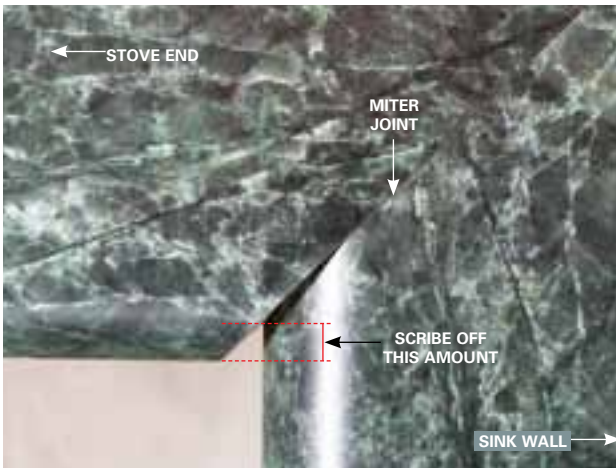




5 Measure the distance the miter extends into the hole, subtract 1/4 in. and set the scribing tool to this dimension. Scribe a line parallel to the end wall.



6 Sand to the line with a belt sander. Set the top in place to check the fit. Make sure the front edge of the countertop is parallel to the face of the cabinets.



7 Set the adjoining countertop section into place, fitting the two miters together tightly. Set the scribe to remove the distance shown.



8 Scribe a line along the back of the adjoining countertop. Sand to the line and replace the top to check the fit. Connect the tops temporarily with miter bolts.



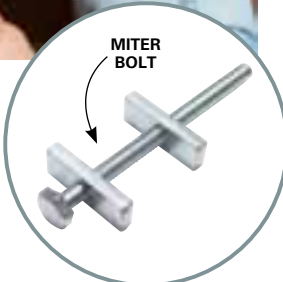
9 Check the position of the adjoining countertop end cap in relation to the cabinets. At stove and refrigerator openings where the end cap must be flush to the cabinet end, set the scribe to the amount of overhang.



10 Scribe a line on the back side of the countertop opposite the end cap. Remove the tops and sand to the line with a belt sander. Set the tops back in place and check the fit to the wall and the end cap overhang.



11 Spread water-resistant wood glue onto both miters, slide them together, and snug them together with miter bolts. Don't tighten the bolts yet.



12 Align the top of the miters by tapping on a wood block placed on the high side. Tighten the bolts when the miters are flush.

Countertops with a backsplash



Sand the protruding lip (scribe material) on post-formed tops to conform to wavy walls and out-of-square corners.

Here, countertops without a backsplash were ordered because the homeowner wanted the wall tile to rest on the countertop. The techniques for installing a countertop with a backsplash are the same. But you'll have to cut a larger hole in the drywall to tilt in the countertop (Photo 4). The other difference is in cutting the sink hole (go to familyhandyman.com and search "laminated kitchen countertop" for more on cutting the sink hole). With some sinks, the space between the cutout and the backsplash is too small to fit a jigsaw. In that case, either use a handsaw for the back cut or cut out the sink hole from the underside of the countertop before you install it.



13 Secure the tops by screwing through the 3/16-in. predrilled holes in the buildup strips into the countertop (1-1/4-in. drywall screws usually work, but double-check the thickness of the top and buildup strips for your counter). Where there are no buildup strips, use metal L-brackets and shorter screws.

Don't worry; it's normal to have to scribe some counters more than once to get a good fit. It takes time and patience, but the result is a tight-fitting, professional-looking installation with almost invisible caulk joints.

Finish the job by gluing and bolting the miter (Photos 11 and 12) and screwing down the tops. Be careful to check the length of the screws. They should extend no more than 1/2 in. into the counter. Use matching caulk to seal the joint between the countertops and the walls.

1
weekend

Transform your countertop with a resurfacing product

Rust-Oleum's new Countertop Transformations coating system (\$250 for 50 sq. ft. of counter at Lowe's, Menards, Ace Hardware and other retailers) is a simple way to transform worn or damaged laminate countertops into a new countertop surface. The product is available in five colors ranging from light to very dark (shown here is Charcoal).

The big pluses of this system are it's not smelly or difficult, you don't have to remove your countertops (!), the instructions are clear, and the kit comes with everything you need (except basic painting tools), plus it includes a very detailed instructional DVD. This product can be applied to any laminate or hardwood countertop in reasonable condition. Burns and scratches are fine, but fill deep dents and chips before you use it.

This product is surprisingly easy to apply. In terms of durability, the manufacturer compares it to laminate. And you can reapply the system to renew the surface later if you want.

Sand and clean the surface

The first step is to completely degloss the laminate surface using the sanding tools included in the kit (Photo 1). You can save on sanding time by using an orbital sander with 60- or 80-grit sandpaper on the flat areas (but you'll add cleaning time vacuuming up the dust). Use a light touch so you don't sand through any areas or create uneven surfaces. Vacuum up the dust and wipe all surfaces with a damp cloth until they're completely dust-free. Use painter's tape and plastic to mask off base cabinets, the sink, appliances, the walls above the backsplash and the floor. Cover the sink drains so nothing falls into them.

Apply the base coat

This step is time-sensitive, so before you apply the base coat, have the decorative chips in the dispenser and ready to go. Once you've applied the base coat, you'll have a 20-minute window to apply the decorative chips before it dries. If you have a long countertop or several countertop areas, work in pairs (Photo 2) and complete one section (including the chip application) before moving on to the next.

Apply the base coat thickly using a brush on the backsplash and a microfiber roller (not included in the kit) on the flat surface and front edge. You really need to lay it on thickly and evenly, and maintain a wet edge on the entire surface for the best result. The kit includes a wetting agent you can spray on to keep the base coat moist and ready for the decorative chips.



1 Rough up the surface. Degloss the countertop with the diamond-embedded sanding pad in the kit so the base coat will stick to it. You'll know it's deglossed when there are tiny scratches everywhere.



2 Apply the base coat. This coat is the background color and a sticky bed for the chips. One person brushes it on the backsplash; the other rolls on the rest. Work fast; you have 20 minutes to complete this and the next step.



4 Sand the chips smooth. Sand hard on the flat surfaces but lightly along the front edge to avoid sanding completely through the chips and base coat. The goal is a smooth, lightly textured surface.

Apply the decorative chips

Moving quickly, use the dispenser to broadcast the decorative chips so they completely cover the backsplash, flat area and front edges of the counter. Don't skimp. The kit comes with a ton of chips, so use more than you need to cover every bit of the base coat. It works best to get down on your knees and zing the chips hard by hand against the front edge for the best coverage (Photo 3). Inspect for any uncovered base coat, apply more chips and let dry undisturbed for a minimum of 12 hours, but no more than 24.

Sand and smooth

After the base coat is dry, vacuum up the loose chips. Then use the chip scraper to knock down the rough chip edges. Use a light touch so you don't gouge the surface at the corners and edges. Vacuum again.

Sand the rough chip surfaces smooth to prepare for the topcoat. The kit includes a sample of how smooth the countertop should be. The challenge is to sand it smooth without sanding through the chips. Use the sanding block



3 Heap on the chips. The multicolored chips hide brush marks and give the countertop a textured, speckled appearance. Move quickly to cover every bit of base coat before it dries.



5 Apply the clear topcoat. Vacuum up every speck of sanding dust. Then brush a thick, even layer of topcoat on the backsplash and roll out the rest. Reroll a final pass in one direction and let it dry undisturbed for 48 hours.

and a lighter touch on the backsplash and front edges since these areas have fewer chips on the surface (Photo 4). The sanding process appears to lighten the chip surface, but the topcoat will darken it again. Vacuum and wipe up the sanding dust with a damp cloth.

Apply the topcoat

The clear topcoat is a two-part formula that you mix and then apply to the countertop. Once you've mixed the formula, you must use it within four hours.

Just as you did with the base coat, use a paintbrush to apply a thick layer of topcoat to the backsplash and back few inches of the countertop. Use a 6-in. high-density roller (not included) to roll a thick, even layer of the topcoat onto the flat counter area and the front edge (Photo 5). Once every surface is covered, go back and roll a final pass of the topcoat in one direction to avoid lap and brush marks. Let dry to the touch (four to six hours) and remove the tape and plastic. The countertop will be ready for light use in 48 hours and completely cured within a week.

2
weekends

Built-in bathroom cabinets



Bathrooms never seem to have enough space for all of the essentials—towels, toothpaste, toilet paper... So it's likely you, like everyone else, want to make the most of the space you have. These projects help you do just that!

Most small bathrooms have all of the plumbing on one

tip

When ordering the pantry cabinets, don't forget to order matching mullion strips (for the outside trim) and a filler strip to join the cabinets in the center. —

wall and the door usually swings against a blank wall. Often, there's a closet on the other side of the blank wall to steal space from. If there's not a closet, it's possible to take 1 or 2 ft. of floor space from the other room, but that requires going to the trouble of framing, drywalling, taping, painting and trimming a false wall to conceal the unsightly cabinet backs.

You can add either one or two

kitchen pantry cabinets to a wall using the method shown here. To add more, it's better to reframe the entire wall. A full 14-1/2-in.-wide stud space is needed for each cabinet

in the blank wall (that space will be expanded to 15-1/2 in. wide). It's easiest to go into the bathroom and find the studs with a stud finder to see how many 14-1/2-in. stud spaces are available.

When a bathroom backs against a closet, there are rarely electrical cables inside the wall. This project shows cutting an inspection hole to check for cables or other obstructions (Photo 1). Reroute an electrical cable if there is one.

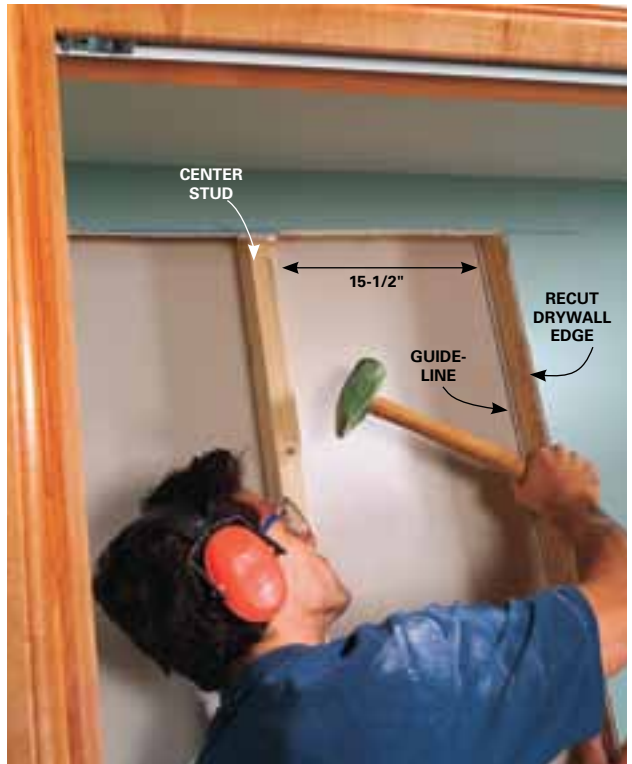
If there's carpeting, unhook it from the tack strips and pull it and the padding back a couple of feet. Cut them both around the cabinets (or false wall), then staple down the padding and push the carpet onto new tack strips when the project is finished. Chop off the tack strip in front of the wall openings with a chisel and reuse it at the back of the cabinets.

Build up a base for the cabinets with overlapping 2x4s to establish the cabinet height (Photos 3 and 4). At a minimum, keep the bottom of the face frame 2-1/2 in. above the bathroom base trim. This eliminates any trim or tilework

continued on p. 46



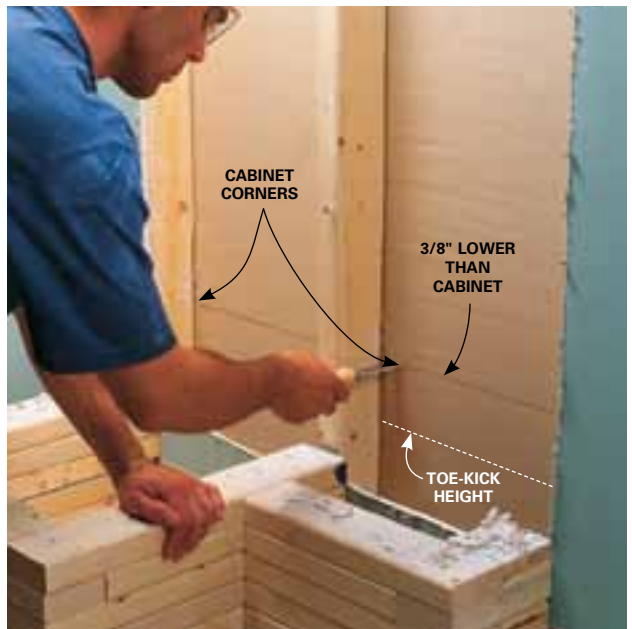
1 Remove the closet rod and shelf from the closet behind the bathroom wall. Cut a rough inspection hole, then check for electrical cables by peering down into the stud spaces with a flashlight. Cut horizontally between the studs 2 to 3 in. from the ceiling and the baseboard. Then cut out drywall using the studs as a guide.



2 Draw a line along the studs on the back side of the drywall, and then use a 2-lb. maul to pound the side studs over until each opening is 15-1/2 in. wide. Use the line as a guide to tell when the stud has moved about 1 in. Pound mostly at the very top and bottom of the stud to slide it along the plates. Smaller taps between the top and bottom will loosen the grip of drywall screws or nails. Toe-screw the studs to the plates with 3-in. screws and cut off the overhanging drywall edge.



3 Subtract 5 in. from the depth of the cabinets and draw lines on the floor to mark the cabinet backs. Use the lines to position the bottom row of 2x4 cribbing. Center the middle 2x4 over the center stud so it supports both cabinets. Position the outside 2x4s even with the side studs. Overlap the rows at the corners and nail them together with 10d nails.



4 Draw level lines on the back side of the bathroom drywall to mark the top and bottom of the cabinet face. (Base the layout on the cabinet face frame. The recessed toe-kick does not protrude into the bathroom.) Poke a drywall saw through the drywall to mark the corners of each cabinet.

MAKE YOUR SMALL BATHROOM SEEM BIG!



5 Use the corner cuts from inside the bathroom to redraw the top and bottom cuts, adding 1/4 in. to the top and bottom for wiggle room. Cut out the bathroom drywall from the bathroom side. Remove the thin strip of drywall that covers the center stud (Photo 6).



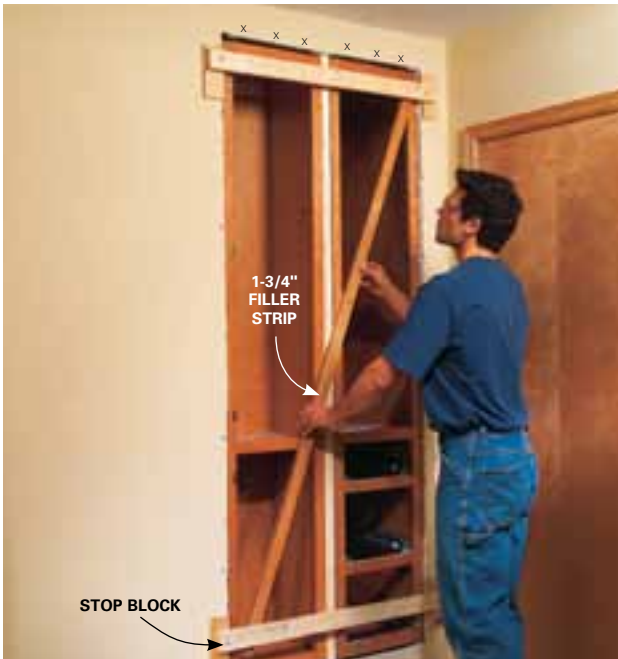
6 Tack four 1/2-in.-thick spacer blocks about 6 in. in from the top and bottom edges of the opening, then screw 1x2 stop blocks across both bays with 3-in. screws.



7 Remove the doors, drawers and shelving from the cabinets and slip them into the stud spaces to make sure they'll fit.



8 Screw the bathroom-side drywall into the shifted studs. Push back the cabinets a few inches and screw 2x4 blocking to the drywall at the top and bottom for trim backing.



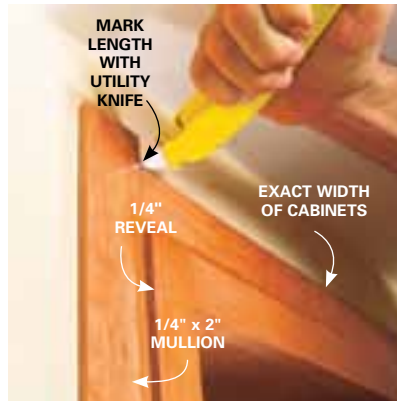
9 Rip the 3/4-in. filler strip to 1-3/4 in. wide and cut it the exact length of the cabinet face frames. Slip the filler into the opening, then place it between the cabinets. Pull the cabinets against the stop blocks.



10 Clamp the filler strip flush with the face of the cabinet frames and with the top and bottom. Shim under the cabinet bases to get the tops and bottoms aligned, if needed. Then drill pilot, clearance and screwhead countersink holes and screw both cabinets to the filler strip with 2-1/2-in. screws spaced about every 12 in.



11 Hold the face frames tight against the stop blocks with clamps and screw the cabinets to the studs with 2-1/2-in. screws spaced about every 12 in. Be careful not to overtighten the screws and pull them through the cabinet sides.



12 Cut the 1/4-in.-thick x 2-in.-wide mullion strips the exact width of the top and bottom of the cabinets and nail them on with 1-1/2-in. brad nails. Then mark the side trim for length and cut and nail it to the side studs.



13 Frame 2x4 stud walls directly behind the cabinets. Nail the bottom plates into the subflooring and the top plates into the ceiling framing with 10d nails. Use construction adhesive to glue any plates and studs that join surfaces that don't have underlying framing. Hang and tape the drywall and corner bead, then paint.

tip

Check the existing doorstep to make sure the knob doesn't hit the new cabinets. If a standard stop isn't adequate, use hinge- or floor-mounted stops.

continued from p. 43
to hassle with inside the bathroom. If using shorter cabinets, adjust the height for convenience and the best appearance.

Finishing around the cabinet backs is optional if they're in a closet. Build a separate wall (Photo 13) or put drywall directly against

the cabinet backs if desired. Lay drywall against the cabinets; don't use screws or nails because they'll penetrate the cabinet backs. Instead, glue the drywall to the cabinet backs with construction adhesive and use paper-flanged corner beads that you tape on instead of nail. To minimize taping, stand the drywall sheets upright to eliminate seams to tape. Cut the drywall to fit tightly into existing drywall at walls and the ceiling, and caulk those seams with paintable caulk.

MAKE YOUR SMALL
BATHROOM SEEM BIG!

1
weekend



1

Swing-out shelf

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



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.



Vanity storage upgrades

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.

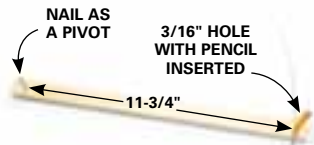
1

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:

- 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.
- You can finish your 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.



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



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.



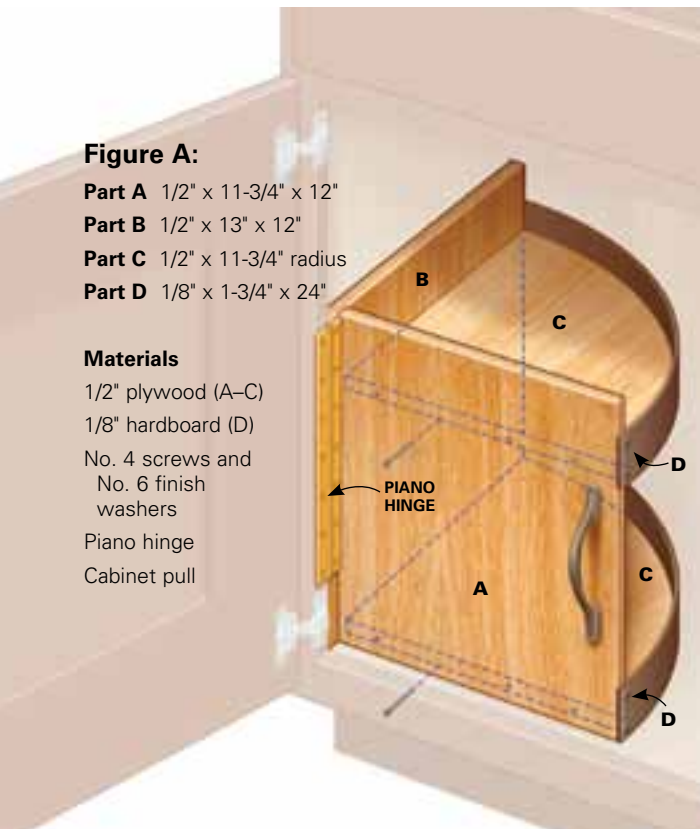
2 Hang it on a hinge. Raise the shelf with spacers and align the shelf back with the inside edge of the face frame. Screw the piano hinge to the shelf back, then to the cabinet. You may have to notch the shelf back to clear the door hinge.

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



2

Mini rollout

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

- Assemble the drawer boxes with glue plus trim screws, finish nails or brad nails.
- Shown is a 14-in. “full-extension” drawer slide. This type of slide is typically mounted on the side of a drawer, but it also 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 shown here, be sure to set the base back a bit so the vanity door can close.

Figure B:

Part A 1/2" x 3-1/2" x 16"

Part B 1/2" x 3-1/2" x 16"

Part C 1/2" x 3-1/2" x 3"

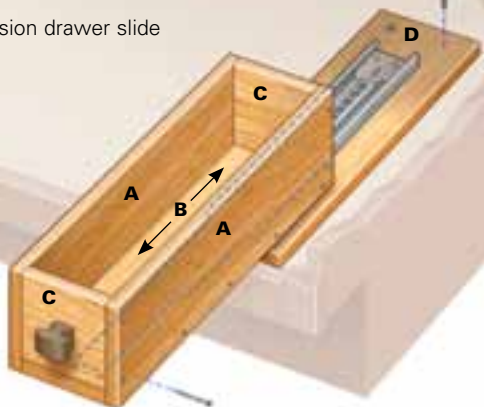
Part D 1/2" x 3-1/2" x 16"

Materials

1/2" plywood

14" full-extension drawer slide

Cabinet pull



familyhandyman.com

- Does your bathroom need an overhaul? Search for “bathroom remodel” to find complete step-by-step projects.
- Your feet will love a warm bathroom floor. Search for “in-floor heat” to see how to install an electric heat system.
- Drawer slides don’t slide? Search for “drawer slide” to see how to replace them.
- Got bathroom clutter? We have tips and projects galore. Search for “bathroom storage.”
- If this rollout is too small, search for “roll out” and get step-by-step instructions for a larger version
- Old vanity top worn out? Glass tile makes an elegant, affordable replacement. And it’s easier than you think. Search for “vanity top.”

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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 tray

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.

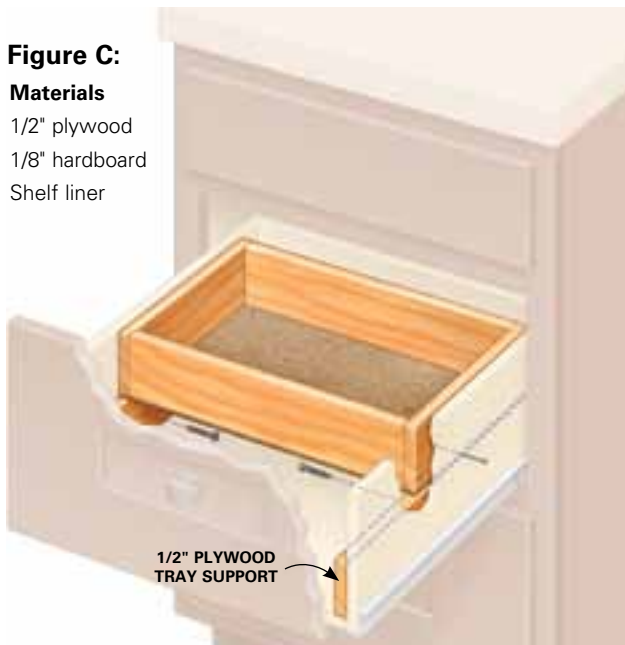
- To size the tray, measure the drawer: Subtract 1/16 in. from the width of the drawer space and divide the length in half. Cut a piece of 1/8-in. hardboard this size.
- You can make the tray any depth you like. If the opening in the vanity is taller than the height of the drawer, your tray can protrude 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 add 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.

If you can get by without a vanity, a great way to make a small bathroom feel bigger is to replace the vanity with a stylish wall-hung sink. Visit familyhandyman.com and search "wall hung sink" for complete how-to instructions.



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!

1
weekend

Simple DIY closet system

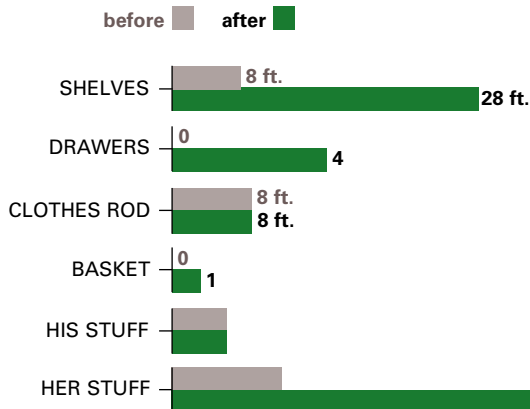
If you have to dig through a mountain of clothes to find your favorite sweatshirt, it's time to take on that messy closet. This simple-to-build system organizes your closet with shelf, drawer and hanging space for your clothes, shoes and accessories. Buying a closet system like this would cost you at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

This system is really just four plywood boxes outfitted with shelf standards, closet rods or drawers. Here it is built 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.

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.

This entire system was built 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, p. 60). 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 on p. 57. 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



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."

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). Visit familyhandyman.com and search "edge banding" for instructions.

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 polyurethane (\$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.

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 your wire basket now (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.

Figure A:
Closet storage system

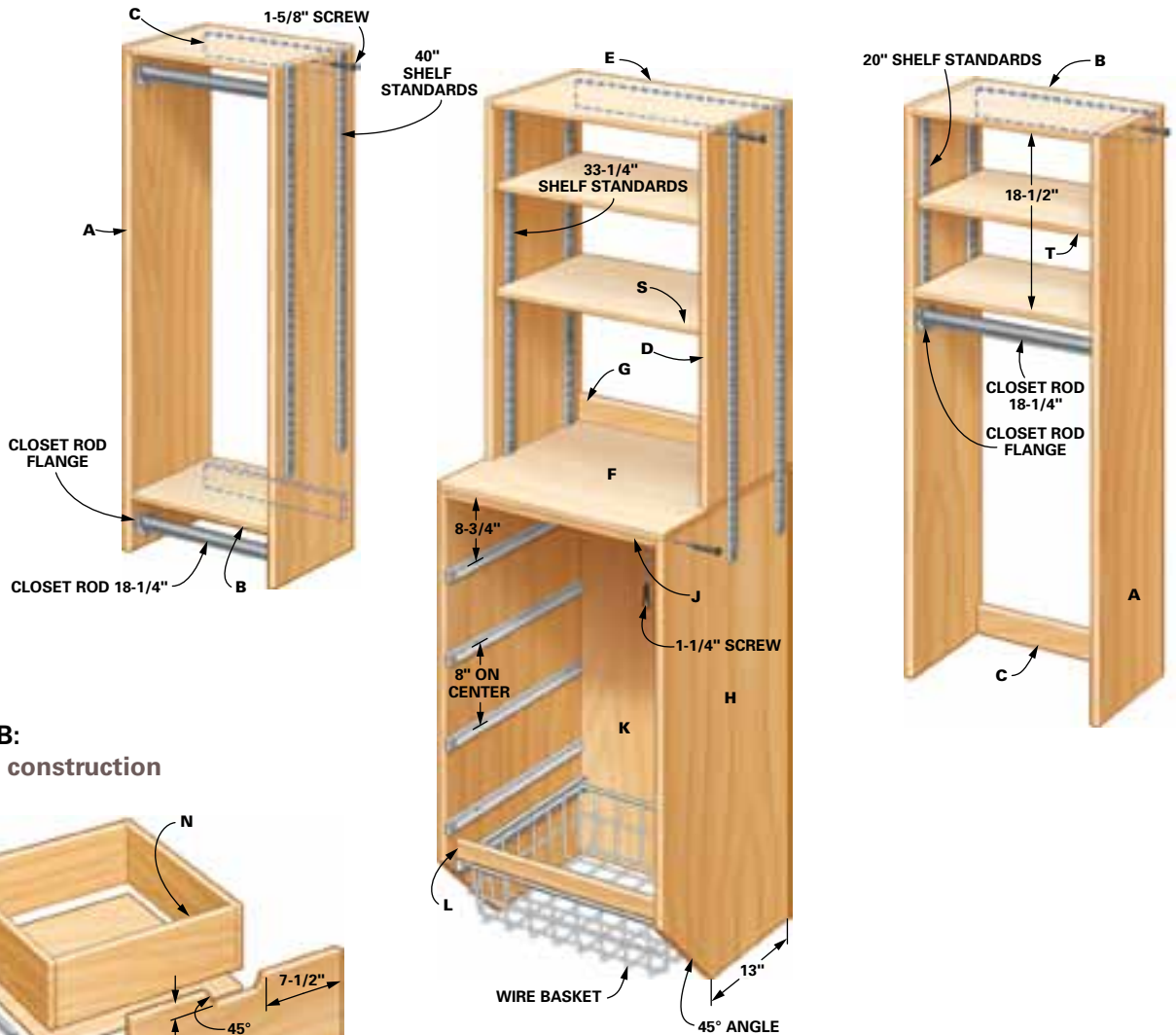
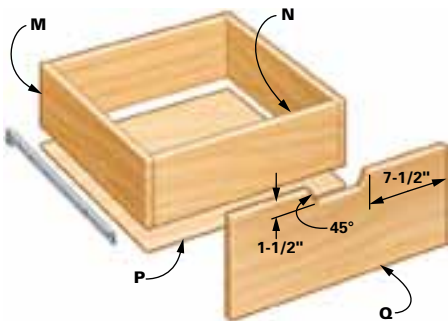


Figure B:
Drawer construction



Cutting list

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



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.

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 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. Shown are 1-5/8-in. trim screws (\$5 for a 1-lb. box) because the screw heads are small and unobtrusive (you can leave 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.



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.

- 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. 57). 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.



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.



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.

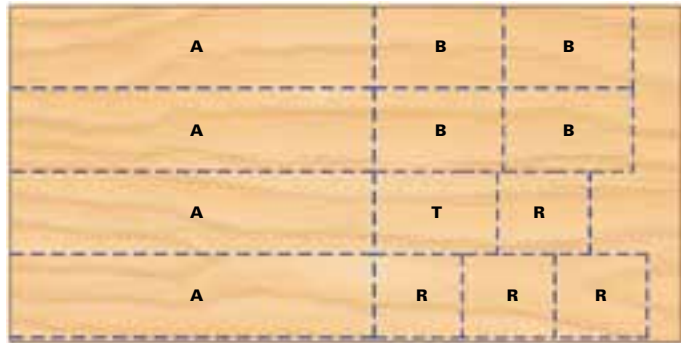


8 Install the center unit in two parts. The center unit is big and clumsy, so install the shelf unit first, then prop up the drawer unit with spacers and screw it to the shelf.

Figure C:

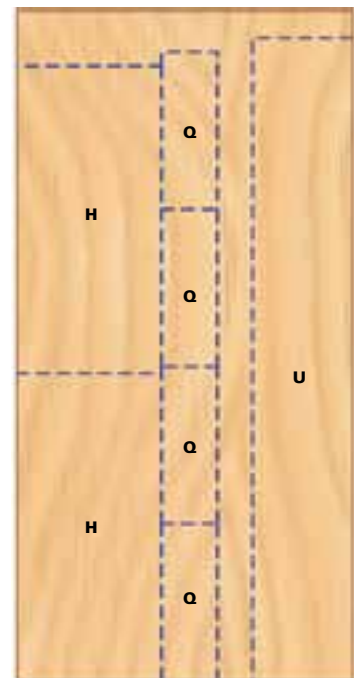
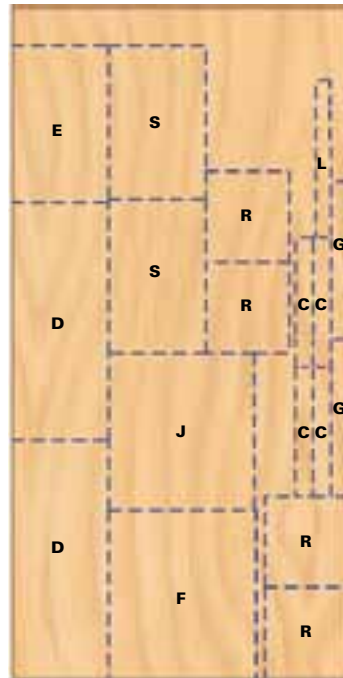
Closet system cutting diagrams

This shows only the 3/4-in. plywood. 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



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. This shelf barely fit 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.

TRANSFORM
YOUR YARD!

3 easy
weekends



Quick & easy garden shed



Easy as building a fence

Build the shed walls from posts, rails and boards—just like a fence. Plus you'll learn foolproof roof-building tricks too!

If you need more space to store and organize your lawn and garden gear, consider this simple, charming 5 x 12-ft. shed. It's large enough for wheelbarrows, lawn mowers and even a moderate-size garden tractor. And there's still plenty of room left over for garden hoses, tools and supplies, pots and other stuff. There's also a built-in bench for potting plants.

The shed will look good for years because it's built from durable cedar siding, pressure-treated wood and a 30-year steel roof. The front is attractive, but the back is all business—it's wide open for easy access and storage. But if leaving it open won't work in your yard, you can install doors (see p. 63).

Another nice feature of this shed design is that you can easily enlarge the plan. Build it up to 12 ft. deep and as long as you like. Even in larger sizes, the shed uses exactly the same techniques and materials. Just keep the post spacing under 6 ft., adding more posts as needed.

Here you'll learn how to assemble this shed, which



You can leave the back wide open for instant access to yard tools and equipment, or enclose it using any of the options in “Adding Doors,” p. 63.

requires no more skill than building a fence. The tough spots—laying out the posts, assembling the roof and marking the angles have been simplified so that you can successfully build it even if this is your first shed. This project costs about \$1,000, comparable in price to—but better

and prettier than—a store-bought shed kit. You can complete the project in three easy weekends.

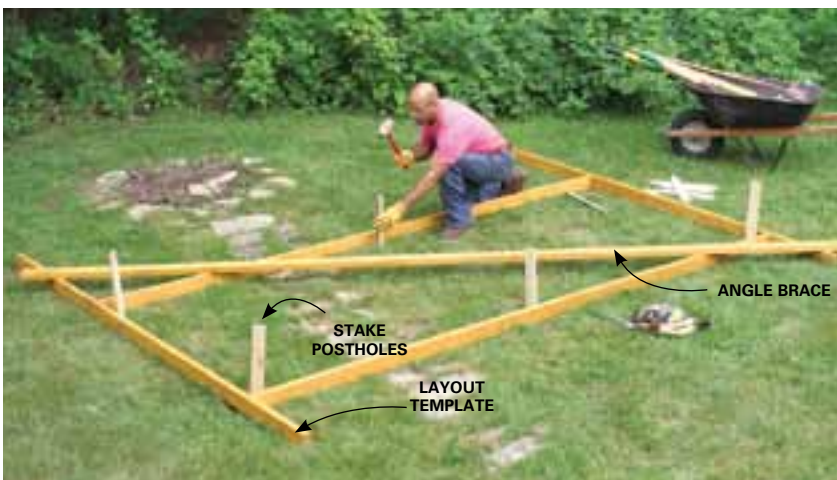
Siting your shed

If you build the shed and leave the back open, it's best to position the open back against a backdrop of foliage,

a fence or a garage wall. That'll keep the finished side most visible and the clutter out of sight. Still, if security is an issue, you may not want to store valuable items there.

It's best to position your shed on a level site. The greater the slope, the more work you'll have leveling the floor. This site sloped about 6 in. from one end to the other. The floor in this shed is simple concrete pavers laid over a 6-in. layer of level sand. It's inexpensive, drains well and can be cleaned with a few squirts from the garden hose. Other options are pouring a concrete slab or even framing in a deck-like floor. Whatever floor you choose, make sure it's higher than the surrounding yard to keep runoff water out of the building.

You probably won't need a building permit for this shed because in most communities it will fall under the minimum size that requires a permit.



1 Build a 2x4 template to the shed dimensions, square it and mark the post locations with stakes. Set the template aside and dig 3-ft.-deep postholes.

TRANSFORM YOUR YARD!



2 Drop the posts into the holes, position them using the template, plumb them and screw them into place. Fill the holes with concrete.



3 Slide the template up 5 ft. and level it, screwing it to the posts. Recheck the posts for plumb and brace the assembly. Let the concrete harden overnight.

Adding doors

If you want to enclose your shed, you have a few options. You could build a wall covering half the back, framing and siding it just as you did the front. Then cover the other half with a pair of swinging doors or install one sliding door. For easier access, skip the wall and cover the whole back with two sliding “bypass” doors. Some home centers carry sliding door hardware (\$75 or more) designed for farm buildings. To shop online, go to hardwarestore.com and search for “barn door hardware.” If your shed has board-on-board cedar siding like this one, you can make doors that match the siding using rough-sawn plywood framed with rough-sawn boards.

But check with the building permit department at city hall to be sure.

Remember to keep your shed to the proper setback distance from your neighbor’s property line. Even if you don’t need a permit, it’s important to check with your local building department to learn the setback rules and shed building requirements. In any case, before you dig, call 811 or visit call811.com to have underground utilities marked.

One-stop shopping for materials

You can buy everything you need at a home center and take it home in one (rather large) pickup load (see the Materials List, p. 64). All of the framing is standard construction lumber; just make sure to get treated posts and treated 2x4s for the bottom horizontal rail (Photo 5).

If the home center stocks metal roofing, it’ll probably only have green, brown or white, but you can special order about 25 other colors and have the panels cut to length for a small extra charge (see Buyer’s Guide, p. 68). If you’re comfortable cutting panels to length and are happy with stock colors, just buy 8-ft. lengths. This roofing was special order and took a couple of weeks to arrive, so plan accordingly. Be sure to order *residential* ridge caps to match (Photo 13). Otherwise, you’ll get the large ridge caps used on farm buildings. Also order the special roofing screws that are colored to match your roof.

The siding shown here is vertical “board-on-board” cedar; 1x12s overlaid with 1x6s. This is by far the most expensive feature of this shed. Substitute any type of siding you wish, either to save money or to match the siding on your home. The construction details are the same if you’re using plywood siding. But if you use horizontal lap siding, substitute a 4x4 for the 2x4 around the bottom. Then add vertical studs



4 Cut the post tops to length. Then cut and assemble the 2x8 beams. Anchor them with hurricane ties.



5 Cut the rails to fit and fasten them between the posts with angle brackets. Frame the window openings to suit your windows.

every 16 in. between that and the top beam instead of the horizontal 2x4 framing shown here.

You can use any window you wish, wherever you wish. Shown here is a “barn sash” type window (Photo 10), which cost less than \$20 each. Add storm window hanger brackets and storm window adjusters and you’ll have inexpensive windows that open like awnings to let the breeze flow through.

Position the posts with a template

Screw a 2x4 template together as a guide for locating the posts (Photo

1). Make the inside dimensions of the frame exactly 5 x 12 ft. Square the template by racking until the diagonal measurements are equal and then add an angled brace to hold it square. Measure and mark the posthole positions on the template. Drive stakes at the post marks, remove the template and dig 8-in.-diameter holes with a posthole digger.

Screw the posts to the template to hold them plumb while you mix and pour the concrete. To make sure the tops of the posts are also perfectly aligned, unscrew the template and move it up about 5 ft. before the concrete hardens. Carefully level

Materials list

ITEM	QTY.
4x4 x 10 (treated) for posts	6
2x4 x 10 (treated) for bottom rail (end walls)	1
2x4 x 12 (treated) for bottom rail (front wall)	1
2x4 x 10 for end wall framing	2
2x4 x 12 for front wall and window framing	3
2x8 x 12 for beams	5
2x4 x 10 for rafters	6
2x6 x 16 for ridge beam	1
2x4 x 16 for purlins	6
1x12 x 10 (cedar) for end wall siding	10
1x6 x 10 (cedar) for end wall siding	8
1x12 x 8 (cedar) for front wall siding	8
1x6 x 8 (cedar) for front wall siding	10
1x6 x 8 (cedar) for window jambs (all trim for two windows)	2
1x6 x 6 (cedar) for window jambs	2
1x4 x 8 (cedar) for window trim	4
60-lb. bags of concrete mix for footings	8
Metal roofing	
56-in.-long sheets of steel roofing (roof panels)	10
10-ft. residential ridge cap	2
1-lb. boxes of roofing screws	2
Hardware	
1-1/2 x 2-in. angle brackets (framing-to-post connections)	34
Hurricane ties (beam-to-post and rafter-to-beam connections)	18
Boxes of 1-1/4-in. joist hanger screws	2
1-lb. boxes of 16d nails	2
24-in. x 43-1/2-in. barn sash windows with handles	2
Pairs of storm window hanger brackets	2
Pairs of storm window adjusters	2

the template as you screw it to the posts; you’ll use it later to gauge the post cutoff heights. Then plumb and brace the whole assembly (Photo 3). Leave the braces in place overnight and get back to work the next morning after the concrete has set up.

TRANSFORM YOUR YARD!

Figure A:
Quick & easy shed

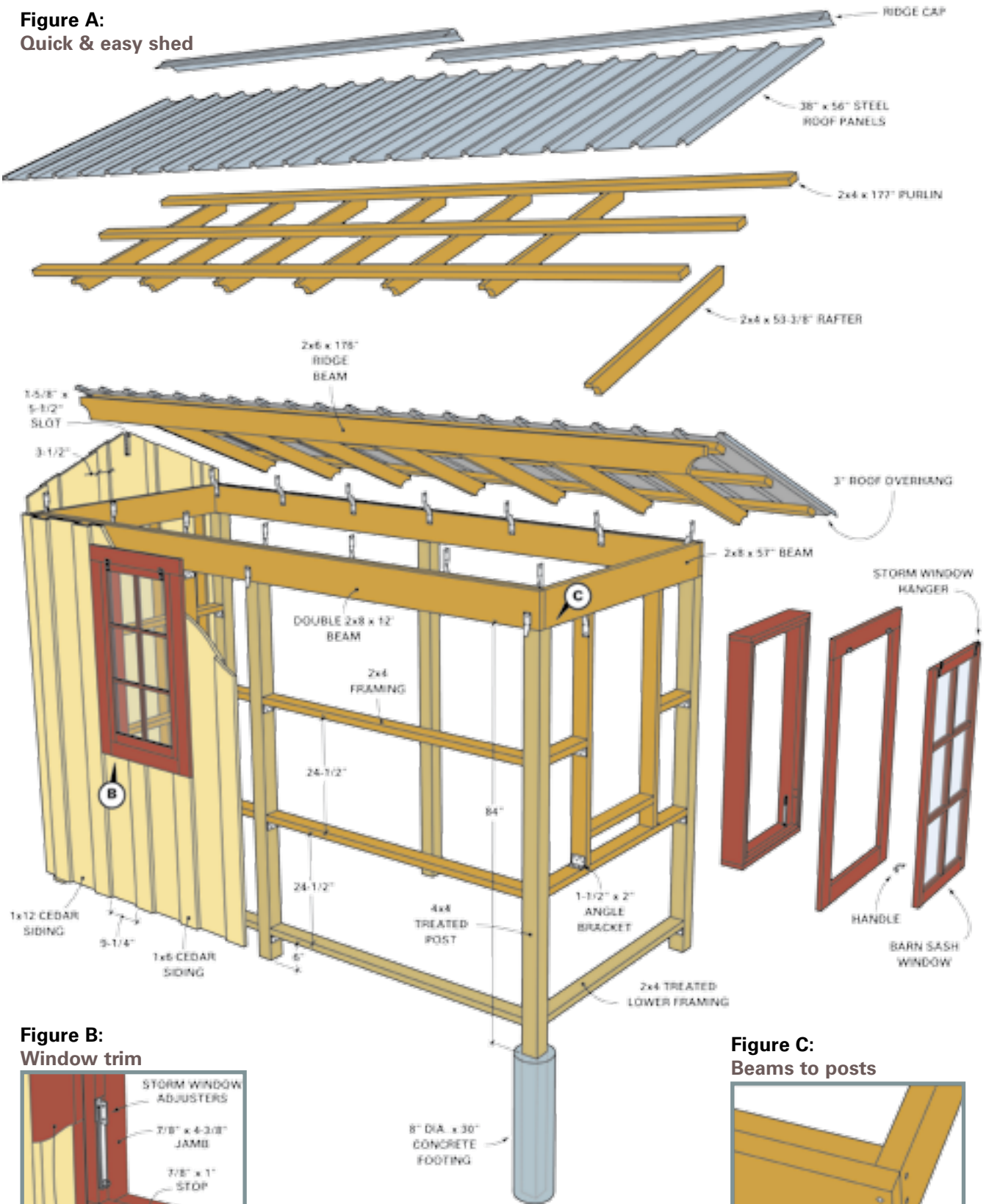


Figure B:
Window trim

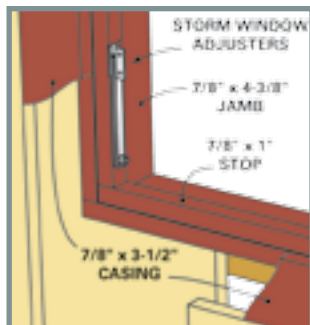


Figure C:
Beams to posts



OVERALL DIMENSIONS:
5' WIDE x 12' LONG x 9' 4" TALL (APPROX.)

Set the beams and frame the walls

Choose the post that's closest to the highest point on the ground and mark it 6 ft. 8 in. above your estimated finished floor height. You'll have to guess somewhat at this. The idea is to keep from bonking your head when you enter the shed. Cut off the post at the mark by cutting from two opposite sides with a circular saw. Then measure from the top of the template to the newly cut top. Match that distance to mark and cut the other posts to the same height. (This is why that template had better be level!) Preassemble the doubled 2x8 beams, toenail them on top of the posts and add the end 2x8s (Photo 4). Set 2x8 beams on the posts, toenail them in place and then anchor them with hurricane ties (Photo 4).

Now add the rest of the wall framing, using Figure A as a guide. It's easiest to toenail the 2x4s into place, then anchor them with angle brackets (Photo 5).

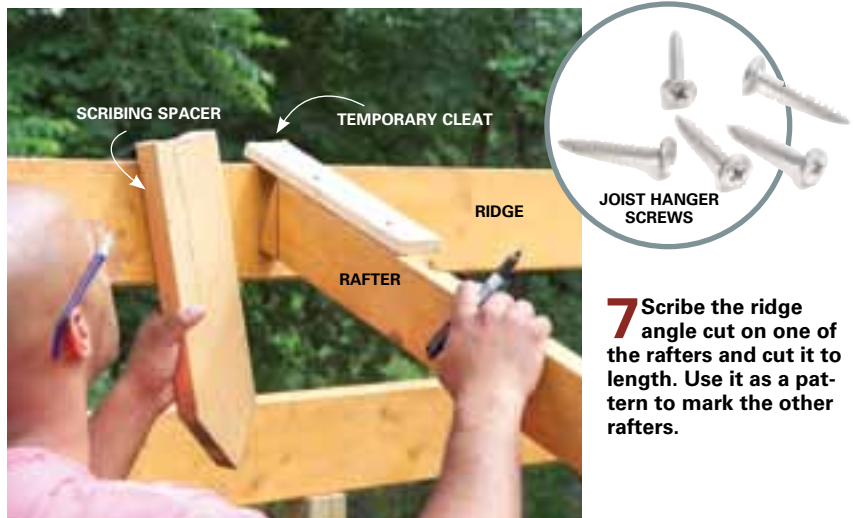
Size window openings to fit your windows. If you're using barn sash windows, measure the width and height of the window sash and add 1-7/8 in. to each dimension to arrive at the rough opening size.

Frame a super-simple roof

Hand-framing a roof is usually challenging, but the job is foolproof with this simple trick: Use the siding to center and support the ridge board while you scribe, cut and install the rafters. Start the roof by cutting a 5-1/2-in.-deep by 1-5/8-in.-wide slot at the ends of two 10-ft.-long 1x12s. Then cut the boards to length so the bottoms will be at least 2 in. above grade and the top will project past the beam 16 in. (Photo 6). Center, plumb and nail those boards to each end wall.



6 Cut a slot, then center and nail a 1x12 siding board to each end wall. Then drop the ridge board into the slots and center it.



7 Scribe the ridge angle cut on one of the rafters and cut it to length. Use it as a pattern to mark the other rafters.



8 Lay out the rafter positions on the ridge and beams. Then toenail the rafters to the ridge and anchor the other ends to the beam with hurricane ties.



9 Space and nail the siding to the end walls (Figure A). Trim it even with the rafters. Add the rest of the 1x12 siding.

Cut a 2x6 ridge board to length and cut coves (here a 1-qt. can was used for a pattern) at the ends with a jigsaw. Drop the ridge board into the slots, making the overhang equal at both ends (Photo 6). Eyeball the ridge board from one end. If there's a bow, straighten and brace it from the beams with a 2x4 (Photo 8).

Scribe the first rafter angle by screwing a short cleat on the top. Then rest the board on the ridge and scribe the angle with a scrap 2x4 (Photo 7). Cut the angle and test the fit. Then cut it to length and add the decorative end cut. Use this rafter as a pattern to mark the rest and then cut and install them (Photo 8).

Finish the siding

To save time, finish the ridge board, the rafter and all of the siding on all four sides before installation (for this shed the interior framing was stained to brighten the inside). To inhibit rot, coat the freshly cut bottom ends of the siding boards before nailing the boards into place.

Begin siding by nailing up the

1x12 boards on the ends. Raise them 2 in. above the ground and run them long at the top (Photo 9). Fasten them in the center of each board with a single nail at each framing member (the overlapping 1x6s will hold the edges). Use a 2x4 block to space the boards 3-1/2 in. apart. That way the 1x6s will overlap 1 in. on both sides. Determine the length of each siding board on the front of the shed by measuring from the ground to the top of the beam and subtracting 2 in.

Install the window frame and exterior trim before you install the 1x6s. Rip the 1x6 jamb boards to 4-1/4 in. wide so they'll be flush with the outside of the 1x12s and the wall framing on the inside of the shed. (Use the leftover strips for the window stops; see Photo 10.) That way you can add the window trim around the openings and surround them with 1x6 siding for a nice, clean look (Photo 10).

Draw marks 1 in. from the edge of the 1x12s to help align the 1x6s. You can cheat the 1x6s left or right



10 Mount the storm window brackets to the window and trim and then hang the window. Nail 1x1 window stop tight against the window.

a bit if it helps them clear window openings or arrive at corners at a better point. Small variations won't be noticeable. Just make sure you have at least a 3/8-in. overlap and that you plumb each one with a level. Nail each side of the 1x6s through the 1x12 below it and into the framing. Use a reciprocating saw to cut off the long siding boards at the end walls flush with the end rafters (Photo 9). Or snap a chalk line on the outside and use a circular saw. Use the leftover pieces to fill in above or below the windows.

Hang the windows

Screw the hanger brackets to the windows. Then center the window in the opening to position and screw the bracket clips to the window trim. Shim the window sash so it's 1/4 in. back from the window trim and centered in the frame. Nail the 1x1 window stops to the jambs, holding them snug against the window sash (Photo 10). Add the storm window adjusters, following the instructions on the packaging.

Screw down the metal roofing

Cut the 2x4 purlins to length and nail them to each rafter with two 16d nails (Photo 11). If they're twisted and won't lie flat, screw them down. Otherwise the metal roofing will deform or kink when you screw it down.

Nail together a 2x4 "L", push it against the bottom purlin and screw it into place from the underside so you can remove it later (Photo 12). This will hold the metal roof panels in place while you screw them to the purlins. If you need to cut roof panels, before installation cut them from the underside with a jigsaw and metal-cutting blade.

Starting at one end, lay the first panel in place, hanging one edge 3 in. over the purlin ends. Center the screws in the flat areas between the ribs and over the purlins. The screws are self-tapping; push down firmly as you run the screw gun and they'll drill their way through the metal and into the wood. Tighten them up until the special neoprene washer mushrooms against the metal. Measure carefully and keep all the screws exactly in line. It'll look bad if lines of screw heads wander all over the place. And if you drive a screw in the wrong place and miss the purlin, there's no good way to repair a screw hole.

Cut both pieces of ridge cap to length with a tin snips so they overlap 6 in. near the middle. Center and clamp the ridges while you screw them to the ribs of the underlying panels (Photo 13). It's best to predrill these holes with a 1/8-in. bit.

Buyer's Guide

Metal roofing is available from Midwest Manufacturing, midwestmanufacturing.com (click on where to buy).

Barn sashes are available by mail. Call Lindsay Windows at (800) 967-2035 or (507) 625-4278. lindsaywindows.com

Storm window hardware is available from Wm. A. Kilian Hardware Co. (215-247-0945 or kilianhardware.com)



11 Cut the purlins to length, then center and nail them to each rafter with two 16d nails.



12 Screw a 2x4 "L" to the rafter tails tight against the bottom purlin. Then rest the roof panels against it and screw the panels to the purlins.



13 Cut both ridge caps to length, then center and clamp them into place. Screw them to every third rib.

TRANSFORM
YOUR YARD!

1
day

Island deck



Most decks are attached to houses, but there's no reason they have to be. Sometimes the best spot to set up a deck chair and relax is at the other end of the yard, tucked into a shady corner of the garden. And if you don't attach the deck to the house, you don't need deep frost footings—which can save hours of backbreaking labor, especially in wooded or rocky areas where footings are difficult to dig.

This deck was designed with simple construction in mind. If you can cut boards and drive screws, you can build it. The only power tools you'll need are a circular saw and a drill. Shown is a premium grade of low-maintenance composite decking with hidden fasteners, which brought the total cost to \$2,100, but using standard treated decking and screws would lower the cost to \$900. You may need to special-order composite decking and hidden fasteners if you use the same ones as shown here, but everything else is stocked at home centers or lumberyards.

Place the footings and beams

Lay out the two beams parallel to each other, 9 ft. apart. Screw on temporary 1x4 stretchers across the ends of the beams, overhanging them each the same distance, then measure diagonally to make sure the beams are square to each other. Mark the location of the gravel base (see

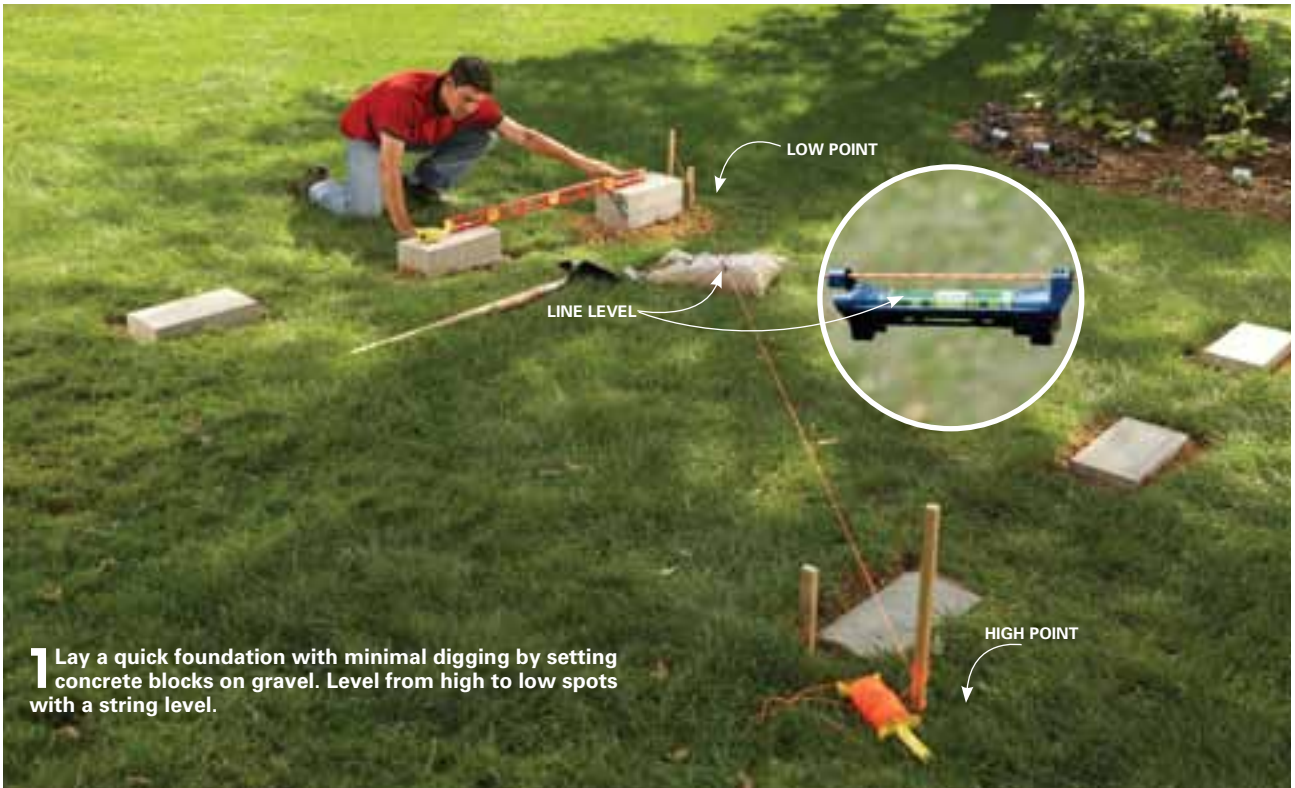


A deck you can build in a day

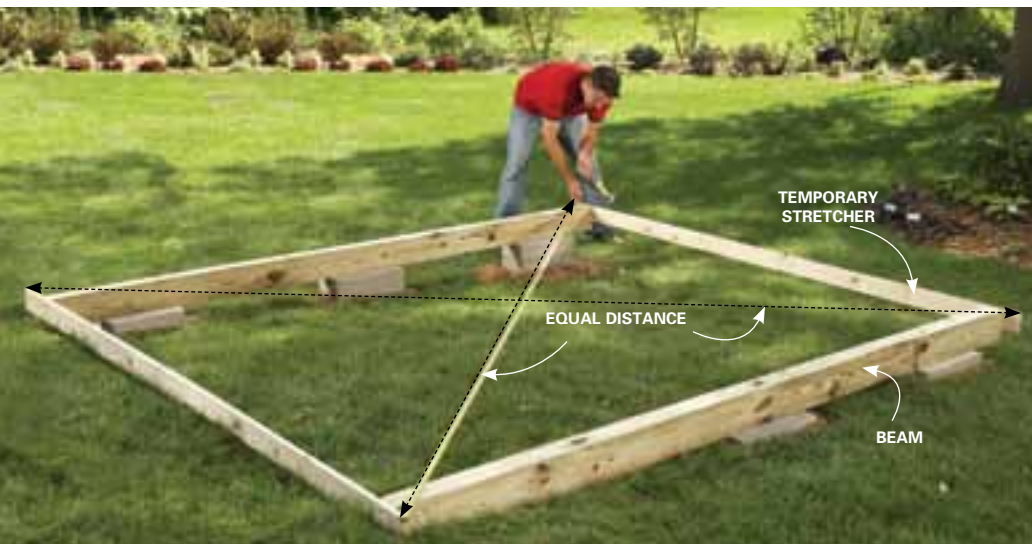
The simplicity of this deck makes it fast to build. With a helper and all the materials ready to go first thing in the morning, you can have a completed deck before sundown. If you add a step to your deck and use hidden deck fasteners as shown, you might need a few more hours to finish the job.

tip

If all or part of the deck is higher than 30 in. off the ground, you'll need a building permit and railings. If you intend to build any kind of structure on top of the deck or attach the deck to the house, you also need a permit. Also, keep the deck at least 4 ft. back from the property line.



1 Lay a quick foundation with minimal digging by setting concrete blocks on gravel. Level from high to low spots with a string level.



2 Take diagonal measurements and tap one beam forward or back to square the beams. Temporary stretchers hold the beams parallel.



3 Screw on angle brackets at each joist location instead of toenailing, which can split and weaken the joists and knock the beam out of square.

Figure A) by cutting the grass with a shovel, then move the beams out of the way and cut out the sod where the gravel will go.

Establish the highest and lowest points with a string and string level to get a rough idea of how deep to dig and how much gravel to put in to make the blocks level (Figure A). Tamp the dirt with a block to make a firm base, then spread the gravel. Place the blocks and level them against

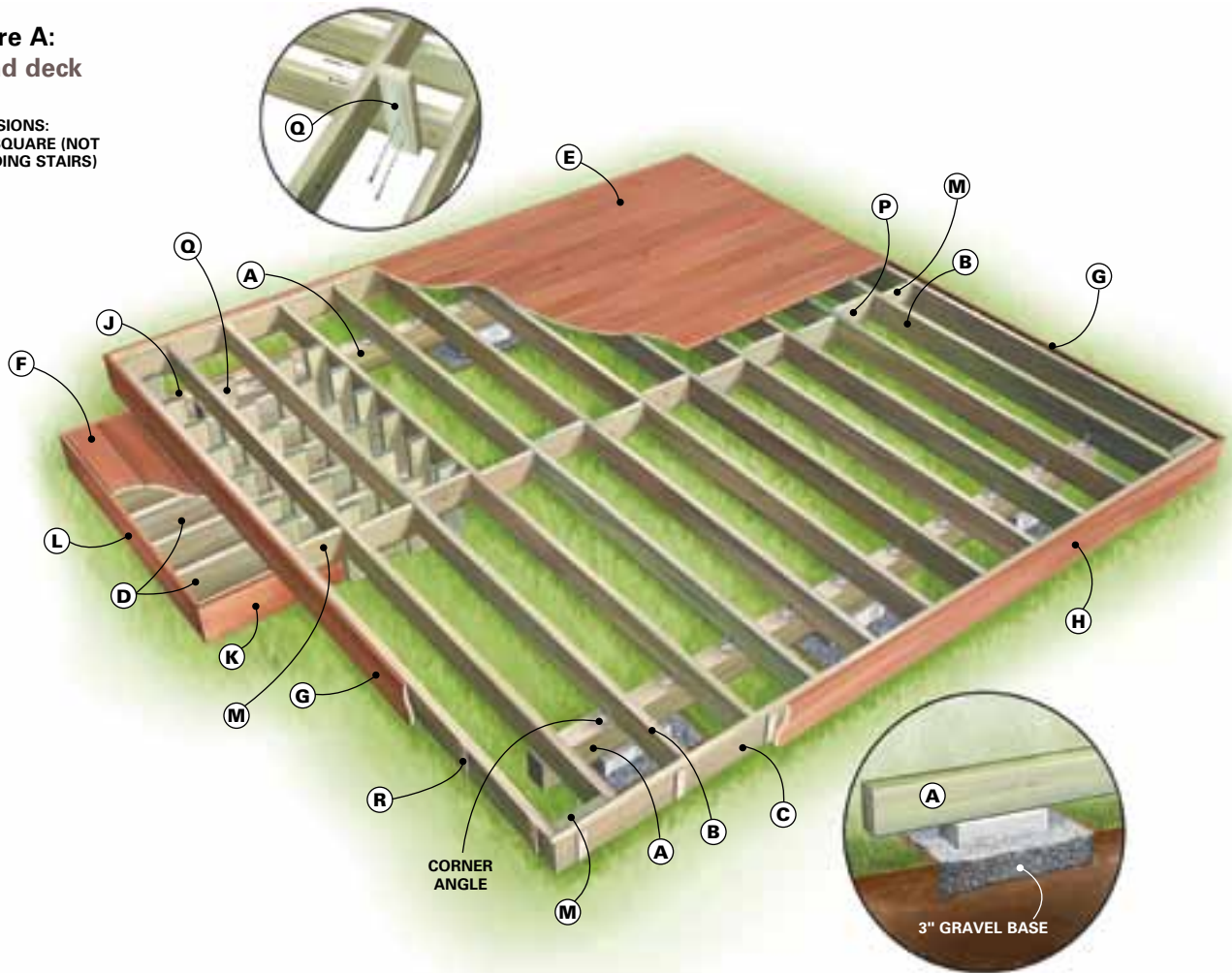
each other and in both directions (Photo 1), adding or scraping out gravel as needed. Use construction adhesive between the 4-in.-thick blocks if you stack them, or use 8-in. blocks. If your site slopes so much that one side will be more than 2 ft. off the ground, support it on a 4x4 post on a frost footing instead—it'll look better and be safer.

Set the beams across the blocks and square them to each other, using the same 1x4 stretchers to hold them

TRANSFORM YOUR YARD!

Figure A:
Island deck

DIMENSIONS:
11' 8" SQUARE (NOT
INCLUDING STAIRS)



parallel and square (Photo 2). If the beams are not perfectly level, shim them with plastic or pressure-treated wood shims (sold in home centers).

Mark the joist locations on the beams, starting with a joist on the end of each beam. Shown are 11 joists spaced 12 in. on center to keep the composite decking from sagging over time, but wood decking can be spaced 16 in. on center.

Instead of toenailing, which often splits the wood, use metal angles to hold down the joists. This also makes it easy to place the joists. Attach one alongside each joist location (Photo 3).

Cantilever the joists on all sides

Set the two outer joists and the center joist on the beams against the metal angles. Extend the joists over the beam on one side by 10-1/2 in., but let them run long over the opposite beam. Trim them to exact length when the deck is almost done so you can avoid ripping the last deck board.

Cutting list

KEY PCS.	SIZE & DESCRIPTION
A	2 3-1/2" x 5-1/2" x 120" beams
B	13 1-1/2" x 5-1/2" x 135" joists
C	2 1-1/2" x 5-1/2" x 138" rim joists
D	7 1-1/2" x 5-1/2" x 48" stair stringers
E	24 1" x 5-1/2" x 138" deck boards (cut in place)
F	2 1" x 5-1/2" x 55-1/2" stair treads
G	2 3/4" x 7-1/2" x 140" skirt board
H	2 3/4" x 7-1/2" x 138-1/2" skirt board
J	1 3/4" x 7-1/2" x 48" skirt board
K	1 3/4" x 7-1/2" x 24" skirt board
L	1 3/4" x 7-1/2" x 57-1/2" riser
M	6 1-1/2" x 5-1/2" x 7-1/2" blocking
P	10 1-1/2" x 5-1/2" x 10-1/2" blocking
Q	25 1-1/2" x 3-1/2" x 11" joist supports (can be used instead of metal reinforcing angles)
R	40 1/4" x 5-1/2" spacers



4 Install the middle and end joists, then screw on the rim joists, using clamps (or a helper) to hold them in place.



5 For strong connections at the corners, set corner blocking between the last two joists, then nail the rim joist from both directions.

Fasten the joists to the angles with deck screws. Screw on both rim joists—you'll have to take the second rim joist back off when the joists are trimmed and then reattach it, but it's needed to hold the joists straight and to hold the outside joists up (Photo 4). The decking will hold the outside joists up when the rim joist is removed later.

Set the other joists on the beams and fasten them to the beams and rim joists. Reinforce the outside corners with additional blocking (Photo 5). Finally, mark the center of the joists and run blocking between each pair of joists. Set the blocking 1/2 in. to the side of the center mark, alternating from side to side, so that the blocking doesn't end up in the gap between the deck boards.



6 Frame the steps next. You can avoid additional footings by hanging stringers from the deck joists with metal angles or 2x4s.

Add a step

The deck surface should be no more than 8 in. above the ground where you step up on it. If it's close, just build up the ground or add concrete pavers. Otherwise, add a step.

To cantilever the stairs, extend the stair stringers underneath four deck joists, then join the floor joists and stair stringers with reinforcing angles (as shown) or wood 2x4s, which are less expensive (Photo 6). Use a screw first to hold the angles or 2x4 blocks in place, then finish fastening them with nails, which have greater shear strength.

The 5/4 (nominal) decking shown (Trex Brasilia; trex.com) called for a maximum spacing between stair stringers

TRANSFORM YOUR YARD!



7 Attach the deck boards. Decks look best when you use hidden fasteners, but they make installation slower. Trim the deck boards flush with the rim joist when you're done.



8 Wrap the deck with skirt boards that match the decking, driving trim head screws just below the surface at the spacer locations (see Figure A).



9 Screw skirt boards to the sides of the steps for a finished look, then measure, cut and attach a riser board to the face of the steps.

of 9 in. on center, but you can space stringers 16 in. on center if you use solid wood.

Hidden fasteners create a clean look

The deck boards shown are attached with hidden fasteners (see Materials list). Other types of hidden fasteners are available—or you can use deck screws, which create lots of holes but save time and money.

Start with a full board at one side, aligning it with the edge of the rim joist. Leave the boards long at both ends, then cut them back later all at once so the edges

are straight. Use four 1/4-in. spacers between each pair of boards as you fasten them, but check the distance to the rim joist after every four boards and adjust spacing if necessary.

At the next to the last board, remove the rim joist and mark and cut the ends off the joists so the last deck board lines up with the edge of the rim joist. Reinstall the rim joist and attach the last boards.

Nail 1/4-in. spacers ripped from treated wood to the rim joist every 16 in. so water won't get trapped against the rim joist. Screw on skirt boards with two screws at each spacer (Photo 8). Attach the decking to the steps after the skirt boards are fastened. Finally, finish the steps (Photo 9).

Materials list

ITEM	QTY.
4" x 8" x 12" solid concrete block	6 (min.)
Class V (5) crushed gravel	6 bags
4x6 x 10' pressure-treated timbers	2
2x6 x 12' (12" o.c. joist spacing)	19
1-1/2" corner angles	22
7" reinforcing angles (or 2x4 x 11" blocks)	25
5/4x6 x 12' decking (Trex Brasilia Cayenne)	25
1x8 x 12' matching skirt board	5
Joist hanger nails	2 lbs.
1-5/8" deck screws	5 lbs.
3" deck screws	2 lbs.
2" stainless steel trim head screws	2 lbs.
Fastenmaster IQ deck fasteners (fastenmaster.com), (100 s.f. boxes)	2
1x4 x 10' temporary stretchers (for layout)	2

Soothing fountain



TRANSFORM YOUR YARD!

1
day



This attractive fountain is proof that good things come in small packages. You can build it in an afternoon for under \$80. It's a "disappearing fountain" so there's no exposed standing water. This means there's less maintenance since there's less chance debris and critters will wind up in the water. Yet it provides the soothing sight and sound of running water people love. Another bonus—since birds love moving water, there's a chance you'll attract some of these outdoor friends.

You can personalize your fountain in a number of ways:

- Surround it with any type of rock. Shown is a natural wall stone, but you can use modular concrete retaining-wall blocks, boulders or flagstone.
- Top it off with any type of small stone. Shown is a decorative rock called "Western Sunset." You can use pebbles, lava stone or special rocks you've collected in your travels.
- Use any bowl, dish or plate you want for the water to splash into. The fountain shown incorporates three pieces so the water cascades from one piece into the next.

Let's get started

The fountain shown here utilizes a whiskey barrel liner from our local home center for the catch basin, but any large plastic container will do (See Photo 1 on p. 76). Some garden centers sell special pond liners just for this purpose.

Regardless of your soil conditions, nestle your catch basin or liner into a bed of sand. This helps protect the bottom of the tub from sharp rocks and makes it easier to level the tub and the first course of rock.

Construct your fountain so you can gain access to the pump by removing a handful of rocks along with the

Multiple spray patterns

All four of these interchangeable fountainheads, which provide different looks, came in one package. It only took part of an afternoon to build this fountain, and it didn't take any fancy tools.





1 Select a location where you'll enjoy your fountain, hollow out a 2-in.-deep area, then level in a bed of sand large enough to accommodate the plastic tub and the rock or block that will surround it.



2 Locate a sturdy plastic flower pot the same height as your plastic tub, cut a hole in the side near the bottom and feed the cord for the electric pump through it. Position this pot right side up in the center of your tub.



3 Cut a hole in the wire hardware cloth (available at home centers) large enough for the pump to fit through, then position the cloth over the tub and bend the edges over the tub lip.

hardware cloth trap door (Photo 5). This allows you to easily remove the pump for maintenance and for storing it indoors over the winter.

Use a bag of sand as a workbench when drilling the holes in your bowls and dishes (Photo 6). It'll provide a cushion and help prevent breakage.

Many large garden centers and home centers sell water garden pumps and accessories. Or you can contact:

- Laguna, www.lagunaponds.com.
- Little Giant Pump Co., (800) 809-1393, www.littlegiantpondworks.com.



4 Surround the tub with flagstone or concrete retaining-wall blocks to match the rest of your landscape. The upper course should be about 2 in. higher than the top of the tub to help contain the decorative rocks.

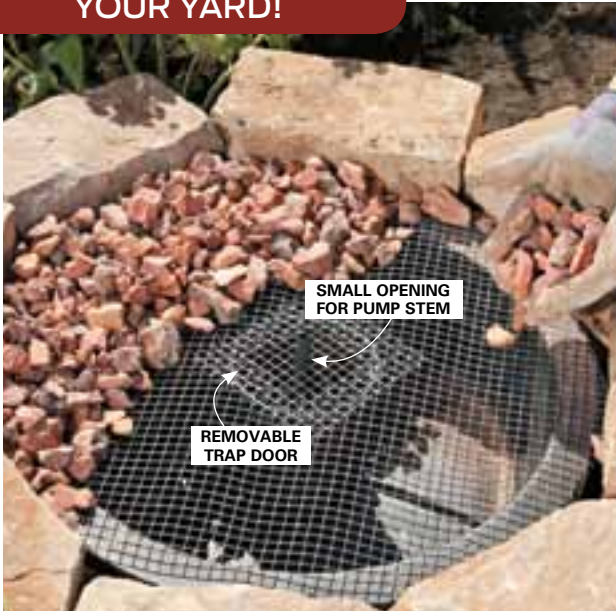
■ MacArthur Water Gardens, (678) 404-8581, www.macarthurwatergardens.com.

Operating tips

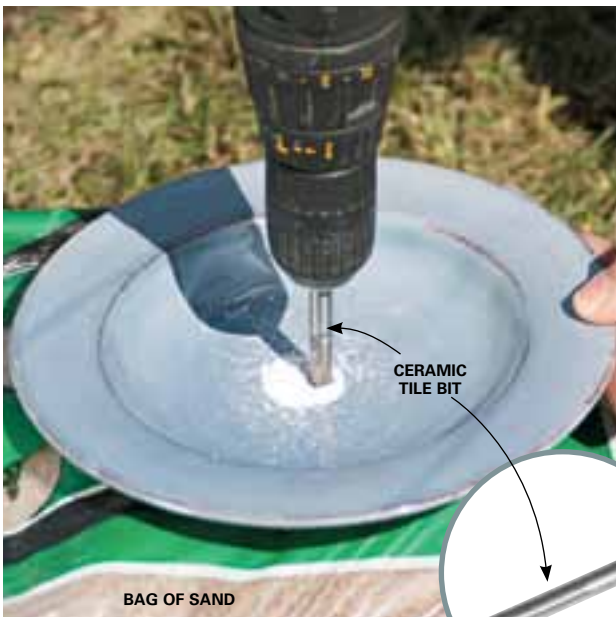
Keep your fountain liner full of water and check the level every day or so, especially in hot weather. You can use any thin stick as a dipstick to check the water level. If you run your fountain frequently and it splashes water outside the tub, you may need to refill it daily.

Plug your pump into a GFCI-protected outlet—ideally one located next to the fountain. If you use an extension

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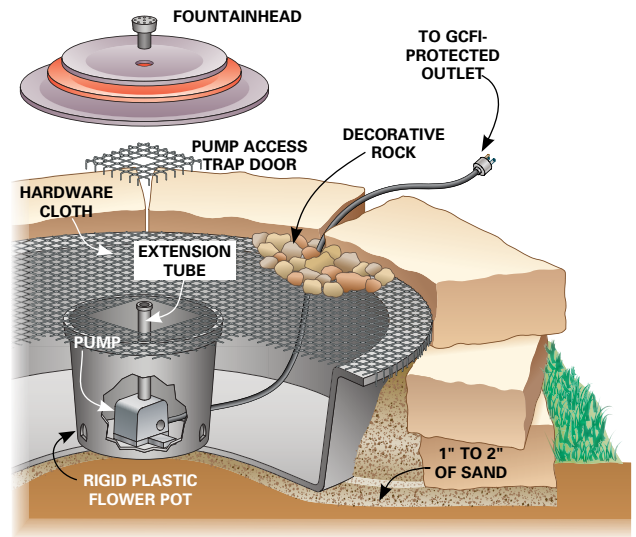


5 Cut a small piece of hardware cloth a few inches larger than the access hole to create a removable trap door, then cut a small opening for the pump stem. Cover the top of the hardware cloth with decorative stone.



6 Drill a hole in your fountain dish by first scoring the glaze in the center of the bowl with a light tap of a nail (*light!*), then boring a hole using a ceramic tile bit. If you need to enlarge the hole, use a larger bit or small file.

Figure A:
How it all goes together



7 Install the fountainhead of your choice. Most pumps can accommodate a range of heads including mushroom-shaped, cup-shaped and fan-shaped patterns (see p. 75). Then fill the tub, plug in the pump and relax.

tip

cord, leave it exposed so you know where it is, and be careful with sharp garden tools and mowers.

As a precaution, unplug the fountain when you're not around to watch it (or put it on a timer). If the pump runs dry, it'll burn out.

Have a little fun selecting your fountain dishes. It's the perfect opportunity to use those I-never-use-'em-but-I-can't-bear-to-throw-'em-out bowls, plates and even teapots.

Most pumps will accept a variety of fountainheads. Bear in mind that with some spray patterns, all the water may not drain back into the tub. You'll have to refill your tub much more often with this type of fountain.



Patio pergola

1-3
weekends

Like any other pergola, this one provides partial shade and—if you like—a home for climbing vines. But with its clean, streamlined design, this pergola is easier to build than most. There are no curves or fussy miter joints, no special-order materials or specialty tools required. That simplicity makes this the perfect pergola for DIYers who are ready to tackle their first big framing project—or busy folks who can't spend weeks on a single project.

Money, materials and tools

This pergola is built from cedar, and the total materials bill came to about \$1,500. Built from pressure-treated lumber, this pergola would have cost about \$1,000. Everything you'll need is available at home centers. Aside from a standard

set of hand tools, the only tools you need are a cordless drill, a circular saw and a jigsaw. Exterior screws instead of nails were used for assembly. An experienced builder could complete this project in one weekend. But haste leads to mistakes, so give yourself two or three weekends.

Planning and preparation

- Depending on local rules, you may need a building permit—check with your inspections department.
- For stability, the postholes must be at least 3 ft. deep. The frost depth in your region may call for deeper holes.
- This pergola is sturdy, but shifting soil or extreme winds could move it. Play it safe and keep all parts of the pergola at least 4 in. from any part of your house.

TRANSFORM YOUR YARD!



1 Perfect posthole positioning. A 2x4 layout frame makes it easy and foolproof. Drive stakes at the corners to mark the postholes, then set the frame aside while you dig.



WARNING:
Before you dig, call 811 to have underground utilities and wires marked.

2 Lock 'em in concrete. No need to mix up all the concrete. Dump in dry mix, leaving the top 6 in. unfilled, and pour in 2 gallons of water. Then mix up concrete to top off each hole. "Crown" the top with wet mix so it slopes away from the post.

■ The beams require 20-ft.-long lumber, so arrange for delivery of all the materials.

Position the posts

The whole pergola rests on four posts. Planting those posts in perfect position is the most critical and time-consuming part of the project.

The traditional way to position posts is with stakes and strings. But that's slow and fussy; you have to reposition the strings again and again until you get it right. Here's an easier way: Screw together a 2x4 frame with *inside* dimensions of 151 x 151 in. (Cut two of the 2x4s to 151 in.; two to 154 in.) Take diagonal corner-to-corner measurements to make sure the frame is square and then brace it with 8-ft. 1x2s.

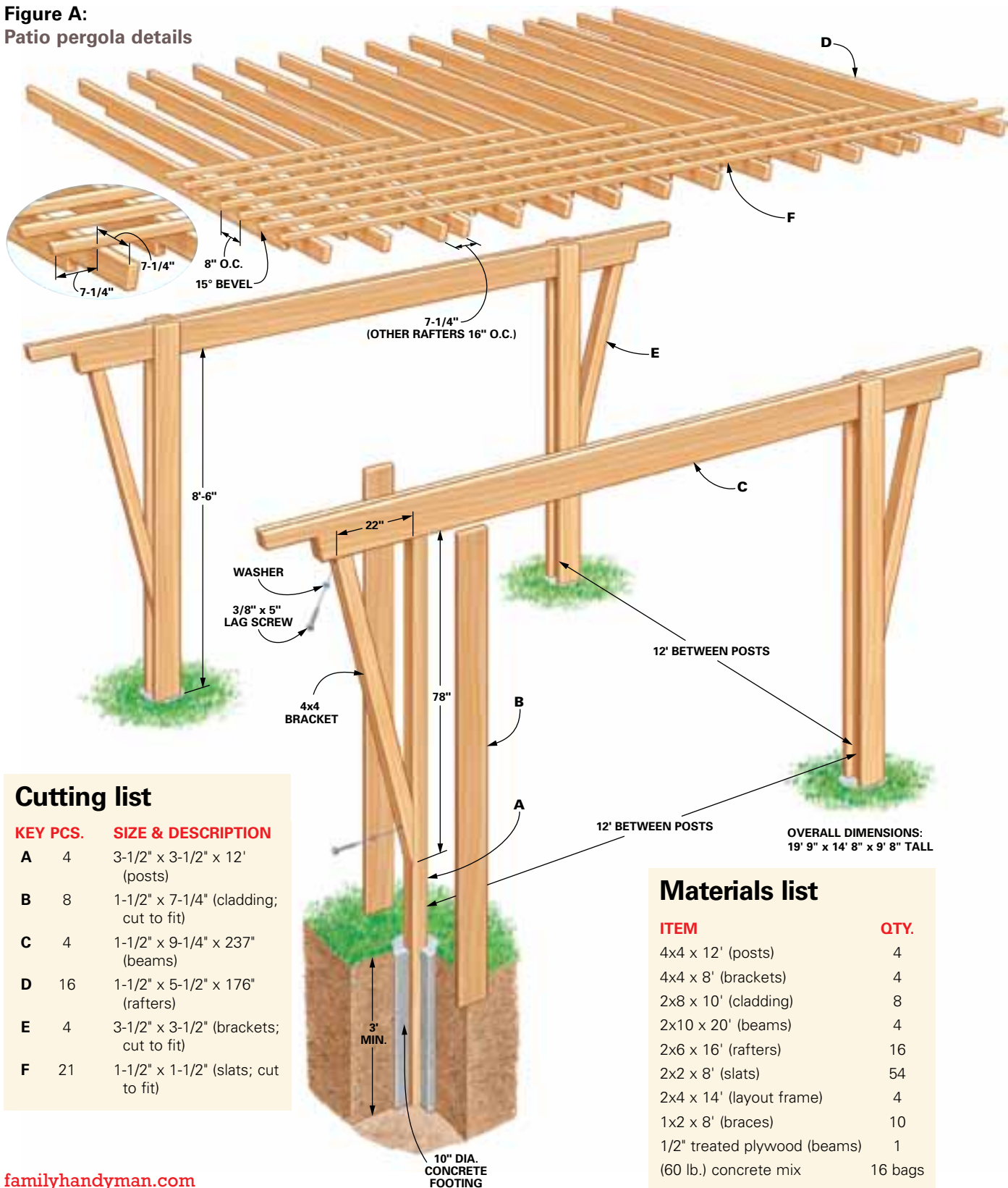
Set the frame into place to instantly position the postholes (Photo 1). After you've dug the postholes, set the frame back into place. Set each post in its hole and drive temporary screws through the frame and into the post. Then grab your level, plumb each post, and lock it into position with stakes and 1x2 braces. Disassemble the frame and you're ready for concrete (Photo 2).

The rest is simple

After the posts are in position, there's still a ton of work to do. But it's not complicated work. If you study Figure A and measure and cut carefully, it will all go together smoothly. Here are some building tips:

continued on p. 82

Figure A:
Patio pergola details



Cutting list

KEY PCS.	SIZE & DESCRIPTION
A	4 3-1/2" x 3-1/2" x 12' (posts)
B	8 1-1/2" x 7-1/4" (cladding; cut to fit)
C	4 1-1/2" x 9-1/4" x 237" (beams)
D	16 1-1/2" x 5-1/2" x 176" (rafters)
E	4 3-1/2" x 3-1/2" (brackets; cut to fit)
F	21 1-1/2" x 1-1/2" (slats; cut to fit)

Materials list

ITEM	QTY.
4x4 x 12' (posts)	4
4x4 x 8' (brackets)	4
2x8 x 10' (cladding)	8
2x10 x 20' (beams)	4
2x6 x 16' (rafters)	16
2x2 x 8' (slats)	54
2x4 x 14' (layout frame)	4
1x2 x 8' (braces)	10
1/2" treated plywood (beams)	1
(60 lb.) concrete mix	16 bags
rolled flashing (aluminum or copper)	40'
3" screws	5 lbs.
5" screws	32
3/8" x 5" lag screws and washers	8

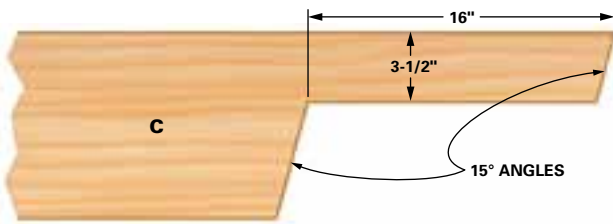
familyhandyman.com

Visit our Web site for more on patios and pergolas.

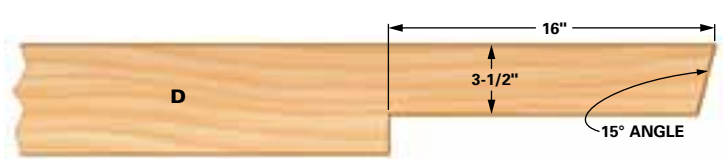
- Looking for a more traditional design? Search for "pergola" to find plans.
- Search for "shade" to find more sunblocking ideas for decks and patios.
- If your deck or patio is a bit too public, build a privacy screen. Search for "patio privacy" to see how.
- Search for "mix concrete" to learn tips that make the job faster and easier.

TRANSFORM YOUR YARD!

Beam details



Rafter details



3 Build "sandwich" beams. Cut the decorative ends of the 2x10s. Then make a plywood sandwich: Screw pressure-treated plywood to one side of each beam, add the other side and lock the sandwich together with 3-in. screws.

4 Flash the beams. Keep rain from seeping into the beam and causing rot. Center a strip of copper flashing over the beam and fasten it with a few staples. Then bend the edges down with a 2x4 block and staple them.



5 Mark the post height. All the posts must be cut at the same height. A laser level makes marking fast and precise. But there's also a low-tech method: Just measure and mark one post, then transfer that height to the other posts with a string level (\$3).

Planting posts in a patio

Any or all of the pergola posts can pass through a concrete patio into the soil below. All it takes is a hole in the concrete that's large enough to let you dig a posthole. That will leave you with an oversize hole in the concrete, of course, but you can patch in around the post with 8-in.-long pavers. After marking the concrete, cut the square with a diamond blade in your circular saw. Also make a couple of diagonal cuts so breaking out the concrete will be easier. Then get to work with a masonry chisel. (If you use a sledgehammer, you'll risk cracking the surrounding concrete.) When the concrete hole is done, set the post as usual.



Mark a posthole on concrete. Set a scrap of 4x4 on the exact post position and wrap it with the pavers you'll use to patch in later. Use a marker to mark the cutout—a pencil line will wash away when you cut.



6 Set the beam. Nail one side of the cladding to each post. Then recruit a helper, center the beam and screw it to the cladding.



8 Set the rafters. The notches automatically set the rafters' overhang. Predrill and fasten each rafter end with a single 5-in. screw.

continued from p. 79

- The plywood in the “sandwich” beams isn’t structural; it just acts as a spacer. So you can puzzle it in any way you like (Photo 3). For better appearance, keep it 1/2 in. away from the bottoms of the beam.

- The flashing on the tops of the beams is optional (Photo 4). Shown is copper, which looks great and bends easily. Copper is pricey, though: \$70 for 40 ft. Aluminum flashing is also easy to bend and will cost about \$25.



7 Gang-cut the rafters. After you cut the rafters to length, line them up and clamp them together. Set your saw's depth to 2 in. and make the notch cuts in one pass. Cut individually to complete each rafter end.



9 Add the brackets. Hold the 4x4 bracket in place and have a helper mark it along the beam and the post. Cut the bracket, screw it into place and add the second side of cladding.

- To save on ladder work, mark the rafter locations on the beam before you set it on the posts (Photo 6). Likewise, mark the slat locations on the rafters before setting them.

- Coat your pergola with any exterior finish you like. Whatever you choose, finish the rafters and slats *before* you install them. You'd have to be a glutton for punishment to brush on the finish after they're in place!

TRANSFORM
YOUR YARD!

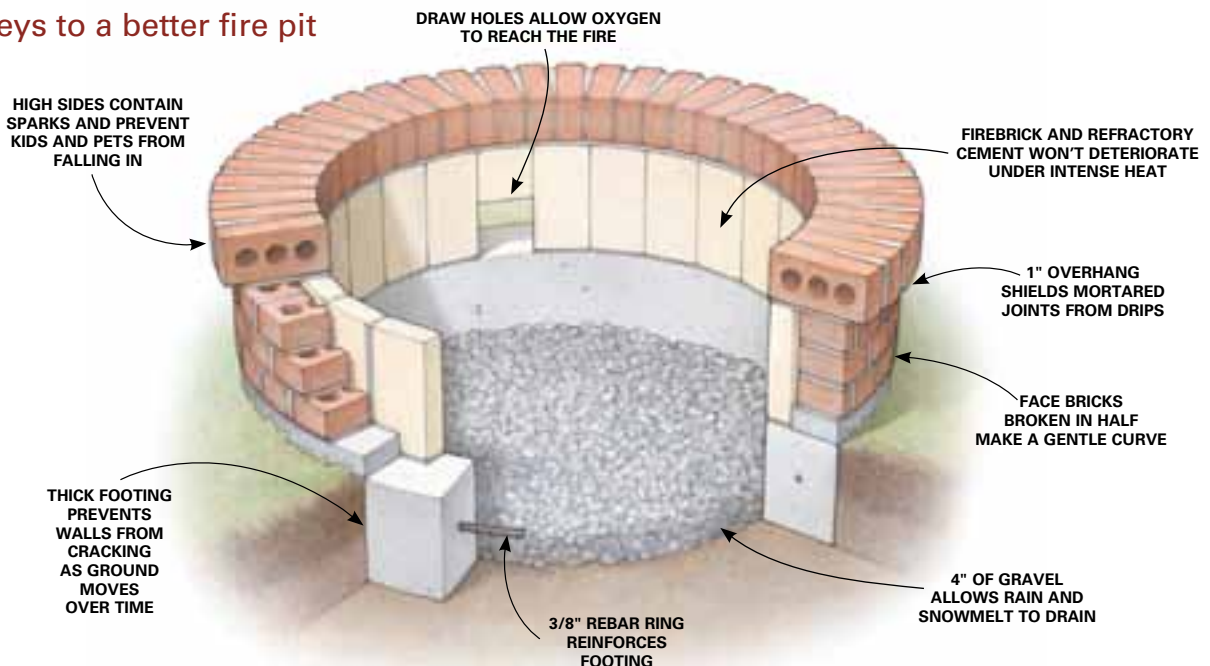
1
weekend

Brick fire pit

Backyard fire pits are still all the rage, and for good reason. There's nothing like a crackling fire to draw friends and family together. Sure, you could set some stones around a hole or spend hundreds of bucks on a steel fire ring. But for about \$200 you can build a handsome brick fire pit that's maintenance free, easy to clean out, and it will last forever.

If you've ever wanted to learn to lay brick, a backyard fire pit is an excellent project to start with. Even if your brickwork isn't perfect, the fire pit will still look great. Set aside several days to complete your fire pit: First you'll pour the footing and let it set up. Then you'll mortar the bricks into place.

Keys to a better fire pit





1 Mark out the pit. Set the larger form in position and spray paint around it. Dig a hole about 8 in. deep and 3 in. larger in diameter than the form.



2 Level the pit. Check the bottom of the hole with a level. Remove high spots by scraping off soil rather than digging. That way, you won't loosen the underlying soil. Compact the soil with a hand tamper or a 4x4 post.



3 Stake the forms. If the forms aren't quite level, raise one end and drive a screw through the stake. If the forms aren't completely round, reposition the stakes.

Dig the pit

Before digging, dial 811 or visit call811.com to confirm the location of buried utility lines. Also check the fire pit code in your area. Most require a fire pit to be 25 ft. away from any structures and overhanging trees. Think about how the prevailing winds blow through your backyard. Don't locate your pit upwind of your patio or where the smoke will blow into your windows or those of your neighbors.



4 Add the rebar. Bend rebar into half circles and tie them together with wire to make a ring. Fill the forms halfway. Press the ring into the concrete, making sure it doesn't touch the sides of the forms.

A 3-ft.-diameter fire pit creates enough room for a good fire, yet keeps everyone close enough to chat (and complies with most codes). To make measuring the pit and pouring the concrete footing easy, use two cardboard concrete form tubes (\$45 for the two from a concrete supply company). You could also make your own forms by screwing together 1/8-in. hardboard. Rip a 4 x 8-ft. sheet (\$7) into four 8-in.-wide strips. Carefully bend and screw two strips together

TRANSFORM YOUR YARD!



5 Finish the footing. Shovel in the remaining concrete until the forms are filled. Recheck level, hammering the forms down if necessary, and smooth the top of the footer. Let the concrete set overnight.



6 Dry-set the firebrick. Adjust the spacing between bricks so you won't have to cut the last brick to fit (cutting firebrick ain't easy). Mark the position of every brick on the footing.



7 Mortar the firebrick. Butter a thin layer of cement on the footer and position your first brick. Butter the second brick and butt it against the first. Continue around the circle checking level side-to-side and back-to-front as you go.

to create a 36-in.-diameter circle, and use the other two to make a 48-in.-diameter circle.

Mark the outside edge of the pit (Photo 1). Then shovel out the soil to a depth of 8 in. (Photo 2). Don't disturb the underlying soil.

Pour a sturdy footing

The concrete footing will create a stable base for the pit walls and keep the sides of your pit from cracking as the ground moves over time. Stake the forms (Photo 3) and mix up ten 80-lb. bags of concrete mix (\$3.40 per 80-lb. bag at home centers) according to the manufacturer's directions. If you're using hardboard forms, stake them so they're nice and round. Fill the forms halfway and press a



8 Create draw (air) holes. Leave gaps in the firebrick in four spots and then fill them with half bricks. These gaps are "draw holes" that feed air to the fire. Prop up the half bricks until the mortar sets.

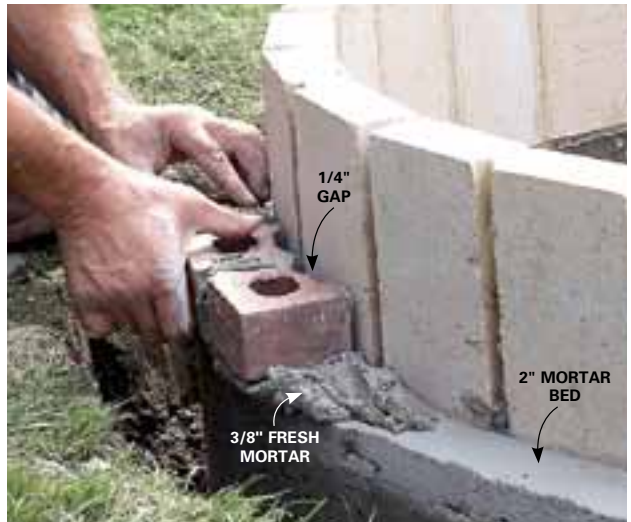
rebar ring into the concrete for strength (Photo 4). Finish filling the forms to the top and tap the tubes gently with a sledgehammer until the concrete mix is level. Smooth the top of the footing (Photo 5). Let the concrete completely set up overnight and then remove the forms.

Dry-set the firebrick liner

Because regular clay brick can crack at high temperatures, use firebrick (also called "refractory" brick) to line the inside of the pit walls. Firebrick is a dense brick that's kilned to withstand high temperatures. It's larger, thicker and wider than regular brick, and you can find it at most brickyards. Firebrick is more expensive (\$2 per brick compared with 75¢ or less), but it will stand up to nightly fires for years to



9 Split 80 bricks in half. Cup the brick in your hand, keeping your fingers below the top edge of the brick. (This mason doesn't use gloves, but you should!) Give the brick a solid tap (a very solid tap for firebrick) on the outside edge near the center hole. Avoid hitting your hand. Repeat 79 times.



10 Set the face brick. Lay a thick bed of mortar and let it harden for 15 minutes. Then lay 3/8 in. of fresh mortar and begin setting brick. Butter one side of each brick before you set it in place.



11 Work in sections. Working on one-third of the pit at a time, check the level of each course and tap down the bricks as necessary. Stagger the joints between courses for strength.



12 Strike the joints. After you finish each section of face brick, use a jointer to smooth ("strike" or "tool") the joints before the mortar dries too much. The mortar is ready to strike if you press your finger into it and the indentation remains. Striking gives the wall a uniform, polished look.

come. You'll need 25 firebricks for a 3-ft.-diameter pit.

Because firebrick is so dense, it's tougher to split than regular brick. "Soldiering" the brick (standing it on end) minimizes the amount of splitting and lets you easily accommodate the curve of the pit. You'll only need to split four firebricks (use the technique shown in Photo 9), which you'll place across from one another around the pit to create draw (air) holes for oxygen for your fire. After you split your firebricks, dry-set them in place on top of the footing (Photo 6).

Mortar the firebrick

Firebrick is mortared with refractory cement, which, unlike regular masonry mortar, can withstand high heat. Refractory cement comes premixed in a bucket (\$10 per half gallon at brickyards) and has the consistency of peanut butter.

A margin trowel makes it easier to scoop cement out of the bucket and butter the bricks. A tuck pointer is useful for cleaning up the joints.

Work with four bricks at a time. The secret is to trowel the cement on thin, like you're spreading peanut butter on toast, and use the tightest joints you can (Photo 7). Continue mortaring the firebrick around the pit, placing the half bricks for the draw (air) holes at four opposite points around the ring (Photo 8). Check for level across the pit and the vertical level of the bricks as you go.

Complete the outside walls with face brick

For this project, SW ("severe weathering") face brick (also called "common" or "building" brick; 25¢ to 75¢ per) was used to line the outside walls. If your climate doesn't

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13 Mortar the cap bricks. Lay a 3/8-in. bed of mortar across 10 to 12 bricks at a time. Lay the bricks on edge and butter the face of each brick on the outside edge as you go.

Materials list

ITEM	QTY.
Cardboard concrete form (\$15 at a concrete supply company)	36"
Cardboard concrete form (\$30 at a concrete supply company) or use a 4' x 8' sheet of hardboard to make both forms	48"
80-lb. bags of concrete mix	10
10' lengths of 3/8" rebar (at a concrete supply company)	2
Firebricks (at a brickyard)	25
Half-gallon bucket of refractory cement (\$10 at a brickyard)	1
Face bricks	120
80-lb. bags of Type N mortar mix	5
Margin trowel	
Tuck pointer	
Mason's trowel	
Concave jointer	
Concrete float	
Brick hammer	
Spray paint (for marking grass)	
Stakes	

include freeze/thaw cycles, you can use MW ("moderate weathering") building brick. Home centers and brickyards carry a large variety of brick. You'll need 80 face bricks for a 3-ft.-diameter pit. Face brick with holes ("cored") is easy to split with a brick hammer (Photo 9). It's easier to form the curve of the pit walls with half bricks. You'll lay three courses of face brick and mortar them together with Type N mortar mix (\$5 per 80-lb. bag at home centers, and you'll need about five bags).

Because face brick is smaller than firebrick, you'll need to make up the size difference as you lay your three courses of face brick. The difference between the height



14 Fill gaps. Add a small amount of mortar to the joints to fill any gaps. Check level frequently and tap gently with a brick hammer to adjust the spacing. Leave a 1-in. overhang on the outside to allow for rain to drip off. Once all the bricks have been mortared in place, strike the joints for a smooth, finished look.

of your firebrick and the total height of three stacked face bricks will determine the width of your mortar beds between courses. Dry-set the face brick, marking where each course of face brick has to hit the firebrick to make the third course of face brick level with the firebrick.

To keep your mortar joints between courses a reasonable width, first lay a 2- to 3-in.-thick bed of mortar right on top of the footing. Let it set up slightly (15 minutes) and smooth out the top. Then, working on one-third of the pit at a time, mortar each course of face brick into place, leaving a 1/4-in. gap between the firebrick and the face brick (Photo 10). Level the brick between courses, tapping the bricks down when necessary (Photo 11). Remember to leave the draft holes open as you mortar each section of face brick and smooth out the finished joints (Photo 12).

Finish off the top lip

Finish the pit with a matching "row-lock" cap using regular face brick set on edge. You'll need about 40 face bricks for this cap, which will help protect the wall joints from rain, keep sparks contained and give you a nice ledge to warm your feet on. Shown here is brick, but you could use natural stone for a different look. Work with 10 to 12 bricks at a time. Lay a 3/8-in. bed of mortar, then butter each brick and press it into place (Photo 13). Work your way around the circle, filling any gaps with mortar and checking level and placement frequently (Photo 14). Smooth the finished joints with a concave jointer.

Give the cement and mortar a week to cure completely before lighting a fire in your pit. Pour a few inches of gravel on the pit's floor for drainage and you're ready for your first wienie roast.



1
day for 2
people

Simple retaining wall

This 32-in.-high, 32-ft.-long wall was built in one fairly laid-back day, by one fairly laid-back DIYer and a skid steer loader (photo 7). The materials cost \$500, plus another \$500 for the loader and its operator, who supplied gravel and some extra topsoil for fill. Having the loader meant there was very little shovel work.

The skeleton of the wall is a treated wood, 2x4 stud wall clad on both sides with 1/2-in. treated plywood. It's held in place with 2x4 "dead men" assemblies buried in the backfill. The dead men are 2x4 struts bolted to the wall studs and anchored to a perpendicular 2x4 sleeper (see Figure A). The weight of the soil on the dead men anchors the wall against the backfill pressure. It's important to locate the bottom of the wall below grade a few inches so the earth in front of the wall will anchor the base in place.

Get the right stuff

Ordinary treated wood will last a good long time depending on soil conditions, although wet sites with clay will shorten the wall's life somewhat. If you use ordinary treated wood from the home center, figure the wall will last at least 20 years. To build a wall that'll last forever,

use foundation-grade treated wood, the material used for basements. It's usually Southern yellow pine, a very strong softwood that accepts treatment better than most, and contains a higher concentration of preservatives. You may find it at lumberyards where contractors shop. Or you can special-order it from any home center or lumberyard, although you'll pay a premium.

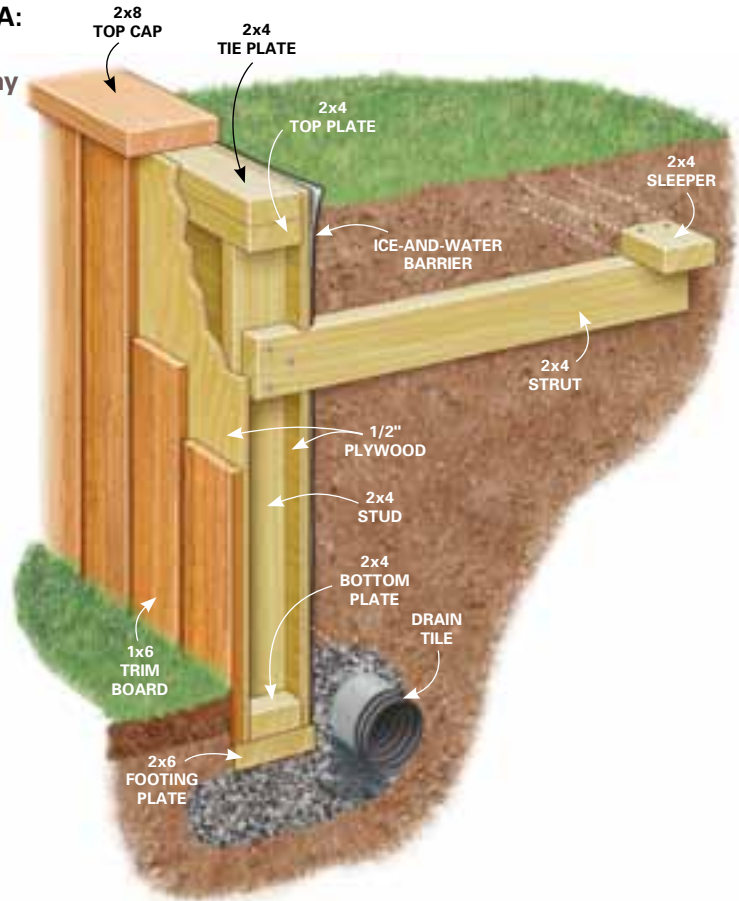
Choose nails rated for treated wood: 16d for the framing and 8d for the sheathing. Use 3-in. construction screws for standoffs and dead men connections—again, ones that are rated for treated wood. You'll also need a box each of 2- and 3-in. deck screws for the trim boards. See the Materials List on p. 91.

Prepping the site

This site had a gentle slope to retain, not a huge hill. This 32-in.-high wall is designed to hold back a gentle slope and is good for walls up to 40 in. For walls 40 to 48 in. place the studs on 12-in. centers and keep the rest of the wall the same. Don't build the wall more than 48 in. high—a taller wall requires special engineering.

Do the digging with a shovel if you wish. The trick is to dig halfway into the hill and throw the soil on top of

Figure A:
**Wall
anatomy**



the hill. That way you'll have enough fill left for behind the wall. The downside is that if you hand-dig, you'll also need to dig channels for the 2x4 struts and sleepers (see Photo 5).

It's much easier to hire a skid steer loader and an operator to dig into the hill and then cut down a foot or so behind the wall to create a shelf for resting the dead men. Expect to pay a few hundred dollars for skid steer services. The operator can also scoop out the 12-in.-wide by 10-in.-deep trench for the gravel footing, and deliver and dump a 6-in. layer of gravel into the footing. Then you'll only need to do a bit of raking to level off the trench. A yard of gravel will take care of 50 linear feet of wall. If you have extra gravel, use it for backfill against the back of the wall for drainage. Have the skid steer and operator return to fill against the back side of the wall and do some final grading.

Get the footings ready

Fill the trench with gravel. Any type will do, but pea gravel is the easiest to work with. Roughly rake it level, then tip one of the footing plates on edge and rest a level on top to grade the footing (Photo 1). Use the plate as a screed, as if you're leveling in concrete, and you'll get it really close, really fast. Try to get it within 1/4 in. or so of level. Offset any footing plate joints at least 2 ft. to either side of wall joints. To drive down the plate until it's level, stand on it as you pound it into the gravel with another board, occasionally checking it with a level. If you can't drive the board down to achieve level, scoop out shallow trenches on either side of the footing plate with your hand. Then there will be a place for gravel to flow as you drive down the plate.

Frame and set the walls

Frame the walls in your driveway or on the garage floor. The walls are very light, so you can carry them a long way if you need to. Build them in sections, whatever length you like, and screw the end studs together at the site. Leave off the sheathing for now. Snap a chalk line 1 in. in from the outside of the footing plate to align the walls (Photo 2). Place them, screw the joining studs together with four 3-in. construction screws and screw the wall plates to the footing plates in every other stud space with 3-in. construction screws.

Plumb, straighten and brace the walls from the front side and then add the tie plate. Make sure to seam the tie plate joints at least 4 ft. away from the wall joints.



T Level the gravel base. Lay the 2x6 footing plates on edge and use a 4-ft. level to level the gravel. Pack the gravel with the footing plate to drive it down until it's flat and level.



2 Frame and set the walls. Frame the walls and stand them on top of the footing plates. Snap a chalk line on the footing plate 1 in. from the edge and then screw the bottom plates to the footing plate even with the line.



4 Waterproof the walls. Clad the back of the wall with ice-and-water barrier and cut out the strut holes with a utility knife.

Sheathe and waterproof the walls

Set the plywood panels in place one at a time. Draw and cut 1-5/8-in. x 3-5/8-in. openings spaced 6 in. down from the underside of the top plate and directly next to every other stud. Nail each panel into place with 8d nails spaced every 8 in. before moving on to the next one. Cover the outside with ice-and-water barrier (Photo 4). The adhesive won't hold the barrier in place, so staple it as needed. Cut off the excess at the top and cut out the strut openings with a utility knife.



3 Brace and sheathe the wall. Plumb and brace the wall, then screw down the tie plate. Dry-fit the plywood to the back of the framing, mark the strut holes and cut out the holes. Then nail the plywood to the studs.

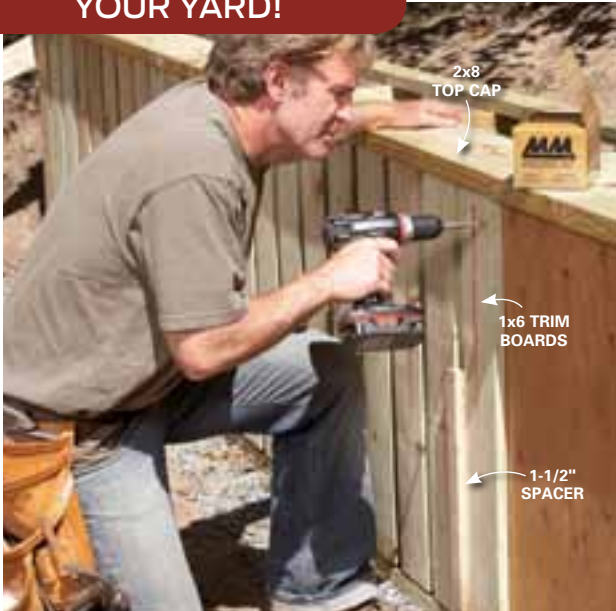


5 Assemble the dead men. Poke the struts through the holes and screw them to each stud. Roughly prop up the struts and secure a continuous 2x4 sleeper to the end of each one with two 3-in. screws.

Add the struts and sleepers

Slip the struts through each hole. Prop them up so they're close to level, either by piling up dirt or supporting them on chunks of scrap wood. Screw each one to a stud with three 3-in. construction screws. (Predrill the holes to prevent splitting since it's so near the end.) Screw the sleeper to the other end of each strut with two more screws.

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6 Add the trim. Nail vertically oriented plywood to the top and bottom plates and to the front of the wall. Make sure to seam plywood over studs. Screw a 2x8 top cap to the top plate, hanging it over the front of the wall 1-1/2 in. Fasten vertical 1x6s to the sheathing with 1-1/2-in. spaces between boards.

Skin and finish the front

Before you can finish the front of the wall and backfill behind it, you'll have to remove the front braces. So prop up the dead men to keep the wall near plumb while you finish the front. Cut the plywood and nail it on, orienting it vertically to the front so the exposed grain will match the 1x6 boards applied over them. Add the 2x8 cap, keeping a 1-1/2-in. overhang at the front. Screw it to the tie plate with 3-in. deck screws. Screw the 1x6 treated boards to the sheathing with 2-in. deck screws. These boards are spaced every 1-1/2 in. using a scrap 2x4 as a spacer. Don't trust the spacer for more than a few boards at a time. Occasionally check a board with a level and make any necessary adjustments.



Backfill and finish

Plumb and brace the wall from the back by nailing braces to the top cap and stake them on the hill. Prop up every other strut and the sleepers with scraps of wood or the fill falling on the struts and sleepers will force the wall out of plumb. Back-

fill first against the front of the wall over the footing to lock the wall base into place, then fill behind it. Then fill over



7 Time to backfill. Plumb and brace the wall from the back. Backfill, starting at the sleeper, to anchor the wall into place as you continue filling the space behind the wall.

the sleeper, working your way toward the wall itself. The object is to lock in the sleeper before the fill pushes against the wall. Once the backfill is in place, it's a good idea to run a sprinkler over the fill for several hours to make it settle before you remove the braces.

If you like the look of your wall, you're good to go—no finish required. The treated wood will weather from green to gray in a year or two. Here, two coats of Sikken's Log & Siding in the Butternut color was applied.

Materials list

This 32-ft.-long wall required the materials listed below. If you're building a shorter or longer wall, just figure a percentage of these quantities and you'll get close. For the longer boards, choose them so combinations of whatever lengths will handle the length of your wall.

ITEM	QTY.
Roll of ice-and-water barrier	1
50' roll of 4" drain tile	1
Sheets of 1/2" plywood (sheathing)	8
2x6 x 16' (footing plates)	2
2x4 x 8' (studs and struts)	20
2x4 x 16' (sleeper and wall plates)	8
2x8 x 16' (top cap)	2
1x6 x 8' (trim boards)	20

familyhandyman.com

For lots of alternative retaining wall ideas, plans and tips, go to our Web site and search for "retaining wall." You'll even find a different version of this wall, also made from treated wood.

Backyard pond and waterfall



1-3
weekends

A backyard pond doesn't have to be big to have a big impact. This pond is less than 6 ft. long and just over 4 ft. across. But with its striking stone surround and sparkling waterfall, it can become the centerpiece of any landscape.

This design is versatile, too. You can make the pond twice as large as this one or half the size. You can locate it on flat terrain or tuck the stone waterfall wall into a slope. And unlike most ponds, this one won't leave you with a small mountain of soil to deal with—you can simply use the excavated soil to form a berm behind the waterfall wall.

This pond will take anywhere from one to three weekends to complete. The size of the pond is one factor in how long it will take. But the stone you choose is also a major factor (for more on that, see "Stonework," p. 94). The cost for the basic pond materials, including the liner, filter and pump, was about \$500. The stone may be free if you can collect it yourself or it can cost up to \$1,000 if you choose expensive stone at a landscape supplier.

This article won't tell you everything you should know before you grab your shovel. For a guide to pond planning, including advice on choosing a site, go to

familyhandyman.com and search "ponds." Electrical codes require a GFCI-protected outlet to power the pond's pump. To see how to run underground wiring and place an outlet anywhere in a yard, go to familyhandyman.com and search "outdoor outlet."

Dig the hole

This pond was dug in a kidney shape, but you can make yours any shape you like. To experiment with different shapes, lay out a garden hose or rope. But plan for the *total size* of your water feature. The surrounding stone will extend 1 to 2 ft. beyond the water's edge on three sides, and the waterfall wall, tank and berm will cover 3 to 4 ft. behind the pond. When you find a shape you like, cut through the sod around the perimeter with a spade to mark the shape. Then start digging.

Toss the soil toward the back and sides of the pond where you'll later build up the berm. Be sure to throw the soil far enough so you don't have to move it a second time. When you reach a depth of about 1 ft., create ledges along the sides of the hole. Carve the ledges into undisturbed soil; don't try to build them from soil you've

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already dug up. Make the ledges at least 1 ft. wide. These ledges help prevent cave-ins and provide a shelf for plants that prefer shallow water. Slope the vertical walls of the hole slightly, about 1 to 2 in. per vertical foot. Don't make the bottom of the hole perfectly level. Instead, slope it slightly toward the end of the pond farthest from the waterfall (about 1 in. of drop per horizontal ft.). That provides a low spot where you can place the pump and make it easier to drain the pond. Level the rim of the hole so the surrounding stones will all rest at about the same height above the water level (Photo 1).

Line the hole

The pond liner is made of tough EPDM rubber, but it's not puncture-proof. So inspect the hole before you line it. Cut back any protruding roots and dig out any stones. If the soil is filled with stones, spread an inch of sand over the ledges and bottom. Next, line the hole with "under-

layment," a thick synthetic fabric that cushions the liner against damage. Overlap sections of underlayment by about 6 in. and run the underlayment at least 1 ft. beyond the rim of the pond.

Lay the rubber liner over the pond and then push it down so it roughly conforms to the inner shape of the hole. Kick off your shoes and work in your socks when you're on the liner to avoid puncturing it. Make sure the liner extends at least 1 ft. beyond the edge of the pond on three sides. On the waterfall side, you'll need enough excess to reach the height of the waterfall. You'll run that extra length of liner upward behind the stone to keep water in and soil out. When the liner is in position, start filling the hole with water, and work out the wrinkles as the pond fills (Photo 3). Once water covers the liner, the pressure won't allow any "dewrinkling," so stay on top of the task. Most important, don't leave any gaps between the soil and the liner.

Bacteria clean the water

There are lots of ways to keep pond water clean and clear—chemicals, high-tech filters, UV light systems. Some pond owners skip all of these and simply change the water a few times each summer as it becomes green or cloudy. A "biological" filtration system was chosen for this pond. The lava rock in the pump basket and the "filtration media" (a bag of plastic strips) in the waterfall tank simply provide plenty of surface area where bacteria can grow. The bacteria consume decaying leaves, fish waste and other stuff that would otherwise make the water murky and feed algae. In addition to being inexpensive and eco-friendly, biological filtration is easy. All you have to do is remove the filtration media twice each year and slosh it around in a bucket of pond water (tap water will kill the bacteria).

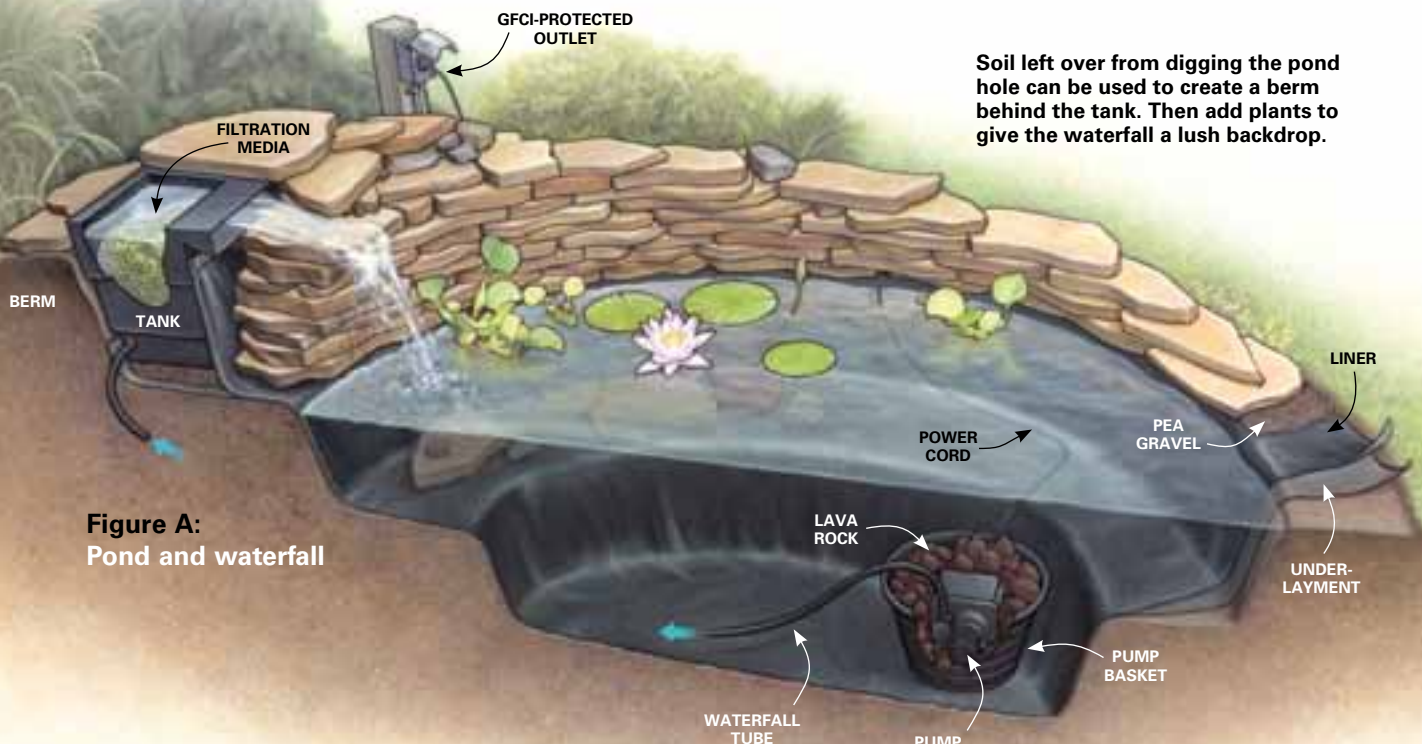


Figure A:
Pond and waterfall



1 Dig the pond hole. To form a level rim, scrape away soil on the high side and build a bank on the low side. Compact built-up soil with a tamper.



2 Line the hole with underlayment fabric and the rubber liner. The underlayment cushions the liner against punctures from stones or roots.



3 Smooth out the liner as the pond fills. Tug out wrinkles and form neat folds. But don't be too fussy—a perfectly smooth fit just isn't possible.



4 Surround the pond with stones. Leave a gap between stones so you can remove the waterfall supply tube if necessary. Do the same for the pump's power cord.

Stonework

Surrounding the pond with stone can take just a few hours or a whole weekend, depending on two things: First, it depends on the shape of the stone you're using. Stone with flat surfaces, like the flagstone shown, stacks up quickly. Rounded or irregular stone requires lots of trial-and-error puzzle fitting and triples the work. The second variable is neatness. Shown here is a rough, informal look, with protruding stones and fairly wide gaps between them. A more formal, even and uniform look will take a lot longer to achieve.

Before you begin, lay out the stones and hose them off to keep dirt out of the pond. Set aside three or four large, flat stones as options for the waterfall ledge and the cap that will cover the waterfall box. Then surround the pond with stone, overhanging the water by a couple of inches to hide the liner (Photo 4). Use fairly large stones that can't

get accidentally kicked into the water. You can set stones directly on the liner, but a 1-in. layer of gravel makes leveling the stones much easier. Be sure to use rounded "pea gravel" rather than gravel containing sharp pebbles. Here, two courses of stone were laid at the front of the pond, but one layer of large stones is enough to hold the liner in place.

As you build the waterfall wall, loosely drape the liner up against the stone and pile soil against it. When you reach the desired height of the waterfall, connect the supply tube to the waterfall tank and attach the liner to the tank (Photo 4). Next, set the waterfall ledge stone in place. Slowly pour a bucket of water over it to make sure the water flows off and into the pond. If the stone needs more tilt, shim it with chips of stone.

Set the tank in place over well-packed soil or stones, with the outlet resting on the waterfall ledge. Then build up stone around the waterfall ledge (Photo 6). You can

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5 Fasten the liner to the waterfall tank. Better tanks include a metal strip that forms a tight seal.



6 Form the waterfall with a large, flat stone. Set the side stones over foam sealant so water won't flow sideways into the waterfall wall.

Choosing materials

Most home centers carry only a small range of pond supplies. For the best selection, visit a large garden center or landscape supplier. To get acquainted with the vast array of choices, go online and search for "pond supplies." Here's what you'll need:

EPDM rubber liner: Make sure the material is at least 45 mil thick. To estimate the size, add twice the depth of the pond to the length and width. Then add 3 ft. to both the length and the width. Finally, add the height of the waterfall to the length. The liner shown here cost \$180.

Underlayment: This feltlike synthetic material provides a protective cushion under the liner. Buy the same amount of underlayment as liner. The one shown here cost \$60.

Pump: Pumps are sized by the amount of water they can move, measured in gallons per hour (gph). One way to select the size is to plan on 100 gph for each

inch of waterfall width. Here the homeowner wanted a 5-in.-wide stream of falling water, so a 500-gph pump, which cost \$100, was chosen.

Miscellaneous: 12-in. waterfall tank, filter media, pump basket, lava rock, black foam pond sealant, silicone caulk, pea gravel, tubing and connectors sized for your pump. Altogether, these items cost \$150.



Before you shop for water plants at a garden center, browse online to learn about your plant options. Just do a search for "water plants."

hide the tank with soil or stone. Here, both were used and one side was left exposed so the supply tube could easily be disconnected. That way you can pump all the water out of the pond for repairs or cleaning. Cap the tank with a stone that's large enough to cover it but small enough to move easily.

Connect the pump to the supply tube, set in a pump basket and add lava rock. The lava rock provides a home for bacteria (see "Bacteria clean the water," p. 93) and keeps debris out of the pump. Set the pump and basket at the end of the pond farthest from the waterfall. That way, water will circulate through the entire pond before being pumped back to the waterfall. Place the filtration bag in the waterfall tank and start up the pump. Watch the water

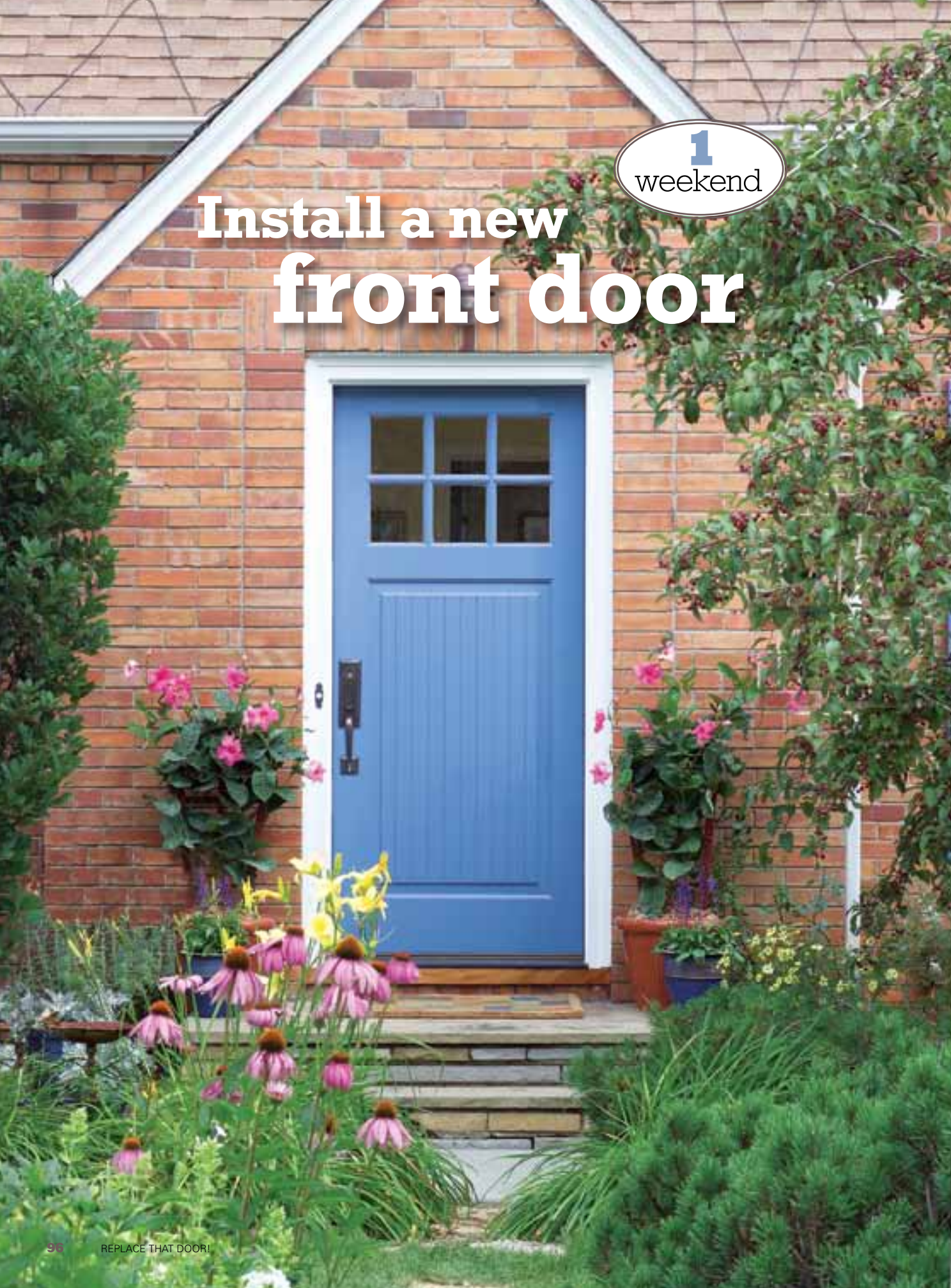
flow at the waterfall. Some of the water may run back along the underside of the ledge stone instead of falling directly into the pond. If so, create a drip line by running a bead of clear silicone caulk along the underside of the stone about an inch from the edge. If the water is dirty, disconnect the tub from the waterfall tank, pump out as much as possible and refill the pond. If the water is still a bit murky, just give the filtration system a few days to do its job.

familyhandyman.com

Cast a concrete fountain using inexpensive concrete mix and a homemade form. For complete plans, go to our Web site and search "concrete fountain."

1
weekend

Install a new front door



It's not often that you can complete a project in a weekend that will save you money and dramatically improve the looks of your house. But that's what will happen when you replace a worn, drafty front door with a stylish, energy-efficient new one. And since new doors come prehung in a weatherstripped frame, you don't have to be a master carpenter to do a first-class job.

Here you'll learn how to order a door that'll fit like a glove. Then you'll learn, step by step, how to get your old door out and the new one in.

If you can handle basic carpentry tasks, you'll have no trouble installing a new prehung door in a day. Figure on another day to finish the details and start painting the door. You can complete most of the job with basic hand tools. You'll need a hammer, pry bar, tape measure, level, utility knife, nail set and saw. If you decide to install new interior trim, you'll also need a miter saw.

For this installation, a top-quality prehung wood door (Simpson Bungalow No. 7228) was ordered from a local lumberyard. Including the special 2-1/2-in.-wide exterior trim (casing), the total cost was \$1,100. You could purchase a steel or fiberglass door for much less, but the style and crisp detailing of the wood door matched the house perfectly. The door arrived about two weeks after it was ordered.

Measure your old door

In most cases, simply order a new door the same size as the old one. If you alter the size or add sidelights, you'll have to reframe the opening and alter many details. This usually doubles or triples the size of the job. Here are the four sets of measurements you'll need to order a door (refer to Figure A, p. 98, for extra details):

Door size. Measure the width and height of your old door. Round these up to full inches to find the size of the replacement door you'll need. If, for example, your door measures 35-3/4 in. wide and 79-1/2 in. tall, you'll order a 36-in. by 80-in. door.

Jamb width. Measure from the back side of the interior trim to the back side of the exterior trim (Figure A). Specify this jamb width when you order your new prehung door. This guarantees that the interior trim will fit flush to the wall without adding "jamb extensions."

Rough opening. You'll have to remove the interior trim to get accurate measurements of the rough opening. Measure the opening width between framing members and from the bottom of the sill to the top of the opening. Compare these measurements to the rough opening requirements of your new door to make sure it will fit.



Exterior opening (or "masonry opening" if you have a brick or stone door surround). Measure to the outsides of the exterior casing and then from the bottom of the sill to the top of the trim. Compare these measurements with those of a prehung door that has standard 2-in.-wide "brick molding" trim. If the framed door with standard trim is too small to completely fill the space or if you want a different trim style, you have three options. The best solution is to order a door with wider, flat casing to fit the opening. You can always add a piece of decorative molding overtop to approximate the style of your existing exterior trim. (Here 2-1/2-in. flat casing was ordered and the existing decorative molding was reinstalled.) Second, you can order your door with standard molding and fill the gap with additional strips of wood. The last option is to order the door without exterior molding and make your own to fit.

Start by tearing out your old door and preparing the opening

Photos 1 – 4 show how to take out the old door and frame. If you plan to reuse the interior moldings, pull the nails through the back side with pliers or a nipper to avoid damaging the face. Cutting through one side jamb makes it easy to tear out the entire frame (Photo 4).

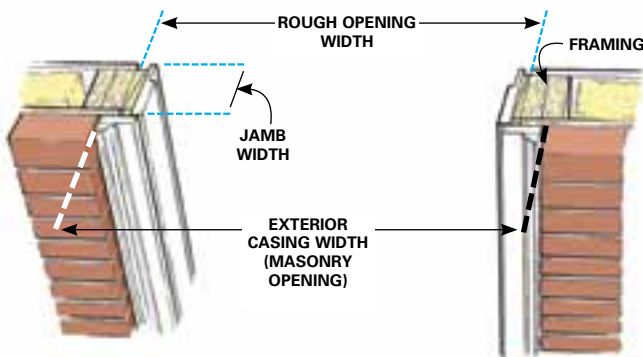


1 Tap the hinge pins loose with a hammer and nail set. Then swing the door open and lift it off. Protect the floor with a dropcloth. The old door will be heavy.



2 Pry the interior trim loose from the door frame. Protect the wall with a wide putty knife. If you plan to reuse the trim, first score the intersection between the molding and jamb with a utility knife.

Figure A:
Measuring



After the door frame is out, check the condition of the framing and subflooring in the sill area. Cut out and replace any rotted wood. If the sill on your new door is thinner than the one you removed, you may have to build up the sill area as shown in Photo 5. Set the sill height so the door just clears carpeting or rugs when it swings inward.

Photo 6 shows how to protect the sill from water intrusion. Buy the flashing tape from a lumberyard or home center. If you're installing a door in a newly constructed wall, you can buy a special plastic sill flashing kit instead. One brand is Jamsill (jamsill.com; call 800-526-7455 for ordering information). Details will vary depending on the doorway situation. The idea is to channel water away from the wood. If your home is built on a concrete slab, the door frame will probably rest directly on the slab.

If your door is exposed to the weather, direct water away from the door with a metal drip cap overtop (Figure C). Brick openings like this one and doors protected by porches with roofs don't require a drip cap. You'll find drip caps at home centers and lumberyards. If the drip cap is damaged or missing, install a new one before you set the

REPLACE THAT DOOR!



3 Slice the caulk joint between the siding (brick) and exterior trim and pry the trim from the doorjamb with a pry bar.



4 Cut completely through the side jamb with a handsaw. Pry the jambs loose and pull them out of the opening.



door frame in the opening. Cut the metal drip cap to fit and slide it under the siding and building paper (Figure C). If nails are in the way, slip a hacksaw blade under the siding and cut them.



5 Build up the sill area to the proper height with treated lumber. Add shims to level it. Fasten it with coated deck screws.

Solid shimming is the key to long-lasting, trouble-free operation

Here the brick opening was level and plumb, but this isn't always the case. Start by checking the sill area with a 2-ft. level. If you're building it up as shown in Photo 5, it's easy to level it with shims at the same time. Otherwise, level the sill area with pairs of shims spaced about 4 in. apart.

Then set the door in the opening for a test fit. Hold a level against the hinge jamb and adjust the door and frame until the jamb is plumb. Check to see how the casing fits against the siding. If the siding is so far out of plumb that the door frame and casing don't fit in, you



SELF-STICKING FLASHING TAPE

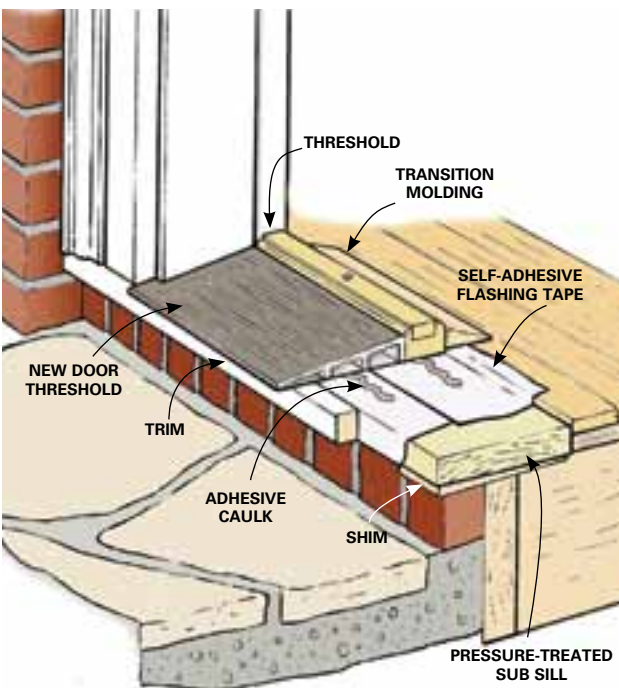
6 Cover the rough sill area with self-sticking flashing tape. Wrap it up the sides of the opening and over the front edge. Set the door in the opening, plumb it and check the fit.



CAULK

7 Apply a bead of caulk along the sides and top of the door opening and at the sill according to the manufacturer's instructions.

Figure B:
Sill detail



either cut back the siding or trim the casing. It looks better if you can cut the siding, but it's usually more practical and easier to trim the casing. Mark the casing in areas that need trimming. Then take the door out and trim the casing with a belt sander or circular saw.

Make sure the building paper is intact around the frame edges. If not, slide strips of No. 15 felt behind the siding and tack it to the framing with staples. When you're sure the door will fit, caulk along the sill and behind the casing and tip the door into the opening. Photos 8 – 10 show how to shim and nail the door. The goal is to center the door in the opening and shim the sides until they're plumb and straight. Adjust the pairs of shims until the gap between the door and the jamb is consistent on the sides and top of the door. When you're happy with the fit, nail through the jamb into the framing at each shim location. Then replace one screw closest to the inside in each hinge with one long enough to reach the framing. This will keep the door from sagging over time (Photo 11).

After insulating the space around the door (Photo 12), install the interior trim. Photo 13 shows how to cover a gap between the doorsill and flooring. Complete the job

REPLACE THAT DOOR!



8 Make sure the doorsill is level. Then center the top of the door in the opening and tack it into place with galvanized casing nails. Plumb the hinge-side jamb and tack the bottom corners.



9 Shim behind each hinge. For large spaces, start with small squares of plywood. Then finish with pairs of shims. Make sure the hinge-side jamb remains plumb.



10 Shim at the top, middle and bottom of the latch-side jamb and at the top until the gap between the door and the doorjamb is consistent. Score the shims with a utility knife and break them off.

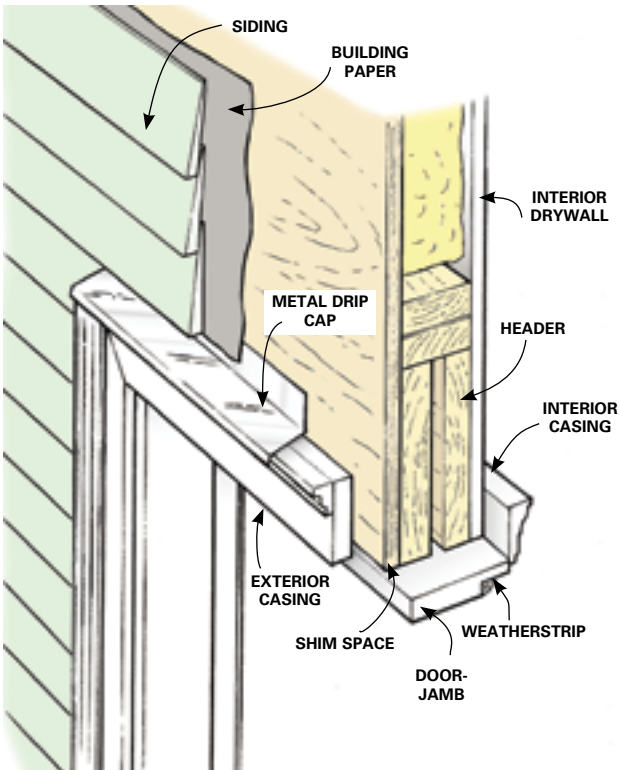


11 Replace a screw in each hinge with a 3-in. screw driven into the framing. Drive additional casing nails every 16 in. along the sides and top of the exterior trim.

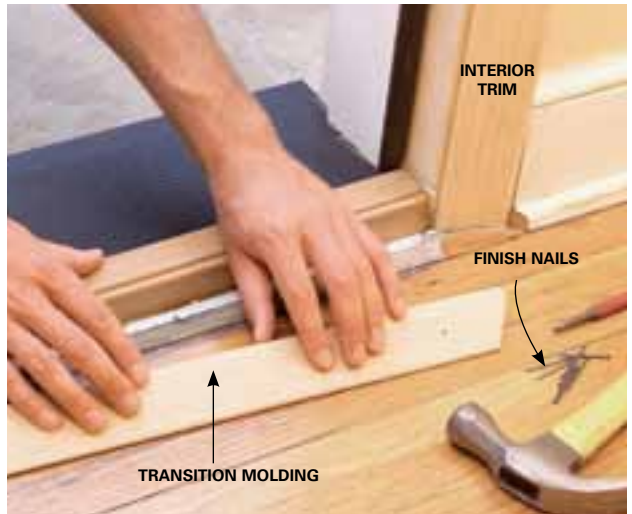


12 Fill the space between the doorjamb and the framing with minimal expanding foam insulation. After the foam has expanded and skinned over, loosely stuff any remaining space with strips of fiberglass insulation.

Figure C:
Drip cap



by caulking the exterior (Photo 14). For gaps wider than 3/16 in., insert a foam backer (available at home centers, hardware stores and lumberyards) and apply caulk over it. Most doors require an additional trim board under the sill to support its outer edge. Finally, remove the door and paint or stain and varnish the door, jamb and trim.



13 Cut and install new interior trim or reinstall the old trim. If there's a gap between the new sill and the existing flooring, cover it with a beveled transition.



14 Press foam caulk backer into the siding/trim gap. Apply a neat bead of caulk between the siding and the door trim. Cut a trim board to fit under the sill and screw it to the framing.

Materials list

ITEM	QTY.
Treated lumber to build up the sill (optional)	
Roll of flexible self-sticking flashing membrane	
Polyurethane caulk	2 tubes
Shims	3 packages
Minimal expanding foam	2 cans
Roll of foam caulk backing (optional)	
Transition molding (optional; Photo 13)	
12d and 16d galvanized casing nails	1 lb. each
3-in. coated deck screws	1 lb.
4d, 6d and 10d finish nails	

REPLACE THAT DOOR!

1
morning

Install a new storm door

You no longer have to put up with a rusty old storm door that bangs shut every time the kids go out. In fact, installing a new one is one of the least expensive ways to dress up an entry.

Replacing an old storm door is easier than you might think. Manufacturers have made installation more DIY

friendly by providing standard sizes that'll fit almost any door opening and simpler installation kits. Still, you'll find some sticking points. The following step-by-step directions walk you through some tricks and techniques you won't find in any instruction manual.

If you have a hacksaw, screw gun, a short level and a



1 Pick a flat area near the entry door, lay the box flat on the ground, fold it open and check to make sure you have all the parts.

tip

If your entry door trim needs paint, do it now. It's a pain in the neck painting around a new door, and you'll have a crisper-looking job.

pair of side cutters and two to three hours, you're on your way to saving the cost of a professional installation. Replacing an old storm door or installing a new one is a perfect Saturday morning project, even if you have limited carpentry skills. Choose a storm door that fits the style of your home. Prices range from \$100 to \$300.

Selecting the door

To find the size of the storm door you need, simply measure the height and width of the main door. Most front entry doors are 36 in. wide and require a 36-in. storm door.

Here a "full-view" storm door was chosen (opening photo). The one shown has a removable screen and glass panels that you interchange each season. The other common type, a "ventilating" storm door, has glass panels that slide open or closed over the screen, much like a double-hung window.

Nearly every storm door sold is reversible. That is, you can install it with the hinge on either side. The manufacturer's directions tell you how to do it. When you buy it, you don't have to specify which way the door must swing.

You typically mount storm doors to the exterior door trim using "Z-bars." The hinge-side Z-bar may already be screwed to the door as this one was, or you may have to



2 Add a trim extension if needed to doors with sidelights. Prime and paint the new trim, position it with a reveal equal to the other trim and then nail it into place.



3 Confirm the door swing direction and fasten the hinge-side Z-bar to the correct side (if necessary). Mark a cutting line on the Z-bar 3/16 in. above the top of the door with a square. Slide the weatherstripping aside and cut the Z-bar with a hacksaw.

tip

Use an 18- to 22-tooth-per-in. hacksaw blade for smoother, easier cuts.

REPLACE THAT DOOR!



4 Measure from the outside lip of the threshold to the top door casing. Transfer the measurement to the bottom of the hinge-side Z-bar and cut it to length, matching the angle on the threshold.

mount it once you determine the door swing direction. On some doors, you'll also have to drill holes for the latch.

Getting started

Begin the project by folding open the box and removing the glass storm panel. Set it and the screen panel in a safe place out of the wind. Then check for damaged or missing parts by comparing the contents with the parts list in the instruction manual. (This door had been returned, repackaged and sold as new. One of the parts had already been cut to length and the mounting screws were missing.) Use the cardboard as a work surface to prevent scratching the parts while you work on the door.

Then determine the door swing. In general, hinge the storm door on the same side as the main door. However, consider these exceptions:

■ **Adjoining walls.** If there's an adjoining wall or rail, it's best to have the door swing against it; otherwise entry can be awkward, especially if you're carrying groceries.

■ **Electrical.** Will the door open against any light fixtures? Will the doorbell or light switch wind up on the latch side where they belong?

Why a storm door?

A traditional storm door was a real workhorse. It protected the handsome but vulnerable wooden main door from harsh weather and helped to insulate it.

Today's better insulated and protected main doors have little need for a storm door and are often eliminated from new homes, showing off fancy front doors. However, the "full-view" storm door (like the one shown here) still showcases the main door and, when screened, allows you to take advantage of those cooling summer breezes too.



5 Center the weatherstripping in the Z-bar, then snip off the ends, leaving it 1/2 in. extra long at each end.



6 Measure the opening width and determine the furring strip thickness (see text). Cut a furring strip to length, then nail it to the inside edge of the hinge-side casing with four evenly spaced 4d galvanized box nails.



7 Lift the door into the opening and pry it against the hinge-side casing with a twist from rubber-handled pliers on the latch side. Screw the hinge Z-bar into the door casing side.



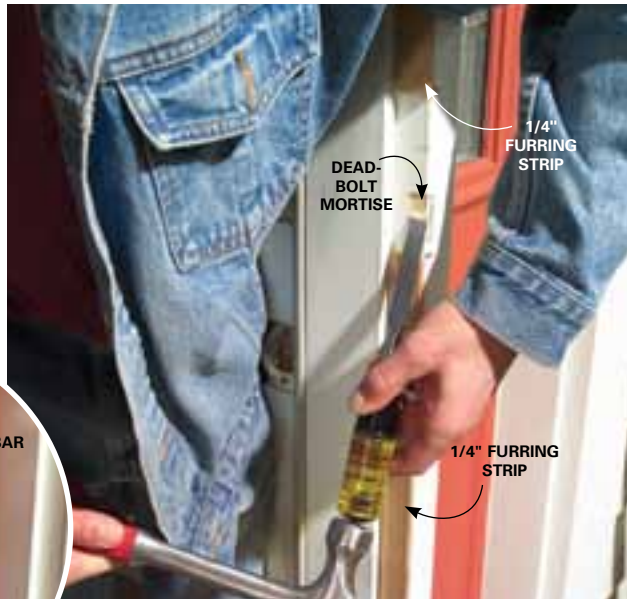
8 Swing the door open, slip the top-side Z-bar into place and close the door to hold it. Adjust the gap between the Z-bar and the top of the door until it's even and screw it into the top casing.



9 Mount the latch mechanism, then mark the position of the top and bottom of the latch on the door casing. If the space between the door and the casing is over 5/8 in., nail two 1/4-in.-thick furring strips to the inside of the casing, one above and one below the marks (see Photo 11).



10 Hold the latch-side Z-bar against the open door and center the holes on the latches. Then push the door and Z-bar against the door frame and mark the bottom at the angle of the threshold. Then mark the top (inset) and cut it.



11 Close the door against the casing with the dead-bolt extended and chisel out the wood where the deadbolt hits. Slip the latch-side Z-bar into place, close the door against it and screw it to the casing, keeping a consistent 1/8-in. gap with the door.

■ **Wind.** If there's a strong prevailing wind, it's best to have the door hinge side face the wind direction. That way, sudden gusts can't fling it open and break it.

Out with the old storm door

Taking off an old aluminum door is usually just a case of unscrewing the mounting screws on the door, closer and safety chain. But sometimes there's caulk around the frame. You can usually cut through the caulk with a utility knife. But worse yet, you could find old caulk between the frame and the door casing. If so, you'll have to pry the

frame away with an old chisel and scrape the trim surfaces clean. A heat gun may help soften the caulk.

Wooden storm doors generally have hinges that are mortised (notched into the wood) and screwed to the door casing. Don't worry about the hinge or latch recesses. When you install your new storm door, they'll be hidden behind the new door frame.

Prep the opening

Storm doors hang from the door trim, technically called "exterior casing." If the door has never had a storm door,

REPLACE THAT DOOR!



12 Slide the rubber weatherstripping into the door sweep and crimp the ends. Slide the sweep over the door bottom and tap it down to snug it to the threshold. Drill 1/8-in. holes through the adjustment slots and add the screws.

you may have to extend the trim between the door and a sidelight (Photo 2). This is the most difficult situation you're likely to encounter. You have to rip a new trim piece to match the thickness of the other trim (usually 1-1/8 in. thick).

Manufacturers make storm doors a bit narrower than standard openings to make sure they'll fit. If your opening is typical, you'll have to "fur out" the sides to center the storm door in the opening. You'll nearly always need to install at least one 1/4-in. furring strip on the hinge side (Photo 6) and possibly even have to add another one to the latch side (Photo 11). To figure this out, measure the exact width of the opening, that is, the distance between the inside edges of the trim. (Measure at the middle, top and bottom.) The manufacturer's instructions will usually list the minimum width required. Subtract that width from your measurement and make the furring strip thickness along the hinge side about half the difference.

It's important to mount the door tightly to the hinge-



13 Position the closer bracket and screw it to the jamb. Attach the closer, level it and mark the screw positions on the door. Drill 1/8-in. pilot holes and screw the closer to the door. Repeat for the top closer.

side trim. Pry against the latch side to make sure it snugs up tight (Photo 7).

Follow the photos with your instructions for the rest of the installation steps. Door latch and Z-bar systems vary. Cutting the latch-side Z-bar is a bit fussy. The idea is to center it on the latch and lock (Photo 10). Observe where it strikes the sill and cut the bottom at an angle that matches the sill. Then cut the top so it fits against the top Z-bar. Don't worry if the latch and lock bolt end up a bit off-center, as long as they work smoothly.

You may need to chisel out the latch or deadbolt pocket as shown (Photo 11). It all depends on the door latch style.

After installing the door sweep and closers, adjust the closer tension. Begin with the window panel rather than the screen in place. The closers should be set with the door at its heaviest. You may want to reset a gentler setting for the screen panel.

Finally, it's a good idea to save the boxes for the window and screen panel for off-season storage. Under a bed is a great safe storage location.

Dealing with warped doors

Storm doors often appear to be warped because they don't rest evenly against the weatherstripping at all corners. However, it's usually the entry door trim that's a bit out of whack. Small gaps may disappear when you install the door closers, especially if your door comes with one for the top and one for the bottom. If that doesn't do the trick, try prying out the Z-bar slightly and slip in a shim (photo at right) that should close the gap.

Bigger gaps call for more drastic measures. First loosen all the Z-bar screws and remove the screws at opposite corners of the door. Then slip a shim behind the corner screws, opposite the gap. Tighten the corner screws to see if the gap closes. Try varying sizes of shims until the door closes well. Then slip in progressively smaller shims behind the rest of the screws as you tighten them to taper the gap between the Z-bar and the door casing. Cut off the shims, then caulk the gap and paint it to match.



Install a new patio door

1-2
days

If you've been putting up with a drafty patio door that sticks, fogs up or leaks during a heavy rainstorm, it's time to consider a new, energy-efficient replacement. While a high-quality door isn't cheap, it'll cut down on drafts, require almost no maintenance, and glide smoothly and latch securely. Best of all, you'll save \$300-plus if you install it yourself.

At first glance, replacing such a big door may seem intimidating. But if you read on you'll see that it's similar to replacing a window. You'll learn each step, plus there's a special section on the critical flashing details that make the new door leakproof.

Manufacturers of higher-quality units have made installation fairly simple and straightforward. If you have experience installing a window or a swinging door, you should have no trouble with a sliding patio door. Other than basic carpentry tools, you'll only need a 4-ft. level and a screw gun. A reciprocating saw fitted with an 8-in. bimetal blade is recommended to hack through shims and nails (Photo 5).

Unless you're a brawny DIYer, another useful tool is a strong helper for short periods to assist with the heavy, awkward panels and door frames.

In most cases, you can replace that old slider with a smoothly operating, energy-efficient door in about a day. Add a few more hours to retrim the outside and the inside and you're done.

Measure the opening before you buy

Before you run off to buy your slider, pull off the interior trim around the old door and measure the "rough opening" for width and height. (If you want to reuse the old trim on the new door, pull the nails through the unfinished side.) Make sure you measure to the framing right next to the old doorjamb. You may have to cut away overhanging drywall to

REPLACE THAT DOOR!



1 Pry the interior trim free. Then chip away drywall to expose framing and measure the rough opening width (distance between studs) and height (floor to beam). Then select a new door that fits that rough opening.



3 Unscrew and remove any angle brackets at the top and bottom of the stationary panel.

get at it (Photo 1). To check the height, make sure you're measuring to the subfloor, that is, the wood or concrete that the doorsill actually rests on and not a secondary layer of particleboard or plywood (underlayment). You can check for underlayment by pulling off a nearby heat register and looking at the floor layers bordering the opening. Then select a door that fits your rough opening. The door catalog will list its rough opening requirements. The door dealer will walk you through sizing and door options. (See "Buying a Patio Door," p. 113.)

Once you get your door home, you'll save a lot of time if you finish any exposed wood surfaces on the door before beginning the installation. That'll save you from tricky brushwork cutting in around exterior claddings, weatherstripping and hardware, and keep smelly finishes out of your living quarters.

Shown here is the removal of a 6-ft. slider surrounded by wood trim and vinyl siding. The new door was slightly smaller so there was a small gap surrounding the new exterior trim. Most new replacement doors will have a similar gap, no matter what exterior siding you have. If your old door has exterior trim fastened to the door frame, remove the trim and follow the installation steps shown. But if the siding comes right up to the doorframe (no trim), you'll probably have to remove the siding or cut it back and restore it after installing the door in order



2 Latch the door, then unscrew and remove the inside head stop. Unlatch the door, tip the top of the sliding panel inward and lift it free of the track.



4 Pry the stationary panel free of the frame at the top and bottom, slitting caulk or paint as necessary with a utility knife. Tip it inward and lift it free.

to achieve a leak-free installation. And if you have stucco or brick, you'll probably have to add trim to fill the gap and rely partly on high-quality caulk to seal out water. More about this later.

You never know how smoothly a patio door tearout and installation will go, so start in the morning to give yourself the best chance to finish up before nightfall. If you're going to have to finish up the next day, cover the opening from the inside with sheets of plywood cut about 6 in. larger than the opening. Run 3-in. screws through the plywood and drywall into the framing where the holes will be covered by the interior trim. If it's chilly out or threatens to rain, also staple plastic over the exterior to keep out drafts and water.



5 Pry off the exterior trim, then cut between the door frame and the framing with a reciprocating saw. Pull the entire frame from the opening.



6 Lay flexible flashing over the sill, wrapping it up the opening sides at least 2 in. and over any flashing or siding below.



7 Prep and lay a special vinyl sill pan over the flashing. Clean the joint overlaps with PVC cleaner, then lay the parts in place and weld the seams with PVC cement.



8 Assemble the frame following the manufacturer's instructions. Apply two beads of silicone caulk along the length of the threshold and tip the frame into the opening.

Removing the old door

Sliding patio doors are heavy (60 to 100 lbs. per panel), so it's best to remove the old panels one at a time and then tackle the door frame. Start with prying free any exterior trim pieces and then remove first the sliding and then the stationary panel (Photos 2 – 4). Usually the sliding panel wheels rest on the bottom track and the panel is held at the top by a removable strip of wood called the "inside head stop." Unscrew the inside head stop and remove the panel by tipping the top into the room and then lifting the bottom rollers free of the

track (Photo 2). Some doors may have a channel instead of a head stop at the top, and you may need to lower the door on its rollers using the adjusting screws at the base to gain clearance (Photo 11). Then lift the panel straight up until the rollers are clear of the track, and pull the bottom into the room to free the panel.

Removing the stationary panel can be trickier. Generally there'll be an angle bracket at the top and maybe one at the bottom that you unscrew and remove (Photo 3). Then slide the panel toward the latch to clear it from the side jamb so you can lift it free. If it won't

budge, use a utility knife to cut through any paint or caulk where it touches the frame and try prying the top and bottom again. If it still won't come free, don't beat yourself up. Replace the angle brackets so it won't fall out later and go to the next step of cutting the jambs free from the opening. Cut through insulation, fasteners and shims with a reciprocating saw sporting an 8-in. bi-metal blade (Photo 5). Most likely, the threshold will be glued to the floor with beads of sealant, and it may take substantial prying with a flat bar to free it. Then get a buddy to help lift out the frame along with the panel. Cut up the frame in chunks for disposal.

Check the floor for level

In rare situations, the floor under the door will be out of level. Sweep the floor free of debris and check it with a straight board and a 4-ft. level. If it's within 1/4 in. of level over the 6-ft. opening, let it be; the door should still slide smoothly. But correct larger variations with two long, tapered shims placed directly under the sill (use treated wood on concrete). Fill any voids with polyurethane caulk to keep out drafts.

Leakproof flashing

In general, the directions that come with the door will be fine for assembly and installation of the new unit. Unfortunately, they assume you're installing the door in a new wall that doesn't yet have exterior siding. Replacing an old door can be a bit more complex.

Begin flashing at the bottom. Apply flexible flashing directly under the doorsill and 2 in. up the sides (Photo 6). Flexible flashing comes in 4- to 6-in.-wide rolls (\$10) and has a sticky side so it adheres to the underlying surfaces. It's thick and seals around fasteners that are driven through it. It's imperative that the flashing laps well over any deck flashing or weather barrier below the door (Photo 6). You may have to overlap two rows, as shown, to get the necessary coverage. Pros will usually rest the new doorsill (caulked) directly on the flashing, but for further protection in wet locations (rain will splash against the door bottom from all angles), add a "sill pan" as well (Photo 7). Shown is a Jamsill Guard (\$40; see Buyer's Guide, p. 113). It comes in three separate parts that glue together with PVC cement. Next apply flashing over any building paper, house wrap or sheathing along the sides and fold it around the door frame opening. For this installation the sticky flashing didn't fit behind the vinyl trim, so No. 15 roofing felt was tucked about 2 in. under it instead.

This door was sheltered by a wide, low soffit, so it

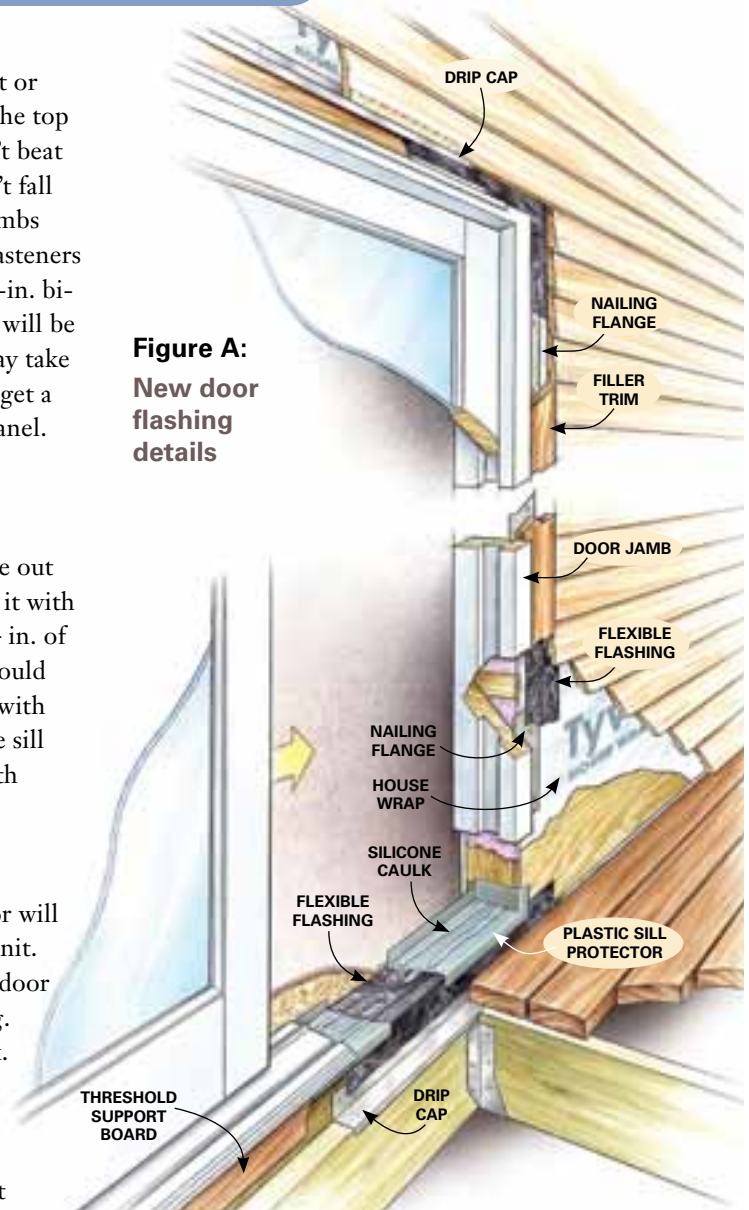


Figure A:
New door
flashing
details

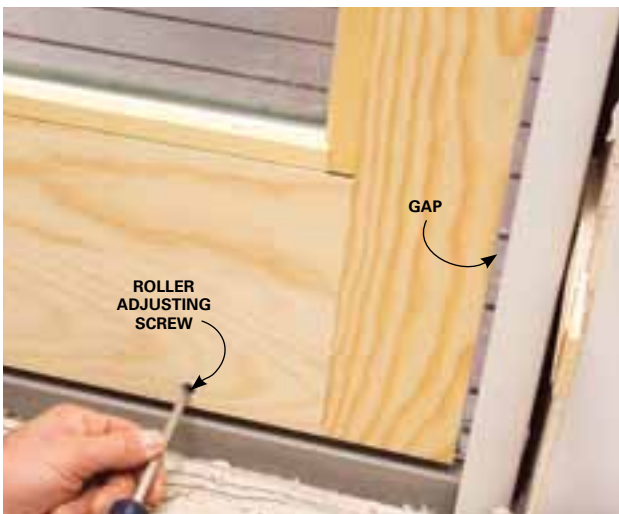
The key to making your sliding door leakproof is to carefully follow the proper flashing techniques. The basic principle is to continually keep water flowing downward to the exterior. In most cases, you can follow the details shown here for flashing the sill. The side details will vary depending on the new door frame details and the exterior siding on your home. Most doors have plastic nailing flanges ("fins") that you lay over some type of house wrap (extend the house wrap if necessary). Then lay adhesive-backed flexible flashing over the flange/house wrap joint to seal it. Finish the sides by nailing on the side trim and caulking the gaps. The top details vary slightly. If you need a trim piece at the top, slide a metal drip cap under the house wrap and nail the trim directly below it. If you don't need an extra trim piece, slide the nailing flange under the house wrap, seal it with flexible flashing, and lay the house wrap over it, sealing the corners with small sections of flexible flashing.



9 Center the frame in the opening and screw it into place, using a level and shims to square it. Check the frame for square and make final adjustments when you install the stationary panel.



10 Tip the stationary panel into the opening, push it against the door frame and install any angle brackets to anchor it (Photo 3). Tip the operable panel into place and screw the inside head stop to the top of the door frame.



11 Slide the door slightly open and adjust the roller heights until the gap between the jamb and the panel is consistent.



12 If you need extension jambs, rip them to width and then shim and nail them into place, leaving a 1/8-in. reveal at the door frame. Then add the casing with another 1/8-in. reveal.

didn't need top flashing. But if your slider is unprotected, leave the top fin intact and slip it under the weather barrier (felt, house wrap, etc.) under the siding when you slide the new door frame into the opening. Then slip in a drip cap (usually included with the door) up under the weather barrier as well (Figure A). Follow this basic principle: Keep water flowing toward the exterior surface, just like shingles do.

Installing the new door

Installing your new slider is usually the easiest part of the job. Be aware that every manufacturer has slightly differ-

ent weatherstripping systems, handle and lock hardware, and ways to fit the doors into openings, so they may not exactly match the ones shown in the photos. Read and follow the door instructions for those details.

If you have a "knockdown" (not preassembled) door frame, assemble it on the deck, garage floor or other flat surface. "Dry-fit" the assembled door frame in the opening to make sure everything fits (Photo 8), then rest it flat and put two beads of silicone caulk on the underside of the sill (where the directions call for it). Slip the door frame back into the opening and push the door fins tight against the sheathing (Figure A). (Line the fin groove up



13 Cut filler strips to fit between the door frame and the siding with a 1/8-in. gap on both sides, then fill the gaps with silicone caulk. Cut a threshold support block to fit between the deck and the siding, then slip it into place and nail it.

flush with the outside of the sheathing if you're not using fins.) Center the door frame in relation to the siding or trim. Otherwise it'll look bad from the outside. Then plumb, shim and screw the door in the opening (Photo 9) following the manufacturer's instructions. Be sure not to bow the jambs in or out when you drive the screws.

Follow the instructions to install the stationary panel first and then the slider. Tip the stationary panel into the opening and slide it within about 1/4 in. of the side jamb, and make sure the gap is even top to bottom. If it's more than 1/4 in. out of plumb or the jamb bows, adjust the frame for plumb and straightness and adjust the shims if necessary. Install angle clips, weatherstripping and trim as needed.

Then rest the sliding panel wheels on the tracks and tip the panel into the opening. Have a helper hold it in place while you screw in the head stop. Slide the door about 1/4 in. from the frame and check the gap from top to bottom. Raise or lower the rollers at the bottom. Adjust the rollers until the gap is even and the door rolls freely (Photo 11). Finish up by installing the handle and the locking hardware.

Finishing up the inside

Standard slider doorjamb depths are designed to fit standard 4-9/16-in.-thick walls (2x4 studs plus 1/2-in. drywall and sheathing). If your walls are thicker, like those shown here, you'll have to add extension jambs (Photo 12). Cut the top piece to fit first, then shim it and nail it in place. Then install the side extension jambs. Leave an even 1/8-in. reveal (backset) between the extension jamb and the doorjamb.

Buying a patio door

Sliders are built from a variety of materials including aluminum, wood and vinyl. Low-maintenance selections include either vinyl or aluminum exterior cladding over wood core, solid vinyl and all-aluminum. If you want a slider that matches existing windows, consider buying the same brand. Check markings on existing window hardware to find out which brand you have.

Looking at the door from the outside, the operable panel determines whether it's a right- or left-handed unit. Don't be afraid to switch the way your original door opened if changing it makes access easier or furniture arrangements better. But be aware that heating vents work better in front of the stationary panel. They don't stand up well to foot traffic.

Insulate around the frame with fiberglass packed tightly against the exterior sheathing and more loosely near the drywall. (Foam insulation is a bit more difficult to use because even minimal-expanding types can bow in jambs and affect weatherproofing or door operation.) Add interior trim around the door, leaving another 1/8-in. backset between the trim and the extension jambs.

Finishing up the outside

You'll frequently be installing a door that's smaller than the one you removed. This will leave a wider gap that you'll have to fill with exterior trim. Match the new trim to the existing as much as possible. Whatever trim you choose, rip the trim slightly narrow so you leave 1/8-in. gaps on both sides. Seal these gaps with a high-quality acrylic or silicone caulk.

Finish up your installation by screwing or nailing a 3/4- to 1-in.-thick piece of cedar, treated wood or composite material directly under the overhanging lip of the threshold to support it (Photo 13). Some sliding door manufacturers offer a premade aluminum support strip as an alternative.

Buyer's Guide

Jamsill Inc., jamsill.com, (800) 526-7455. Have your patio door brand, size and style selected before ordering. The staff will help you select the correct unit. Or try a full-service lumberyard to see if it carries a similar product.



1
morning

Install a new interior door

Hanging a door correctly is one of the most satisfying jobs in the home improvement world, but it's often the most challenging. Unless it's installed correctly, your door can have uneven gaps along the jamb, or it can bind or not even latch.

Here you'll learn foolproof tips and techniques that'll give you great results every time. All you need are simple carpentry tools and some basic home improvement skills and tools to easily master the techniques. Allow about an hour and a half for your first door, and once you get the hang of it, your next door will go in twice as fast.

When you buy your door, pick up a package of wood shims and 4d, 6d and 8d finish nails. Also get a straight 7-ft. 2x4 and cut another 2x4 the width of your opening (Photo 1) that are both straight as you sight down the edge. Since installing trim is part of the door installation, purchase some matching door trim and be sure you've got a miter saw to cut it. You'll also need to pick up a lockset for the door.

REPLACE THAT DOOR!



1 Check the floor for level and the jambs for plumb. Measure the exact amount the floor is off level. The opposite jamb must be cut by this much to level the door in the opening.



2 Mark and cut the jamb on the high side with your saw (remove any packaging strips at the bottom of the jambs). If you cut more than 1/4 in. from the jamb, you may need to trim the bottom of the door so it conforms to the floor slope.

tip

If you're setting your door into adjoining rooms that'll be carpeted later, you can hold both jamb sides 3/8 in. above the floor and avoid having to trim your doors.

Check your rough opening carefully before starting

Here the focus is on installing standard prehung doors. These have a door jamb that's 4-9/16 in. wide and are made to fit into a 2x4 wall that's 4-1/2 in. thick. This gives just enough of a fudge factor to have the jamb a bit proud of (raised above) the wall surface on each side and to make up for any irregularities in the trimmer studs of the walls. Most openings will be about 82 in. high for standard doors, so that's what is shown here.

Before you order your door, check the width of your opening. It should be 2 to 2-1/2 in. wider than the door. This extra space gives you room to fit the jambs and the shims into the opening to hang the door. If your rough opening is 32 in., get a 30-in. prehung door. Also check the vertical sides of the rough opening to make sure they're reasonably plumb. Openings that have a trimmer stud out of plumb more than 3/8 in. from top to bottom will make it nearly impossible to install the door. It would be somewhat like trying to put a rectangle into a parallelogram. Small variations from plumb are quite common, however. Checking both sides and getting familiar with any problems with the opening will give you an idea



3 Nail temporary cleats to the wall opposite the door opening to act as stops for the door frame. To ensure the jambs are centered in the wall, shim them away from the drywall slightly with a stack of three note cards as shown.



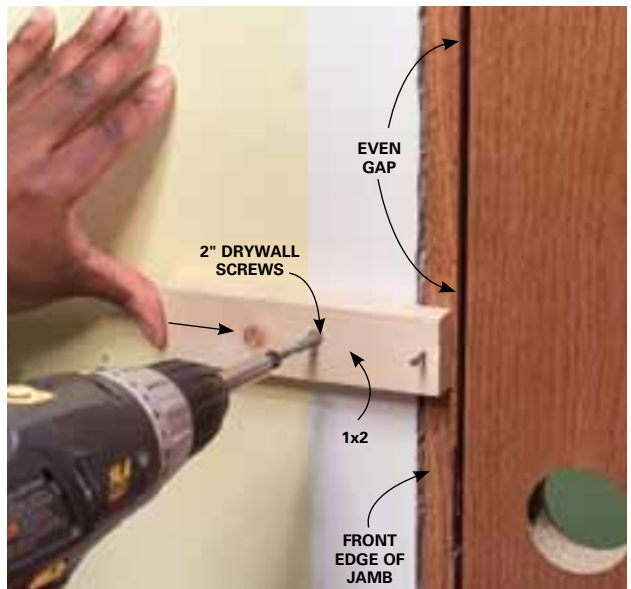
4 Push the door and frame into the opening. Open the door and shim the bottom edge of the open door to keep the frame tight against the stops on the other side.



5 Center the frame in the opening. Slip a shim in from each side of the jamb (make sure the frame is pushed against the cleats) and nail the top sides of the door frame into the trimmer studs. The jamb should be perpendicular to your temporary cleats. Be careful not to twist the jamb as you nail it.



6 Shim the bottom of the door jamb up about 4 in. from the floor on the hinge side, making sure the hinge side is exactly plumb, and then nail it. Tape your level to a straight 2x4 as shown. Next, shim the center area of the jamb to straighten it and then nail it. Check the whole length with your straightedge.



7 Tack a 4-in. 1x2 to the front edge of the jamb with a 4d finish nail. Set up an even 3/16-in. gap between the door and the strike-side jamb. Then screw the block to the studs to hold the jamb in this position.

tip

Check the length of your prehung door jambs. They may be longer than you need. You may have to trim both sides to minimize the space under the door. In most cases, the door should clear the floor by 1/2 in.

REPLACE THAT DOOR!



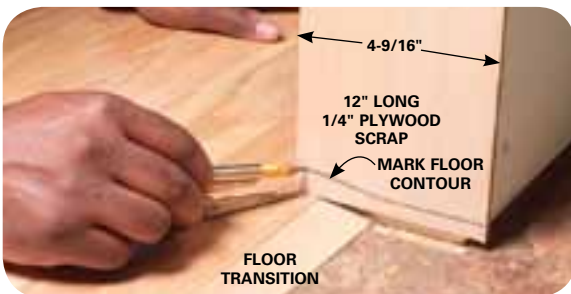
8 Shim and nail the strike side near the strike plate and then near the floor.

of how much and where to shim the jambs later.

Most installation problems occur because the floor isn't level under the doorway. If the floor slopes slightly and the jamb isn't trimmed to compensate, your latch won't line up. You must check the floor with an accurate level as shown in Photo 1.

How do you fit the jamb to floors of different heights?

Cut a 1-ft.-long strip of 1/4-in. plywood the same width as your door jamb. Drop it to the high side of the floor, tack it in place, set your scribe and mark the contour of the floor onto the plywood. Remove the plywood, cut the shape with a jigsaw and transfer the shape to the bottom of the jamb. Cut along your mark with a jigsaw. Do this for each side of the door. If your transition is more than 1/2 in., you may need to trim the bottom of the door as well.



9 Score the shims several times with a sharp blade and then snap them off to make way for the trim.



10 Nail the trim to the door frame with No. 4 finish nails. Nail the trim to the framing with No. 6 finish nails.

tip

An accurate level is crucial for a good installation. Check it by laying it on a flat surface. Memorize the bubble's position. Then flip the level end for end and check the bubble. If the bubble doesn't settle in the exact spot, find an accurate level.

1 morning

Save money with a blank door slab

1 You already have the perfect template. Carefully align the top and hinge edges of both doors and clamp them together.

The kids shouldn't have been playing floor hockey indoors with a real puck because those babies can go right through a hollow-core door! But the damage is done and now somebody has to replace the door. You have two choices. Yank the old door and jamb, trim and all, and replace with a prehung door. Or, spend less time and save \$70 and up by installing a blank door slab in the existing jamb and leave the trim intact. Hanging a blank door is easier than you think. All you need is a hammer and chisel, clamps, a square and a drill and a hole saw. Measure the width of the old door. Sizes are all standard, so you'll be able to find a replacement at the home center.

Line up both doors and lightly clamp them together (Photo 1). Next, mark the new door (Photos 2 and 3). Mortise the hinge openings using a chisel and utility knife (Photo 4). Once you've finished mortising the hinges, set the door upright and bore the lockset holes.

If the old door was trimmed at the bottom and you were happy with the gap at the floor, cut the new door to match. Mount the hinges on the new door and hang the door. If you don't need any further adjustments, remove the door again, then finish it to match the rest of the woodwork and rehang it.



2 Transfer the hinge locations. Use a Speed Square and a sharp pencil to transfer the hinge locations to the new door.



3 Trace the hinge. Unscrew the hinge and tape it in place to trace the rest of the hinge outline. Be sure to match the distance from the edge of the door to the edge of the hinge (the same as it was on the old door).



4 Chisel and slice. Chisel out the opening, leaving the corners for last. Then use a sharp utility blade to score around the corner radius. Pop out the corner slug with the chisel.

1
weekend

Bedroom makeover

Here's a simple method for creating an elegant paneled wall without the expense of solid lumber or the skill of a master carpenter. This paneled wall is finished by nailing strips of inexpensive MDF (medium-density fiberboard) directly over the drywall. The square-edged strips are easy to join, and the smooth MDF surface makes a perfect surface for a flawless paint job.

With a little perseverance, you can nail up the strips on Saturday, leaving Sunday to sand and paint. You'll need a basic set of hand tools, a circular saw, a power miter saw, a sander and a finish nailer to complete the job. See p. 121 for how to rip the MDF strips with a circular saw (Photo 2), but if you own (or have access to) a table saw, use it instead. Making accurate square cuts on the end

of the strips is easy with a power miter saw, but you can use a circular saw with a guide. If you don't have a finish nailer, rent one for a day (\$45 per day with a compressor). There's a lot of nailing to do and it will speed up the job considerably.

Tape a mock-up to the wall

Start by prying off the baseboard and the window and door trim. Slip a wide, stiff putty knife behind the pry bar to spread out the pressure and prevent damage to the drywall. With the moldings out of the way, tape up 4-in.-wide strips of masking paper to simulate the look of the MDF strips (Photo 1). If you can't find 4-in.-wide masking paper at the home center or paint store, cut a wider

What's MDF and why should I use it?

MDF (medium-density fiberboard) is a pressed-wood product that offers several advantages over solid wood for a project like this. First, it's inexpensive (\$20 for a 4 x 8-ft. sheet) compared with solid wood, and the smooth surface looks great painted. Unlike strips of lumber, which can be bent or twisted, strips ripped from MDF are perfectly straight, simplifying installation. And the material is flexible enough to conform to slightly wavy walls. Finally, the 1/2-in.-thick strips look nice. (It's hard to find 1/2-in. lumber.)

MDF isn't perfect, though. It's heavy and the 4 x 8-ft. sheets are hard to handle without help. Some home centers will cut it into smaller pieces for you. Also, the dust from cutting and sanding is so fine that it'll drift and settle on everything in sight unless you take special precautions. Collect the dust with a vacuum or dust collection system if possible. Otherwise, try to do most of your cutting outdoors.



roll to 4 in. with a miter saw. Start by placing strips at the top, bottom and sides. Then run vertical strips along the windows and doors. Line up horizontal strips above doors and windows. Add a horizontal strip under windows too. Now divide the remaining spaces to create an attractive grid. When you're happy with the arrangement, make a dimensioned sketch to guide you later. Then count the number of 8-ft.-long strips you'll need to complete the project. You'll get twelve 3-7/8-in.-wide by 8-ft.-long strips from every 4 x 8-ft. sheet of MDF.

If you're going to change the wall color, patch imperfections in the wall with spackling compound. Even if you're not changing the color, sand and paint before applying the MDF strips. You'll have to do some touch-up painting later, but at least the bulk of the work will be done. This is especially important if you're going to paint the MDF strips a different color than the wall.

Cut MDF into strips

The 4 x 8-ft. sheets of 1/2-in. MDF you'll need for this project are available at lumberyards and home centers. If you don't have a way to haul large sheets, ask a store employee to cut the sheets into 16-in.-wide strips that you can tie to your car top. Also pick up a few tubes of construction adhesive to attach the strips that don't align with studs (Photo 7).

Cut the MDF into 3-7/8-in.-wide strips. If you don't have a table saw to cut the strips, assemble a cutting guide (Photo 2). Start by cutting a 6-in.-wide strip from the edge of a sheet of MDF. Cut another strip 4 in. wide to use as a stop. Position the stop and screw it to the bottom of the guide so that you can cut 3-7/8-in.-wide strips by running the edge of the saw base against the guide. With this setup, you won't have to measure for each strip. Just reposition the guide and clamp it to the MDF sheet after each cut.

Note: Sawdust from MDF is very fine and will cover everything in sight if you're not careful. Cut outdoors if possible. Otherwise, put an exhaust fan in the window and use a shop vacuum to collect dust from power tools. Make sure to wear a dust mask and safety glasses when cutting.

After ripping the strips, sand the edges to remove saw marks. Clamp a bunch of the strips together and sand all of the edges at once to speed up the job and avoid rounding over the corners (Photo 3). Use a random orbital sander and 80-grit paper. After sanding, leave the clamps in place while you roll on a coat of quick-drying, stain-blocking primer such as KILZ or BIN. After the primer dries, sand



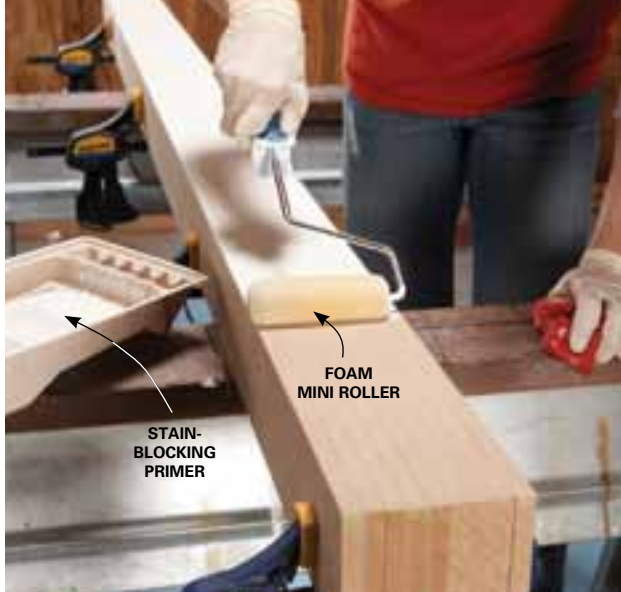
1 Tape up strips of masking paper to lay out the wall pattern. Adjust the arrangement until you like the results. Take a photo as a reminder of the pattern.



2 Cut straight, uniform strips of MDF fast using a cutting guide with a stop on the underside. If your saw has a vacuum port, use it! Cutting MDF is dusty.



3 Sand the cut edges of the strips fast by clamping several strips together.



4 Prime and paint the edges to avoid fussy brushwork later. Roll on a coat of primer, let it dry and sand lightly. Then roll on a coat of paint.



5 Nail the base and ceiling rails to studs. Splice rails over studs. Join the ends with 30-degree bevel cuts.



6 Hold stiles in place and mark them with a utility knife rather than a pencil to create fine, precise cutting marks.

lightly and apply one coat of paint. Prepainting the edges will save you a lot of time on the final paint job.

Nail the strips to the wall

Start by locating the studs. Look for drywall screws or baseboard nail holes as a clue to stud locations. Or use an electronic stud finder. Stick pieces of masking tape to the floor to mark the locations. Cut MDF rails (horizontal strips) to fit along the floor and ceiling and nail them to the studs with 2-in. brads (Photo 5). Next cut stiles (vertical strips) to fit between the rails at the corners and along the sides of windows and doors and nail them to the wall (Photos 6 and 7). Position the stiles 1/4 in. from the inside edge of door and window jambs to leave 1/4 in. of the jamb exposed.

Determine the positions of the remaining stiles by dividing the space evenly according to your original layout. Hook your tape measure on the left side of the farthest left stile and measure to the left side of the farthest right stile. Divide this measurement by the number of spaces you want. The result is the distance from the left edge of any one stile to the left edge of the next stile. Mark the locations on the bottom and top rails. Then cut the remaining stiles to length. Apply two beads of construction adhesive to the back of the strips before tacking them to the wall with 2-in. brads (Photo 7).

With the top and bottom rails and all the stiles in place, it's time to fill in the rest of the rails. Start by stretching a mason's line tightly across the top of the windows or doors, making sure to leave a 1/4-in. reveal on the jamb. Make a pencil mark where the string intersects each stile (Photo 8). Then cut rails to fit between the stiles, align them with the marks and nail them to the wall. If you have a window, align another set of rails with the bottom of the window. Then divide the remaining space and mark the rail locations on the stiles (Photo 9). Complete the paneled wall by cutting rails to fit between the stiles at each mark and nailing them to the wall.

tip

Use a 4-in.-wide foam mini roller (Photo 4) to apply the primer and paint. You'll get a smooth finish, free of brush marks.



Fill and sand for a perfect paint job

Fill the nail holes and other imperfections with spackling compound. Let it dry and sand it smooth. Nail holes may require two coats of spackling. Where they intersect, sand the MDF strips flush with an orbital sander (Photo 10). Caulk the cracks where the MDF meets the side walls and ceiling. When you're done filling, sanding and caulking, roll or brush a coat of stain-blocking primer onto the face of the MDF strips. Finish the job by painting the face of the MDF strips and touching up the wall paint.

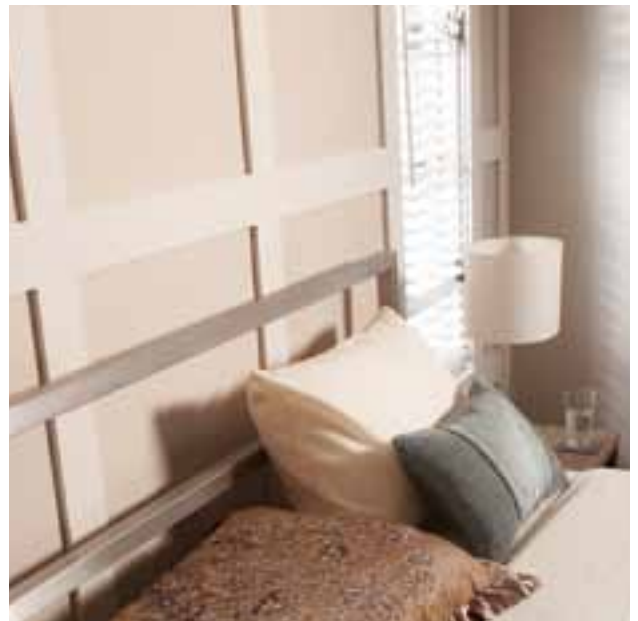
7 Fasten the stiles without worrying about stud locations. Apply adhesive to the stiles and tack them to the drywall with brads. The brads hold them in place until the adhesive dries.



8 Mark the position of the rails above and below the windows. Use a mason's line to align the marks with the windows.



9 Divide the remaining space and mark the location of the rails on the stiles. Cut the rails and nail them to the studs.



10 Fill nail holes with spackling compound and let it dry. Sand any uneven areas for a smooth, flush surface.



1
day

Driveway makeover

You can keep your asphalt in tip-top shape by following the three steps shown here. Asphalt maintenance doesn't require special skills, and you'll only need a few inexpensive tools. You can get everything you need at home centers and hardware stores. However, as with exterior painting, high-quality results hinge on some sweat and careful prep work. Expect to spend about six to eight hours completing the job. To fill cracks and seal coat an average driveway (750 sq. ft.), you'll spend \$100 to \$150 on materials. That's about half what a pro would charge.

Fill cracks every year

Maintaining the asphalt skin is the best thing you can do to preserve your driveway. The asphalt layer serves primarily as a protective skin over the gravel base. The weight of your car is supported by the base, not



Add a coat of curb appeal

Most driveways are big and conspicuous. And a long stretch of gray, cracking asphalt can give a home a scruffy look, no matter how handsome the rest of the property is. So a fresh coat of shiny black sealer isn't just protection against expensive driveway damage—it's a face-lift for your home and yard.



1 Clean out cracks, digging deep enough to completely remove roots. Clean the edges of the asphalt with a hand broom and blasts of air or water.

the asphalt. If too much water gets through, the base erodes, causing additional cracking, potholes and total asphalt breakup.

The best way to keep the asphalt skin intact is to fill cracks, ideally every spring. Buy the high-quality pouring-type filler (\$10 per gallon). Read the labels. Experts recommend the ones containing rubber compounds. They typically handle cracks from 1/8 in. to 1/2 in. wide. For smaller cracks, small tubes of filler (\$5) in a caulking gun are easier to use. For larger cracks, 1/2 to 3/4 in. wide, buy an extra-thick filler that you spread with a trowel, or tamp in asphalt patching material.

Fillers adhere to the sides of cracks, so your first task is to clean out the dirt and old, loose filler 1/2 in. to 1 in. deep. This is time-consuming. Use a screwdriver or a 5-in-1 tool (shown in Photo 2) for the packed areas. Go deeper if weeds have taken hold. If you don't get all their roots, they'll grow right up through the new filler. **Tip:** A week before you begin this project, apply a nonselective herbicide to kill roots. Clean the crack edges (Photo 1). You can use a pressure washer or a garden hose, but then let the driveway dry for at least a day before filling.

Fillers need at least 24 hours to dry, so don't fill cracks when rain is in the forecast. The filling technique varies with the product, so check the directions. With most products, you can simply pour the filler into cracks up to 1/4 in. wide. For wider cracks, stuff in backer rod first (Photo 2). Backer rod is available in several thicknesses at home centers and costs about 10¢ per foot.

Neatness counts when you're filling cracks (Photo 3).



2 Stuff backer rod into wide or deep cracks, leaving about 1/2-in. depth to fill with crack filler. The foam rod conserves filler and makes the repair more flexible.

The jet-black filler contrasts with the gray asphalt and can look bad if you overfill or smear it.

Cracks that form a spider web pattern in a small area usually indicate that the base has softened. Water will settle in this spot and make the problem worse. Fillers will help for a while, but sooner or later you'll have to cut out and patch the cracked area. Cut the asphalt using a diamond blade (\$30) in your circular saw (Photo 4). Then repack the gravel base by pounding it with a 6-ft. 4x4 or a hand tamper (\$25). Fill the cutout and pack with a 4x4 or hand tamper (Photo 5).

You can buy asphalt patching material (\$10 per 40 lbs.) at home centers and hardware stores, but it isn't nearly as durable as regular hot asphalt. For better performance, seal coat the patch after about six months. And for areas larger than a few square feet, hire a pro.

Clean up edges every two years

Asphalt edges are especially prone to cracking because the base erodes at edges more easily. Grass invades the cracks and increases erosion. So every other year, grab a shovel or lawn edger and cut back the grass (Photo 6). Then clean out and fill the cracks.

Seal coat every four to five years

The purpose of a seal coat is to protect the asphalt against sun and water and to fill small cracks. It also dresses up the asphalt by covering fillers and patches. You don't need to do it every year. In fact, seal coat will peel if there are too many layers, and you'll permanently ruin the appearance of the driveway.



3 Pour in filler until it's even with the driveway surface. Smooth out overfilled areas with a putty knife. Check for voids in the filler the next day and refill them.



4 Saw around heavily cracked areas using a circular saw and diamond blade. Chisel out all the loose asphalt down to the gravel base.



5 Fill the cutout with new asphalt. Be sure to repack the gravel base first. Then add asphalt in 1-in. layers, packing each layer with a hand tamper.



6 Cut back invading grass along the driveway. Left alone, grass roots will enlarge any cracks and gradually destroy the driveway from the edges inward.

Home centers carry several sealers (\$10 to \$30 per 5-gallon bucket). Buy the best one (the most expensive!), especially if you're sealing your driveway for the first time. A better sealer means better long-term adhesion. Adhesion is vital, because you'll apply more coats in future years, and each fresh coat is only as good as the coat beneath it.

tip

If you're a rookie, work on a cooler, more humid day to slow drying so you have more time to spread the sealer smoothly.

To ensure good sealer adhesion, the driveway must be clean and dry. Fill cracks and edge the driveway at least a week in advance. Scrub with a stiff broom. Then sweep or blow debris off with a leaf blower. You can use a garden hose or a pressure washer, but you'll have to wait for it to dry.

Sealer won't stick to oily spots left by a drippy car. First scrape off the oily gunk with a putty knife. Then apply a detergent (such as dishwashing liquid) or buy the sealer manufacturer's cleaner and scrub. After you rinse, examine the spot. If you see an oil film on the rinse water or if water beads up on the spot, scrub again. You can wash the



7 Coat oil-stained spots with a primer before seal coating. Without thorough cleaning and primer, the seal coat won't stick to oily areas.



8 Apply the sealer around the perimeter of the driveway. Protect walls and the adjacent concrete with wide masking tape.



9 Spread the sealer by working back and forth across the driveway. Pull the broom or squeegee at an angle to plow the excess sealer onto the uncoated area.

entire driveway surface at this time, since you'll have to wait one or two days for the asphalt to dry anyway. When it's dry, apply primer (\$10 per qt.; Photo 7) to the spots.

Before you apply sealer, check the weather forecast and the sealer's label to make sure you'll get good drying conditions. Seal coats are water-based, and a rainfall before they dry will ruin them. Drying times will slow in cooler and more humid conditions.

Coat the edges first using a stiff brush such as a masonry brush (\$6; Photo 8). Then coat the entire driveway using a seal coating broom or squeegee (\$12; Photo 9). Stir the sealer before application even if the label claims

it's a no-mix formula. Seal coating isn't difficult, but it is messy. Wear old shoes and clothing you can toss. The worst mistake is stepping in drips, then tracking the seal coat across concrete or inside your home.

Be sure to read the manufacturer's directions and follow the recommended spread rate. Take care not to lay it on too thick. Puddles or thick areas will probably peel. Work the sealer into the surface. Although some sealers require only one coat, it's better to have two thin coats than one thick coat. And you're less likely to leave ridges or brush marks.

Finally, surround the driveway with stakes and string or tape. Keep everyone, including pets, off the finished surface until it dries. Otherwise you might find black, gooey paw or foot prints on your kitchen floor!

For more information

Visit the National Pavement Contractors Association education site: PavementPro.org.

Black Jack Products, gardner-gibson.com

Jet-Black professional sealcoating, jet-black.com

Latexite Products, (800) 851-5606. latexite.com

familyhandyman.com

- To see how pros install a whole new driveway, go to familyhandyman.com and search "driveway."
- For concrete repair help, go to familyhandyman.com and search "concrete repair."
- Driveway sinking in front of the garage? For a do-it-yourself solution at familyhandyman.com and search "sinking driveway."

Garage storage makeover

Build one cabinet or all five!

If you have an attached garage, the door to the house is probably a dumping ground for shoes, sports gear, jackets and all kinds of other stuff that you don't have space for indoors. These cabinets can eliminate that mess so you don't have to walk through an obstacle course to get in the house. Each cabinet is a simple box that has been customized to solve a different storage problem. Build one or all five.

You can build, install and load five of these cabinets in a weekend. The only power tools you'll need are a drill and a circular saw. But a table saw and a sliding miter saw

are handy for ripping and crosscutting the plywood, and a brad nailer helps tack the cabinets and drawers together before you drive the screws.

Each cabinet requires one sheet of plywood or less and costs about \$50, including the hardware and finish. Shown is birch plywood (\$40 per sheet). You could use oak plywood (\$48) or even MDF (\$30). For the pantry cabinet, you'll need 1/4-in. plywood for the drawer bottoms. All the materials are available at home centers except the drawer slides for the pantry cabinet.

1
weekend



**\$100 OR LESS
MAKEOVERS!**



1 Get perfectly straight, accurate cuts with a circular saw using a homemade saw guide. Clamp the saw guide at your mark on the plywood.



2 Clamp the frame parts together, including the screw strip. Drill pilot holes and drive screws.

Box assembly tips

These cabinets are surprisingly easy to build. The illustrations tell you most of what you need to know. Here are some tips for smooth assembly:

- If you don't have a table saw to rip the plywood, use a saw guide and a circular saw (Photo 1).
- Use a shorter saw guide or a sliding miter saw to get straight, square crosscuts.
- Drill 1/8-in. pilot holes to prevent splitting. Keep screws 1 in. from edges.
- If you have a brad nailer, tack parts together to make drilling easier. But don't rely on brads alone—you still need screws. If you don't have a brad nailer, use clamps (Photo 2).
- If your cuts were slightly off and the top, bottom and sides aren't exactly the same width, don't worry. Just make sure the front edges of the box are flush.
- Attach the screw strip to the top before attaching the side pieces.
- Attach hardware (drawer slides, shelf standards) to the sides before building the box.



3 Set the cabinets on a cleat, then screw them to the wall at the studs (use tape to mark the stud locations). Drive screws through the cabinet bottoms into the cleat.

- Screw the top, bottom and any fixed shelves onto one side before attaching the other side.

Hanging the cabinets

Install a 2x2 cleat on the wall for the cabinets to sit on.

continued on p. 131

\$50 and 3 hours per cabinet

These cabinets were designed with economy and speed in mind. Here are three tricks to cut costs and assembly time:

- Size all parts to use the plywood efficiently. The sides, for example, are just under 12 in. wide (11-7/8 in.), so you'll get four from a 4 x 8-ft. sheet.
- Eliminate the cabinet backs, saving time and materials. Just be sure to handle the cabinets gently—they're a bit flimsy until they're screwed to the wall.
- Apply the finish before assembly. After you cut the parts to size, sand everything with 120-grit sandpaper and apply a coat of Minwax Wipe-On Poly (\$9 per pint).



Wet clothes cabinet

An airy hangout for damp or dirty coats and boots

The wire shelves in this cabinet allow boots to drip-dry and air to circulate freely so clothes will dry. The extra-wide screw strip lets you attach coat hooks. To build the cabinet, you'll need 6 ft. of 12-in.-deep wire shelving (\$6) and coat hooks (starting at \$2.60 each).

Attach the back cleats flush with the sides. Inset the front cleats 1/4 in. Cut the wire shelves at 22-1/4 in. This gives you 1/8 in. of play on each side. Cut the shelves with bolt cutters or have the home center cut them for you. The metal in the shelves is very tough and hard to cut with a hacksaw.

Place plastic end caps (\$1.30 for a pack of 14) over the shelf ends. Secure the shelves to the front cleats with C-clamps (\$5.70 for a pack of 20). Fasten two clamps per shelf. Hold the coat hooks in place in the cabinet, drill pilot holes and then drive the screws that came with the hooks to fasten them in place.



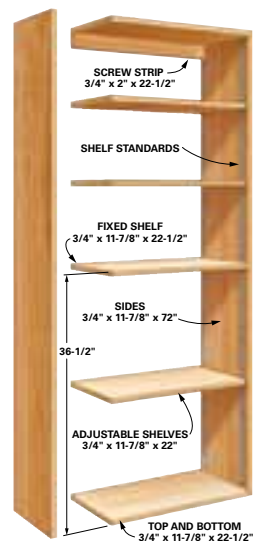
Open shelf cabinet

Spacious, adjustable shelves that cut garage clutter

This open-shelf cabinet needs a fixed shelf in the middle to keep the sides from bowing, but you can make the rest of the shelves adjustable. Install as many adjustable shelves as you want—this cabinet can hold a lot of stuff!

You'll need four 6-ft. shelf standards (\$3.30 each) for this cabinet. Get started by marking the shelf standard locations and the fixed middle shelf location on the two cabinet sides. Cut the shelf standards to length with a hacksaw, then screw them to the sides above and below the fixed shelf marks.

Install the adjustable shelves after you hang the cabinet on the wall.



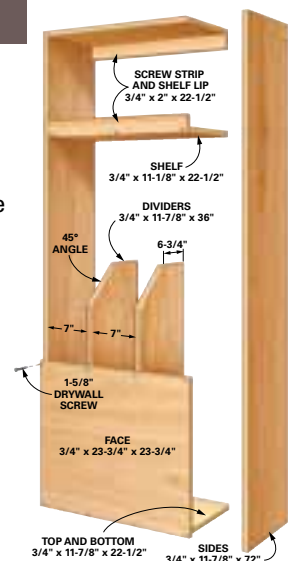
Sports gear cabinet

A compact organizer for all kinds of equipment

The cabinet dividers let you store long-handled sports gear, like hockey sticks, bats and rackets. The lip on the top shelf keeps balls from falling off. Nail the lip to the shelf before installing the shelf at any height that suits your needs.

When installing the dividers, cut two 7-in. spacers and place them between the cabinet sides and the dividers to keep the dividers straight as you install the cabinet face.

Measure diagonally from box corner to corner to make sure the cabinet is square before attaching the face. Set the face on the cabinet, leaving a 1/8-in. reveal along both sides and the bottom. Drill pilot holes and screw the face to the sides and the dividers.



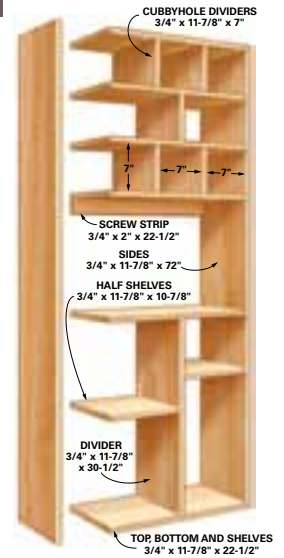
Shoe and boot cabinet

Eliminate the footwear pileup on the back steps

The lower shelves in this cabinet hold boots and shoes, while the cubbyholes at the top are for slippers and sandals. The screw strip is lower in this cabinet than it is in the rest, but it'll still hold the cabinet in place.

Install the lower shelf first, then add the divider and screw on the shelves that fit between the divider and the cabinet sides.

Build the cubbyholes on your work surface, then stick the assembled cubbies into the cabinet. Start by screwing two dividers onto a shelf. Make two shelves this way. Then install a center divider between these two shelves. Add a shelf to the bottom, over the two dividers. Then insert the cubbies inside the cabinet and screw through the sides into the shelves and through the top into the dividers.



Pantry cabinet

Bulk storage that frees up kitchen space

If you buy groceries in bulk, this is the storage solution for you. The bottom drawers in this cabinet are deep enough to hold two cases of soda. The top drawers are perfect for canned goods or bottled water. The upper shelves are adjustable for more bulk storage. The cabinet faces and door keep everything enclosed.

Inexpensive drawer slides let the drawers open and close easily. The ones shown are from Woodworker's Hardware (\$4 per set of two, including screws; No. B230M 12CM; wwhardware.com). You'll also need two 6-ft. shelf standards (3\$3.30 for 6 ft.).

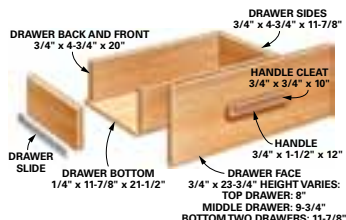
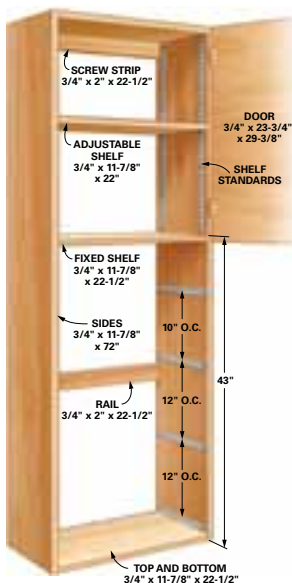
Lay the cabinet sides next to each other and mark the center for each drawer slide. Place a slide over each mark, drill pilot holes (a \$7 self-centering drill bit works best) and screw the slides into place. Cut the shelf standards with a hacksaw and screw them to the cabinet sides, above the fixed shelf.

Assemble the drawers with 1-5/8-in. screws. Place the drawer slides on the drawers, drill pilot holes and attach them with screws. Test-fit them in the cabinet. If the cabinet sides are bowed even slightly, attach a 2-in. rail in the back to hold the sides in place so the drawers slide smoothly.

Fasten the faces to the drawers with 1-1/4-in. screws driven from inside the drawers. Build the handles with leftover plywood and attach them with 2-in. screws (driven from the inside).

Attach the door to the cabinet with 1/2-in. overlay hinges, also called half-wrap hinges. They're

available at home centers or wwhardware.com (No. A07550).



continued from p. 129

You'll need 24 in. of cleat for each cabinet. Keep the cleat at least 8 in. above the floor so you can sweep under the cabinets.

Snap a level chalk line on the wall for the cleat (measure down from the ceiling if your floor slopes!). Attach the cleat at the chalk line by driving a 3-in. drywall screw into each stud. Set the cabinets on the cleats. Place a level alongside the cabinet to make sure it's standing plumb and square. Then drill pilot holes through the screw strips and attach the cabinets to the wall with 3-in. drywall screws (Photo 3). Screw adjoining cabinets together by driving 1-1/4-in. drywall screws through the side near the top and the bottom.

NOTE:
ALL CABINETS ARE 11-7/8" DEEP x 24" WIDE x 72" TALL

Build the best-ever garage storage shelves!

The average two-car garage has the upper regions of three 24-ft.-long walls ready and available for big-time storage. Add a continuous 2-ft.-deep shelf on all three walls and you're talking about a huge, accessible storage platform that takes up no floor space whatsoever. This project will work in just about any garage, although you may have to customize it a bit for your space. (More on adapting it later.) Shown here is a garage with finished walls, but the assembly techniques will also work on garages with open studs.

While these shelves aren't sturdy enough to store hun-

dreds of pounds of stuff, they're plenty strong enough for off-season clothes, sporting goods and camping gear. In short, just about anything you'd want to hoist up onto an 8-ft.-high shelf and out of the way. In general, keep the weight under about 30 lbs. per linear foot.

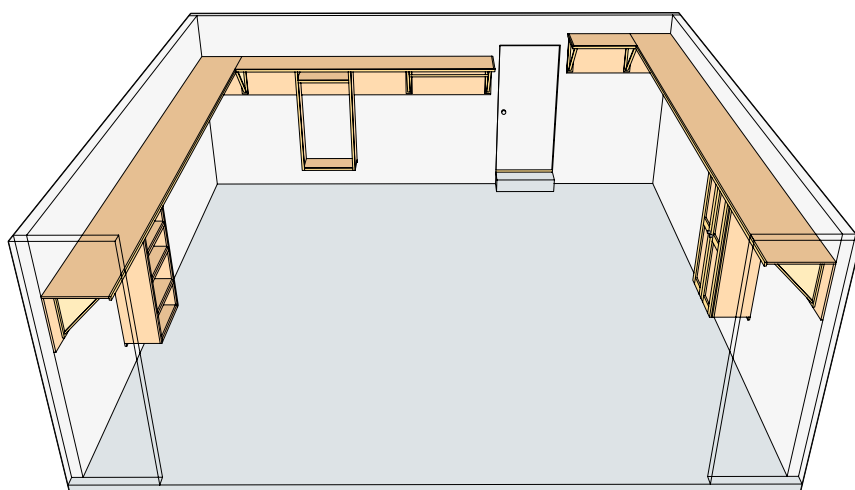
The 23-in.-high apron under the shelf is a great place to drive nails and hooks for hanging garden tools, cords and hoses—all that other stuff that clutters up the garage. Add a closet rod between a couple of braces and you have a convenient place to hang jackets, raincoats or other clothes. Cutting and installing the parts for an entire

1
weekend



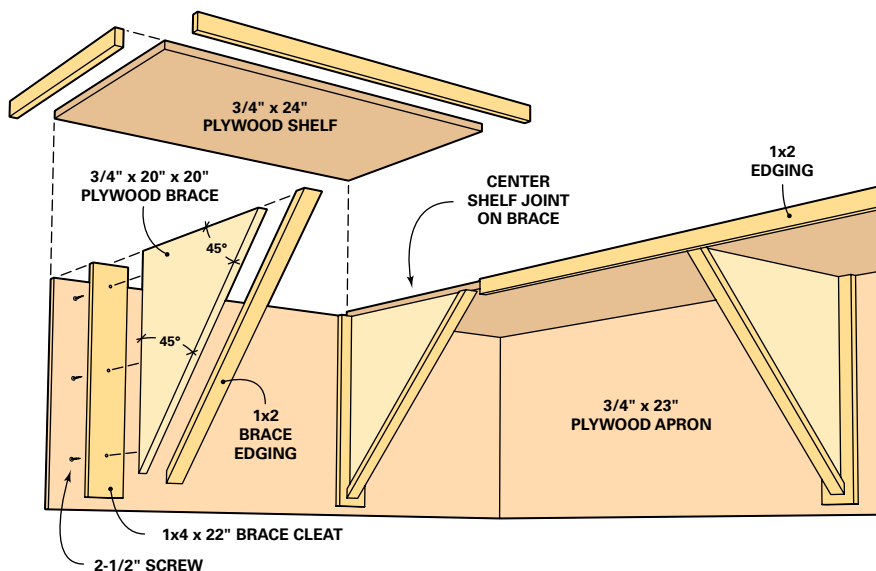


Figure A:
Shelving plan



Position shelves in all unobstructed zones along the ceiling. Customize by varying heights and adding shelves, racks and cabinets for special items.

Figure B:
Shelf construction details



garage will only take you a weekend. As for skills, it's a project almost anyone can tackle. If you can handle a circular saw, a screw gun and basic hand tools, you'll have no problems. For the cleanest look, use a miter saw to cut the trim. And to speed up the job, use a brad nailer for most of the nailing.

Planning your shelves

There are no magic heights or widths for your shelves; you'll want to customize them for your garage and needs. The best strategy is to build a 3-ft.-long mockup of the shelf shown and hold it against the walls in various positions to test the fit. It just takes a little effort and may help prevent headaches later. Then you can decide what height and size the shelves need to be to clear obstacles.

Some rules of thumb for sizing and positioning:

- Choose shelf heights that'll allow for enough space between the ceiling and the shelf for the tall items you plan to store.
- Make sure that shelves and braces will clear obstructions like garage doors, garage door tracks and service doors.
- In foot traffic areas (near car doors, for example), keep braces above head level and back from doorways, so you don't bump into them.
- If you have an SUV or a pickup truck, make sure the braces won't obstruct the doors.
- If you need to build narrower shelves, just shrink the plywood braces and shelves by the same amount.

Choosing the materials

This shelving system, made from oak plywood and solid oak trim, costs about \$55 per 8 ft. of length. If you choose 3/4-in. CDX (construction grade) plywood and pine trim, you'll whittle down the cost to about \$40 per 8-ft. section. Everything here is shown with two coats of polyure-



1 Rip 24-in.-wide shelves and 23-in.-wide aprons from each 3/4-in. sheet of plywood. Use a factory edge as a straight-edge guide.

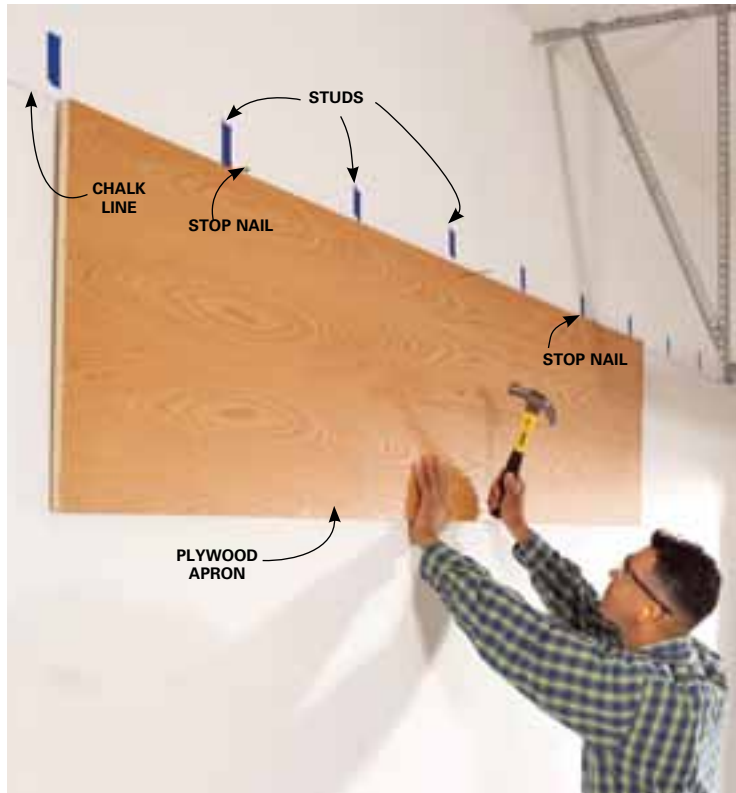
thane. If you choose to finish your shelves, roll the finish on the full sheets of plywood and brush the finish on all of the trim boards before cutting. That'll take much less time than finishing it later.

Measure the overall length of shelving you intend to build and then use the dimensions in Figure B to help calculate the materials you need.

Lay out the walls and mount the aprons

Rip each sheet of plywood into one 23-in.-wide apron and one 24-in.-wide shelf. Use the factory edge of a cut shelf as a saw guide for straight cuts on the other shelves and aprons (Photo 1), or use a table saw.

Snap a level line on the wall to mark the top of the apron and then mark all of the studs with masking tape. Take your time with this step; it's important that the apron nails anchor into solid framing, since they support the entire weight of the shelf. To be sure, poke nails through the drywall (just below the line, where holes will be hidden) to find the centers of studs. Start the first apron somewhere in the middle of the wall, making sure that both ends fall on the centers of the studs. Then work toward the corners where the freehand crosscut ends will be hidden. If you're working alone, partially drive a couple of "stop" nails at the chalk line to help align



2 Snap a chalk line to mark the top of the apron and then mark the stud locations. Hold the plywood apron even with the line and nail the apron with 16d finish nails, four to each stud.

the apron (Photo 2). That'll eliminate any guesswork. Prestart a couple of nails at stud locations before hoisting the apron into place so you can tack it to the wall while supporting it with one hand.

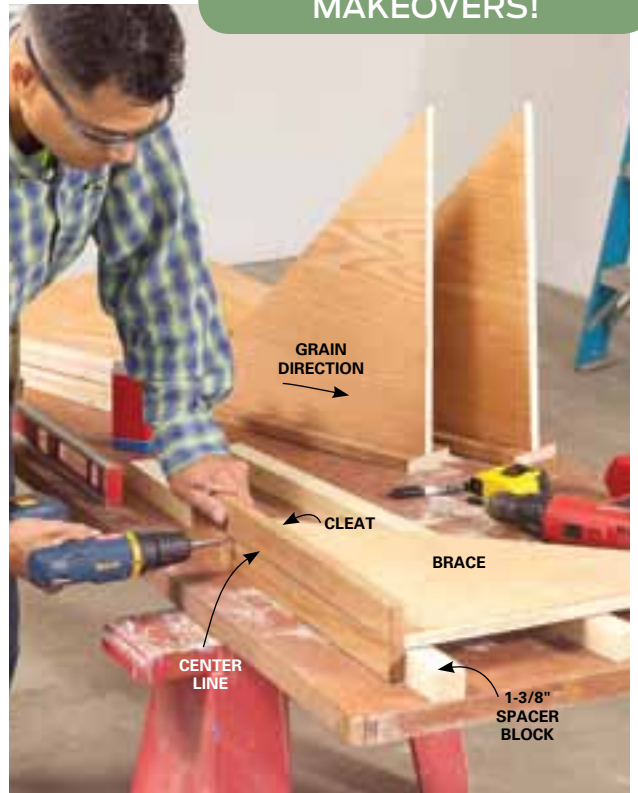
Cut and mount the braces

Cut the triangular braces from 20-in. squares (Photo 3). You can cut the diagonal freehand because the trim will hide minor cutting flaws. Use two 1-3/8-in.-wide spacers to center and support the brace while you're screwing the 1x4 brace cleat to the back side (Photo 4). Drill 1/8-in. pilot holes into both pieces and countersink holes in the cleats to prevent splitting. Use three 2-1/2-in. screws, one about 2 in. in from each end and one more centered. Run the wood grain the same direction on each brace.

Drill four pilot holes in the cleats, two 1-1/2 in. from the top and two 3 in. up from the bottom. Then screw each brace assembly to the apron (Photo 5). Use finish washers under the screws for a polished look. Position a brace directly over each apron seam, and place one more in the center so no shelf span is more than 4 ft. Make sure they're flush and square with the top of the apron. When shelving turns a corner, center a brace exactly 24 in. from one wall (Figure B). This brace will support the front edge of the shelf on the adjoining wall as well as a shelf end.



3 Rip 20-in.-wide lengths of plywood and cut them into 20-in. squares. Draw a diagonal line and cut the triangular braces. Use a sharp blade to minimize splintering.



4 Rest the braces on 1-3/8-in.-thick spacer blocks, then mark the center of each 1x4 cleat. Pre-drill 1/8-in. holes and screw the cleat onto the brace with three 2-1/2-in. screws.



5 Fasten each brace to the apron, flush with the top, with four 1-5/8-in. screws. Space the braces at the ends and middle of each full sheet.



6 Nail the shelves to the apron and to the braces with 2-in. nails spaced every 8 in. Make sure joints meet at the center of the 3/4-in. braces.



Customized shelving

You can easily customize this shelving to fit special items like golf clubs, hanging clothes or anything else that's best stored in a cabinet or on open shelving. Just assemble a cabinet box like the one shown here so that the sides fall over the wall studs. Go as narrow as 16 in. or as wide as 4 ft., but make sure you can attach the cleats directly to wall studs. Attach those cleats to the back of the cabinet with 2-in. screws placed every foot, just as you did with the braces, and then screw the assembly to the wall. The cabinet sides replace the 45-degree braces and support the shelf. A simple unit like this one takes no more skill than the shelves required. If you're interested in drawers or fancier cabinetry work, you're only limited by your cabinetmaking skills.

Nail on the shelves and add the trim

Lay the shelves in place so joints fall over the braces and nail them to the braces and the apron with 2-in. brads spaced every 8 in. As with the apron, start somewhere in the center of each wall so you'll have factory edges abutting each other at joints and the saw cuts will be hidden at the ends. Angle the nails slightly at joints so they hit the center of the braces.

Add trim to the raw plywood edges for a nice finished look. Trim also strengthens the assembly and stiffens the shelves. Cut the brace trim to fit with opposing 45-degree bevels at each end. Then glue and nail them to each brace with 2-in. brads (Photo 7).

Starting at one end of each wall and working toward the other wall, cut the shelf edging to fit (Photo 8). Overlap plywood joints by at least 2 ft. for better support. The plywood will be a little wavy, but it'll straighten out as you nail on the trim.



7 Cut the 1x2 brace trim pieces to fit with opposite 45-degree bevels at each end. Glue and nail them to the braces with 2-in. brads.



8 Cut the 1x2 edge trim to length, then glue and nail it to the front edge of the shelf with 2-in. brads.

\$100 OR LESS
MAKEOVERS!

1
weekend

Patio makeover

Concrete stain is a fast, simple way to turn your dull gray patio into a lively, colorful surface that will make your outdoor space more inviting. The stain is nearly foolproof to apply—just wet the concrete and spray on the stain. If you're not happy with the result, you can go back and apply a second or third coat to enhance the color.

Here you'll learn how to apply the stain, including ideas for mixing stains to create a unique, multicolored surface that looks like marble. A pro would charge \$500 or more to do the work, but you can do it yourself for less than \$100. You won't need any special tools—just basic painting tools and rain-free weather. If you're cutting kerfs into the concrete, you'll need a masonry blade (\$16 at home centers) for your circular saw.

You can apply the stain over worn concrete, but don't expect a miracle. You'll still be able to see the old appearance through the stain. And avoid staining spalling concrete. The stain will turn a darker color wherever the concrete is pitted.

What is concrete stain?

Concrete stain is a water-based product that coats the concrete and becomes a permanent part of the surface. The stains can fade and wear over time, but sealer helps protect them.

Concrete stains are different from acid (or etching) stains, which chemically react with minerals in the concrete to change the color. Acid stains are available for DIYers, but there are fewer colors to choose from, and applying it involves more steps.

Time, money and materials

You can do this project in a weekend. Prep the concrete and apply the stain on Saturday, then seal it on Sunday. If you decide to add a second coat of stain, you'll need another day.

The stains are available at home centers in the paint section—the color is added just as with paint. One gallon (\$24) covers 200 to 400 sq. ft. A gallon of sealer also costs \$24 and covers 200 to 400 sq. ft.

The color you choose may look slightly different after it's applied. Each patio will accept the stain a little bit differently. However, the color will be close to what you see in the brochure.

The stain is semitransparent. It won't completely cover the surface as paint would. You'll see the concrete through the stain, especially if you're using a light color.

Cut kerfs and clean the concrete

This project is much faster and easier if you stain your whole patio a single color. All you have to do is wet the concrete and apply the stain. Then backroll with a 3/8-in.-nap roller if you want even coverage. That's it—there's no need to block off sections or switch sprayers. If you want a pattern with different colors, start by deciding on a color scheme. Anywhere you want to switch from one color to another, such as for a border or the checkerboard pattern shown here, you'll need a kerf (a shallow cut in the concrete). This gives the colors a crisp separation. Taping off the concrete won't work. The stain will run under the tape.

If you already have expansion joints in the concrete,



1 Cut kerfs to separate sections that will be stained different colors. Use a large board as a saw guide to get a perfectly straight cut. Mist the blade with water to contain the dust.

incorporate them into your design to avoid cutting kerfs. But if you need to cut kerfs, start by snapping a chalk line where you want to cut. It's important for the cuts to be perfectly straight. Crooked cuts will be obvious once you apply the stain. So use a wide board as a saw guide and weight it down with buckets of water (Photo 1).

Install a diamond masonry blade (\$16 at home centers) in a circular saw and set it to a depth of 1/4 in. The cuts don't need to be deep—just enough to separate colors. Have a helper spray a water mist on the blade during the cut to contain the dust (Photo 1). Don't use cheap abrasive blades for cutting concrete—you can't spray them with water, and you'll end up with dust all over your siding and windows.

You won't be able to get the saw blade right next to the house, so finish off the kerfs with a masonry chisel and a



Use multiple colors of stain to create a distinct border or design on patios or sidewalks.

QUIKRETE



2 Scrub the concrete with TSP substitute using a stiff broom to clean dirt off the surface. Then rinse the entire patio with water.

hammer or a grinder with a diamond blade.

As with any other staining project, surface preparation is critical. Any stains, such as rust, will show through in the finished project. Clean the entire surface with TSP substitute (\$7 per quart; Photo 2), working in 4 x 4-ft. sections at a time. Rinse the concrete with water until you don't see any more bubbles from the TSP substitute. For tough rust stains, use a stain remover (CLR is one brand; \$6 for 28 ozs. at home centers), and rinse it off with water. For grease or oil stains, use a product like Pour-N-Restore (\$9 for 16 ozs. at home centers or pour-n-restore.com) that's designed to remove those stains. Blast dirt and debris out of the kerfs with water.

Prep the area for staining

Now that the concrete is clean, make sure your shoes are, too, before you walk on the patio again. The surrounding ground will be wet from concrete cleaning. It is a good idea to change into a pair of clean, dry shoes to work on the patio.

Before cracking open the stain, shield the lower portion of the house and any nearby landscaping materials to protect against drifting spray. Tape plastic film (\$16 for 48 in. x 180 ft.) along the siding. You don't have to protect plants and grass if you don't want to (any stain that gets on them will hardly be noticeable). If any dirt gets on the patio after you've cleaned it, brush the concrete lightly with a broom to avoid pushing the dirt into the surface.

Apply the stain

You shouldn't apply the stain in direct sunlight (partial or full shade is best), so wait for a cloudy day or a time of day when the patio is shaded. Also avoid windy days so the stain won't drift. You'll need a few garden sprayers (\$10



3 A base coat of stain covers the concrete and makes your topcoat color more vibrant. Spray the first color (the base coat) onto wet concrete, applying just enough stain to cover the surface. Move the sprayer wand in a continuous circular motion.



4 To create a marbled look, spray on the second color while the first color is still wet. Don't worry about even coverage with the second coat—you want the colors to mix together.



5 To finish creating the marbled look, blend the first and second colors together with water. Use the water stream to push the stain to bare spots and to produce swirls in the stain.



6 To create a focal point with three colors, follow these steps: Spray on the first color (the base coat). While it's still wet, spray two colors over it at the same time. Let the colors intermix.

each) for this project—one for each stain color you're applying and one for water. Fill the sprayers over tarps on the grass (don't fill them on the patio since spills will stain the concrete). Test the spray pattern on cardboard.

If you're creating a pattern, you'll need shields to place in the kerfs or expansion joints to prevent spraying onto adjoining areas. For this project, fluorescent light lenses (\$7 at home centers) were used, but you could use cardboard. Have four or five on hand. Don't use them if they're dripping wet with stain or they'll drip onto (and stain) the concrete.

Work in small sections (4 x 6 ft. or so), starting near the house and working outward. Plan the application so you don't box yourself into a corner.

Start by spraying the concrete section with water. Get it wet but don't leave standing water. To create the marbled look shown here, have a helper hold the shields in the kerfs (if necessary) and apply the first color (base coat) of stain in a circular pattern (Photo 3). The base coat makes the second color more prominent. Immediately after spraying, mist the section with water and apply the second color (Photo 4). Then spray more water over the top to create swirls or small runs in the second color (Photo 5). The first and second colors will intermix, producing the marbled effect. Use the water to "push" the color all the way to the edges or onto bare spots. If the water pools in a low spot or starts to run onto an adjacent section, dab it up with a cloth.



7 Look for bare spots after the surface is dry. Touch them up by spraying stain from a hand-held spray bottle onto a clean cloth, then dabbing the stain onto the spots. Dab the surrounding area so the stain blends naturally.

When switching to a new stain color, be sure the lens shields are dry, or use new shields so the old color doesn't run onto the section of the patio with the new color. Don't worry if a leaf or debris blows onto the wet stain. After the stain dries, remove the debris and touch up the stain (see the next step).

Add more stain for deeper color

Let the stain dry for 24 hours. If the color isn't as vibrant as you want or the coverage is spotty, go back and add another coat of stain. Wet the concrete and apply the stain using the same steps as before. Here a second coat was added to the corner squares to give them a deeper, richer color.

You'll probably find bare spots that you missed, especially along the edges. Touch-up is simple. Fill a spray bottle with stain, spray the stain on a cloth and dab it on the bare spot (Photo 7).

Finish with the sealer

The sealing step is recommended because it protects against fading and wear, and it enhances the stain. You'll have to clean the patio with TSP substitute and give the patio a fresh coat of sealer every three to four years.

Give the stain a full day to dry, then apply the high-gloss sealer. Choose a day or time of day when the patio is shaded (don't apply the sealer in direct sunlight). Start by cutting in with sealer along the patio edges with a 3-in. brush. The milky white sealer turns clear as it's applied. Roll sealer on the rest of the patio with a 3/8-in.-nap roller (Photo 8). Let the sealer dry for two hours, then apply a second coat. Roll the second coat perpendicular to the first coat.



8 Let the stain dry for 24 hours, then apply a sealer to keep the stain from fading. Plan on rolling on a new coat of sealer every three to four years to protect the surface.

Endless possibilities

To see hundreds of examples of how stain can enrich concrete, go to google.com and click on "images" at the top of the page and then type in "stained concrete."



QUIKRETE

Buyer's Guide

These companies offer a semitransparent stain and a sealer. Check their Web sites for buying information.

BEHR: (877) 237-6158. behr.com

QUIKRETE: (800) 458-0047. quikretecoatings.com. Shown is Quikrete's Adobe Tint as the first color for the corners, and then Red Rocks. Tuscan Sunset was used for the alternating squares. Adobe Tint was the first color in the middle square, then Burnished Gold and Red Rocks.

RUST-OLEUM: (800) 323-3584. rustoleum.com

familyhandyman.com

- Find great ways to shade your patio at familyhandyman.com. Search "patio shade."
- For tips on enhancing curb appeal, go to familyhandyman.com and search "curb appeal."
- To add a patio privacy screen, go to familyhandyman.com and search "patio screen."

BONUS!

**Build a pair in
one weekend
for \$300**

Build an elegant bookcase

This is one of those rare woodworking projects that has it all: high style at a low cost, and fast, easy construction that delivers sturdy, lasting results. This bookcase design is versatile too. You can easily make it shorter or taller, wider or deeper. With a little know-how, you can even adapt the building methods to other projects, like the fireplace mantel shown here.

You could save a few hours of work by building just one bookcase, but there's a financial incentive to build two. By mostly using the plywood left over from the first bookcase, you can get a second one for half-price. The materials for one oak bookcase will cost you about \$200; two will cost about \$300. If you choose cherry or birch, expect to spend an extra \$100 or more on materials.

You'll need a table saw and a miter saw for this project. A pneumatic brad nailer will make the job faster and easier. All the materials are at home centers. You may not find the solid wood panel shown here as the bookshelf top (made from glued-together boards). You could use oak stair tread material or glue boards together. Also, the home center may not carry the board widths listed, but you can easily rip wider boards to width.

Cut the plywood parts

To get started, rip the plywood parts to width on a table saw. If cutting full sheets is difficult in your small shop, cut the parts slightly oversize with a circular saw and then trim them on the table saw. Rip two 9-in.-wide planks of

3/4-in. plywood (for the shelves) and two from the 1/2-in. plywood (for the sides). Then cut them to length. To make the crosscuts with a miter saw, use a stop block (Photo 1).

Next, drill the screw holes in the sides using a 3/32-in. bit (Photo 2). Measuring from the bottom, mark the screw holes at 3-3/8, 16-1/8, 26-7/8, 37-5/8, 48-3/8 and 58-1/8 in. Position the holes 1 in. from the edges so the screw heads will be covered by the stiles later.

Sand all the plywood parts before assembly to avoid awkward inside-corner sanding later. Plywood usually requires only a light sanding with 150-grit paper, but watch

for shallow dents or scratches that need a little extra sanding. And be careful not to sand through the micro-thin veneer along the edges.

Assemble the case

When you screw the sides to the shelves, use plywood spacers to eliminate measuring errors and out-of-square shelves (Photo 3). Before you cut the spacers, measure the thickness of the shelves. Although they're cut from 3/4-in. plywood, you'll probably find that they're actually a hair thinner than 3/4 in. To compensate, simply cut

Figure A:
Simple bookcase

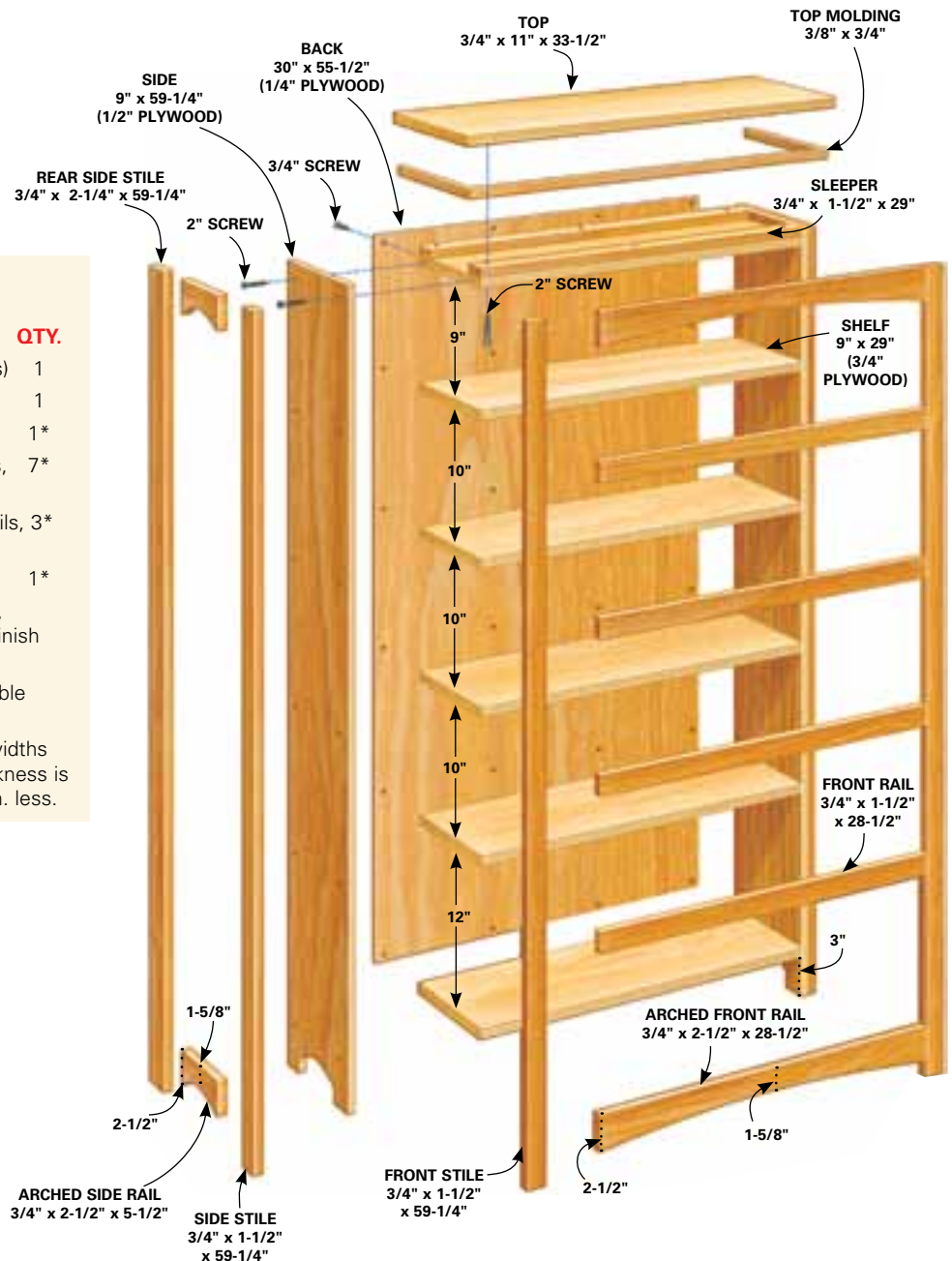
With this simple design, you can easily alter the dimensions to suit your needs. The bookcase shown here is 60 in. tall, 11 in. deep and 33-1/2 in. wide.

Materials list

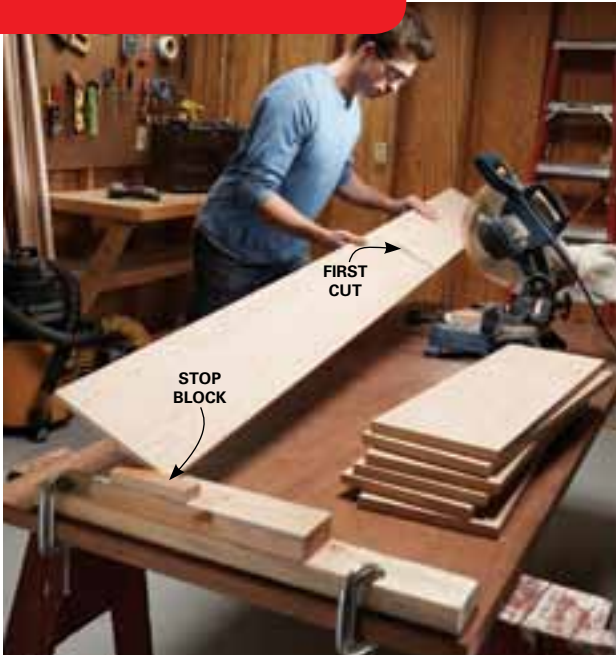
ITEM	QTY.
3/4" x 4' x 8' plywood (shelves)	1
1/2" x 4' x 8' plywood (sides)	1
1/4" x 4' x 8' plywood (back)	1*
1x2 x 6' solid wood (shelf rails, 7* front and side stiles)	
1x3 x 6' solid wood (arched rails, 3* rear side stiles)	
1x12 x 3' glued panel (top)	1*
Wood glue, No. 8 x 2" screws, No. 6 x 3/4" screws, 1-3/4" finish nails	

*To build two bookcases, double these quantities.

Solid wood thicknesses and widths given are nominal. Actual thickness is 3/4 in. Actual widths are 1/2 in. less.



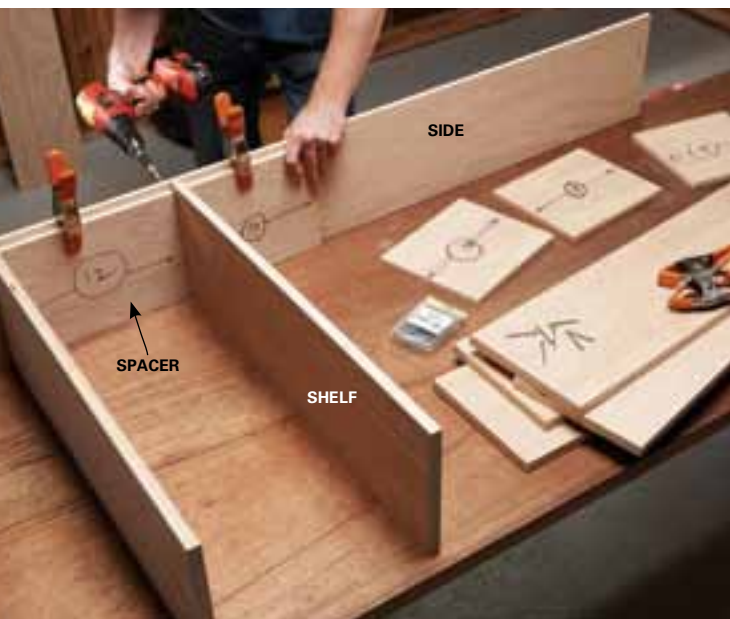
BONUS!



1 Crosscut the parts quickly and accurately using a stop block. The parts are too wide to cut in one pass, so flip the plank over after the first cut and make a second cut.



2 Stack up the sides, mark the screw locations and drill through both sides at once. This cuts measuring and marking time, especially if you're building two bookcases.



3 Screw the sides to the shelves using plywood spacers to hold the shelves in precise position.



4 Mark arches on the front rails using a simple arc jig made from wood scraps and a metal straightedge. Cut the arches with a jigsaw.

your spacers a bit longer (your 12-in. spacer may actually be 12-1/16 in. long, for example).

Inspect the sides before assembly and orient them so the best-looking veneer faces the outside of the case. Drill 3/32-in. pilot holes in the shelves using the side holes you drilled earlier as a guide. Also drill countersinks for the screw heads. "Pilot" bits that drill a pilot hole and countersink in one step cost about \$5. Screw all the shelves to one side, then add the other side. Don't use glue. The

screws alone are plenty strong, and any squeezed-out glue would prevent the plywood from absorbing stain later.

With all the shelves screwed into place, add the back. Measure the case from corner to corner in both directions; equal diagonal measurements mean the case is square. Set the back in position and use a straightedge to mark the locations of the shelves. Fasten the back with screws rather than nails. That way, you can remove the back later to make finishing much easier.



5 Sand out bumps or waves in the arches using the cutout. Stick sandpaper to the cutout with spray adhesive.

Cut arched rails

Although straight rails would look good, the project shown here has arches cut in the top and bottom rails for a more elegant look. If you want curved rails, cut the top and bottom rails 28-5/8 in. long (you'll trim them to final length later). To mark the curves on the front arches, screw two blocks to a long scrap 35-7/8 in. apart. Bend a 36-in. metal straightedge between the blocks. Align the straightedge with the corners of the rail (Photo 4). To mark the side rails, use the bottom of a 5-gallon bucket (or any circle that's about 10 in. in diameter).

If you end up with a small hump or two, smooth them with sandpaper. For a perfect arc, use the cutout as a sanding block (Photo 5). Cut 80-grit sandpaper into 1-in.-wide strips and apply a light coat of spray adhesive (\$6) to their backs.

Next, cut the stiles to length, but don't cut the rails to length just yet. Before you attach any rails or stiles to the case, position the arched bottom rails on the case sides and use them to mark arcs. Cut these arcs with a jigsaw.

Add the trim and top

Fasten the rails and stiles following this sequence: Attach both of the side stiles along the front of the case. Align your nails with the shelves so they don't poke into the case. Then add one front stile. Set one front rail in place. Set the other front stile in place to check the length of the rail. If the length is right, cut the other rails to identical length. Attach the front rails and the second front stile. Don't worry if the rails and stiles aren't quite flush;



6 Glue and nail the trim to the plywood case. Use as few nails as possible—just enough to hold the parts in place while the glue sets.

you can sand them flush later. Next, add the side rails and the rear side stiles (Photo 6).

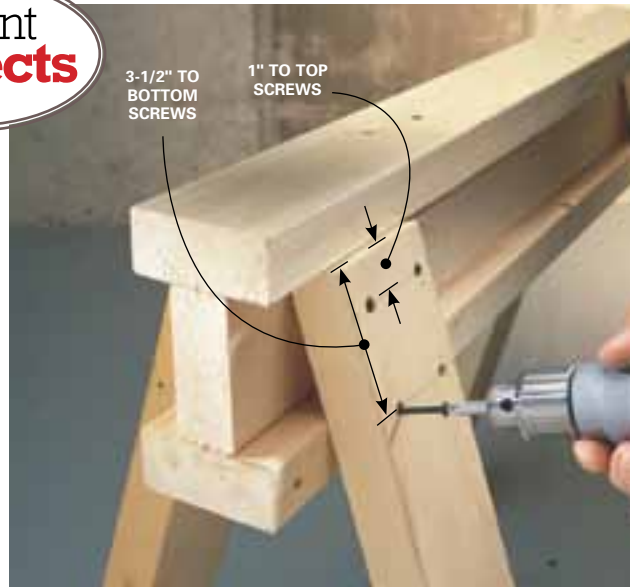
Two to four nails should be adequate for each part, although you may need more if the rail or stile is badly bowed. The glue will provide plenty of strength regardless of how many nails you use.

Allow the glue to set for an hour before you sand all the rails and stiles using a random orbital sander. Start with a 100-grit disc to sand flush uneven joints and remove any shallow scratches. Then switch to a 150-grit disc.

To attach the top, glue 3/4-in. plywood sleepers to the top shelf as shown in Figure A. Then predrill and screw the top in place. The top molding is simply 3/8-in.-thick strips cut from leftover scraps. Miter the corners and glue the strips in place, again using as few nails as possible.

Finish the bookcase

Unscrew the bookcase's back for easier finishing. The bookcases shown were finished with stain and three coats of polyurethane. With all the surfaces sanded to 150-grit, apply one coat of Minwax red oak stain. Shown is a satin sheen for the clear finish. But because three coats of satin can look like a cloudy sheet of plastic over the wood, begin with two coats of gloss, sanding lightly with a 320-grit sanding sponge between coats. Fill nail holes with color-matched wood putty after the first coat. After the second coat, add a coat of satin polyurethane. After setting the bookcases in place, drive one 2-1/2-in. screw through the back of each and into wall studs to prevent them from tipping forward.



Straight-cut sawhorses

Need sawhorses right now? You can make a pair from five 8-ft. 2x4s cut into six 32-in. lengths and eight 26-1/4 in. lengths.

Nail or screw the 32-in. pieces into I-beam shapes and, after drilling pilot holes, attach the legs to the I-beams with 3-in. drywall screws. These screws, along

with the upper edge of the I-beam, stabilize the legs. They're the perfect horses for holding a heavy load of boards and sheet goods. And when you need another workbench, just screw a piece of plywood on the sawhorses and you'll have a stable table.

Simple stepstool

Here's a great gift idea that will draw raves. The joints are accurately made in seconds with a plate joiner, but don't tell your admirers. You'll also need a power saw to crosscut the boards and a jigsaw to cut the half-circles in the risers. The lumber you'll need:

- One 8-ft. 1x8 clear hardwood board (actual width is 7-1/4 in. and actual thickness is 3/4 in.). Oak is a good choice because it's readily available.

- One 4-ft. 1x3 hardwood board (actual width is 2-1/2 in. and actual thickness is 3/4 in.).

Cut the 8-ft. board into:

- Two 22-in. riser boards
- Two 11-in. riser boards
- One 14-in. step board
- One 14-in. seat board

You'll use 94 in. of the 96-in. board, so make practice cuts on a scrap board first to check the angle and length of cut. Don't cut the 3-ft. 1x3 board until you've dry-assembled the step, seat and risers and measured for a perfect fit.

To create two risers, join the 11-in. boards to the 22-in. boards with No. 20 biscuits and glue. Let dry 30 minutes, then lay the step and seat across and mark for two No. 20 biscuits at each joint. Dry-assemble the step, seat and risers with biscuits, then cut and snugly fit the crosspieces. Mark the riser-to-crosspiece joint and cut



slots for No. 0 biscuits. Glue and firmly clamp the step, seat and crosspieces to the risers. Check for square and let dry 30 minutes, then cut out the 4-1/2-in.-dia. arc on the bottom of the risers to create the legs. Finish-sand and apply your favorite finish. This project is designed for use on hard-surface flooring only—not carpeting.