

THE FAMILY Handyman

#1 in DIY Home Improvement

Build It Now— Enjoy It This Summer



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Simplest bench in the world

Build it with a few 2x8s and a handful of screws

One of the easiest ways to make a good garden even better is to set a comfortable bench in a secluded corner. Just having a place to sit transforms an ordinary patch of flowers into a quiet contemplative refuge.

So if you're looking for a simple bench, take a look at this one built by Aldo Leopold, whom many consider the father of wildlife ecology. Leopold's writings have led

many to discover what it means to live in harmony with the land. If this bench was good enough for him, it's definitely good enough for the rest of us!

A little research led to this sturdy design which can be built quickly with a few 2x8s, glue and screws. Best of all, it's amazingly comfortable, perfect for bird-watching — even for two people.





1 Mark one end of the 2x8 x 10 at a 22-1/2-degree angle with a speed square or protractor, then cut with a circular saw. Make a mark 36 in. away and repeat the cut at the same angle. Cut the remaining front leg and two back legs from the same piece. Cut the seat and the backrest from the 2x8 x 8.



2 Fasten the legs together. Stack and clamp the seat and backrest to the edge of the worktable as guides, and then align the legs against them. Spread adhesive on the front leg, set the rear leg in place, and fasten the legs together with three 2-1/2-in. screws.

Building tips

To make a simple project even simpler, remember these tips:

- Be sure to assemble the legs (Step 2) so they're mirror images of each other, and not facing the same direction.
- Use clamps or a helper to hold the legs upright when securing the seat.
- Pre-drill all your screw holes to prevent splitting the wood.

Tools

Speed square or protractor
 Drill with #8 countersink drill bit
 Circular saw
 Caulking gun



3 Attach the seat and backrest. Stand the two ends up, 42 in. apart, spread glue on the tops of the rear legs, and screw the seat in place. Lay the bench on the worktable and attach the backrest with glue and screws.

Shopping list

- 1 2x8 x 8 cedar, redwood or treated lumber (seat and backrest)
- 1 2x8 x 10 cedar, redwood or treated lumber (front and rear legs)
- Exterior construction adhesive
- 2-1/2" galvanized deck screws

Fold-up grill table



A handy companion for your barbecue that collapses for easy storage

After building this collapsible cedar table, your family will wonder how they ever grilled without it. The legs nest under the top for quick storage or carrying to all kinds of other jobs, indoors or out. All you need to build it is a drill, a saw, basic hand tools, a short stack of cedar boards and half an afternoon.

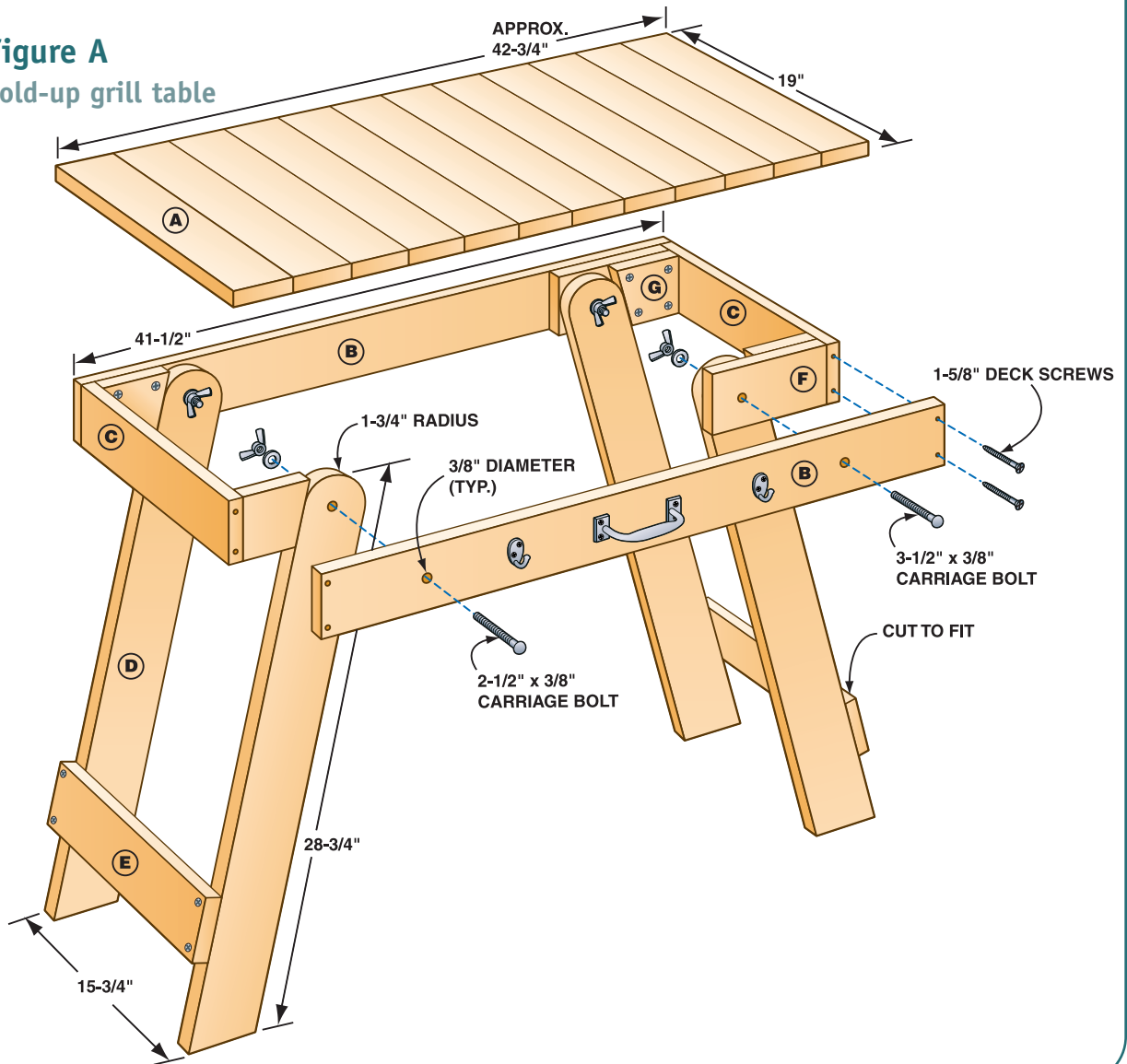
The table is made entirely from 1x4 cedar boards. Wood quality varies, so pick over the lumber for flat,

straight boards that are free of large or loose knots. You can make the table from eight 6-ft. boards, but buy 10 to allow for possible miscuts and to give you more choice for the top slats. Lumber cost? About \$35.

Cut the parts

You can use a handsaw to cut the parts, but an electric jigsaw speeds up the job significantly. Use a square to help make straight cuts (Photo 1, p. 6). To ensure

Figure A
Fold-up grill table



Shopping list

- 2 2-1/2" x 3/8" carriage bolts
- 2 3-1/2" x 3/8" carriage bolts
- 4 3/8" wing nuts and flat washers
- 1 Box 1-5/8" deck screws
- 1 Pint Penofin wood finish
- 1 Drill with countersink

matching legs and frame parts, clamp two boards together and mark and cut them at the same time (Photo 2). Cut slats one or two at a time. You'll cut the stretchers after bolting on the legs.

To assemble the frame, drill two holes in the ends of the longer frame boards and add a countersink hole for the screwheads to nestle into. Cut the slats and place them top-side up on a flat surface (Photo 3). Center the frame on the slats to create a 3/4-in. overhang on all

Cutting list

Overall Dimensions: 28-1/2"H x 42-3/4"W x 19"D

Key	Name	Qty.	Dimensions in in.
A	Top slat	12	1x4 x 19"
B	Long side pc.	2	1x4 x 41-1/2"
C	Short side pc.	2	1x4 x 15-3/4"
D	Leg	4	1x4 x 28-3/4" (15 degree angled end cut)
E	Leg stretchers	2	1x4 x 15-3/4" (Cut to fit)
F	Leg spacers	2	1x4 x 6-3/4"
G	Leg stop blocks	4	1x4 x 4-3/8" (15 degree angled end cut)

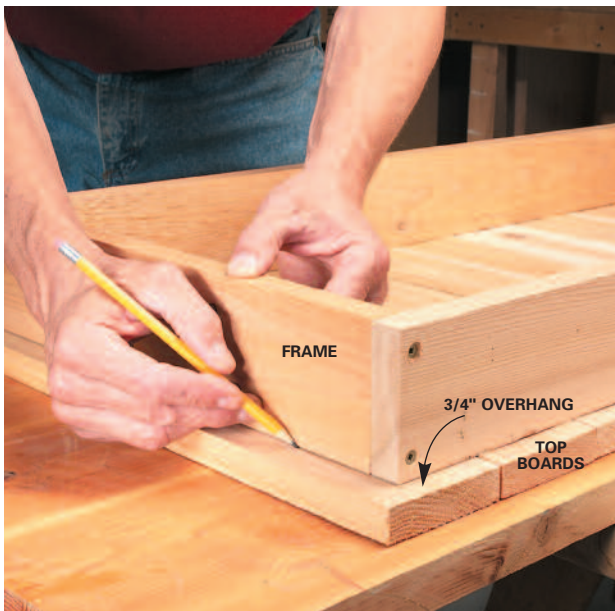
(Note: All parts cut from "1x4 S3S" cedar, so each board is a "fat" 3/4" thick and 3-1/2" wide, with two smooth edges, one smooth side and one rough side.)



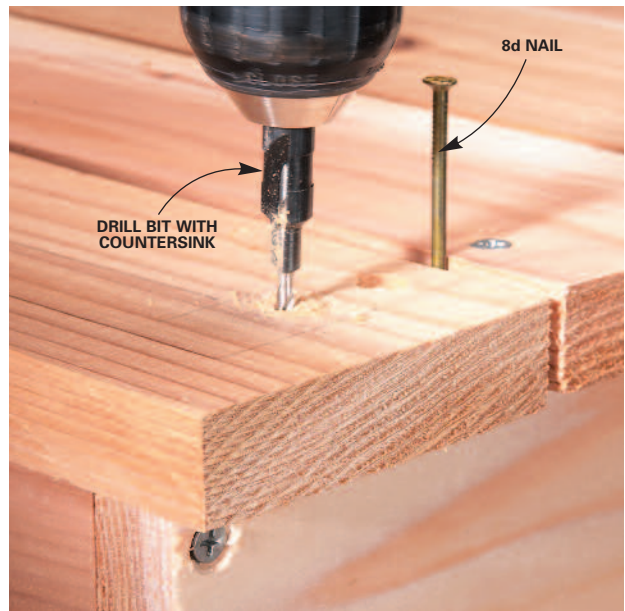
1 Cut the boards for the top and the frame that supports it using a jigsaw or handsaw and a square. (See the exploded view diagram on p. 9.)



2 Clamp the leg boards together (rough side in) and cut both of them at once to create identical leg pairs. Drill the 3/8-in. bolt hole in the upper end before unclamping.



3 Lay the frame on the top boards and lightly trace the frame shape so it's easy to see where to drill holes. Space the top boards with about 1/16-in. gaps between them.



4 Drill two holes on each top board end with a countersink bit and screw them to the frame. A nail is handy for creating even spacing.

four sides. Then lightly trace the frame shape on the slats with a pencil.

Lift off the frame and drill and countersink screw holes in the slats using the traced lines as a guide. Then screw the slats to the frame (Photo 4). Lightly tap a couple nails between the slats while screwing them to the frame in order to create the approximate 1/16-in. spacing between the slats. The end slats will overhang the frame approximately 3/4 in. to match the slat overhang

along the frame sides.

Attach the legs

Flip the tabletop upside down and screw the pair of angled leg stop blocks to the corners of one end (Photo 5). Butt the rounded leg ends against the blocks, then drill and bolt on the outer leg pair with the shorter 2-1/2-in. carriage bolts, washers and wing nuts. Attach the inner leg pair to the other frame, first screwing in the



5 Screw a pair of angled leg stop blocks in one end of the frame, then butt the rounded ends of the legs against the blocks. Drill through the frame and bolt on the legs.



6 Screw spacer blocks in the other frame end. These allow the other pair of legs to nest inside the first pair. Then drill and bolt on the second pair of legs and leg stop blocks.



7 Screw stretchers across each pair of legs. For best fit and overall results, mark and cut the stretchers based on the actual spacing between the legs.



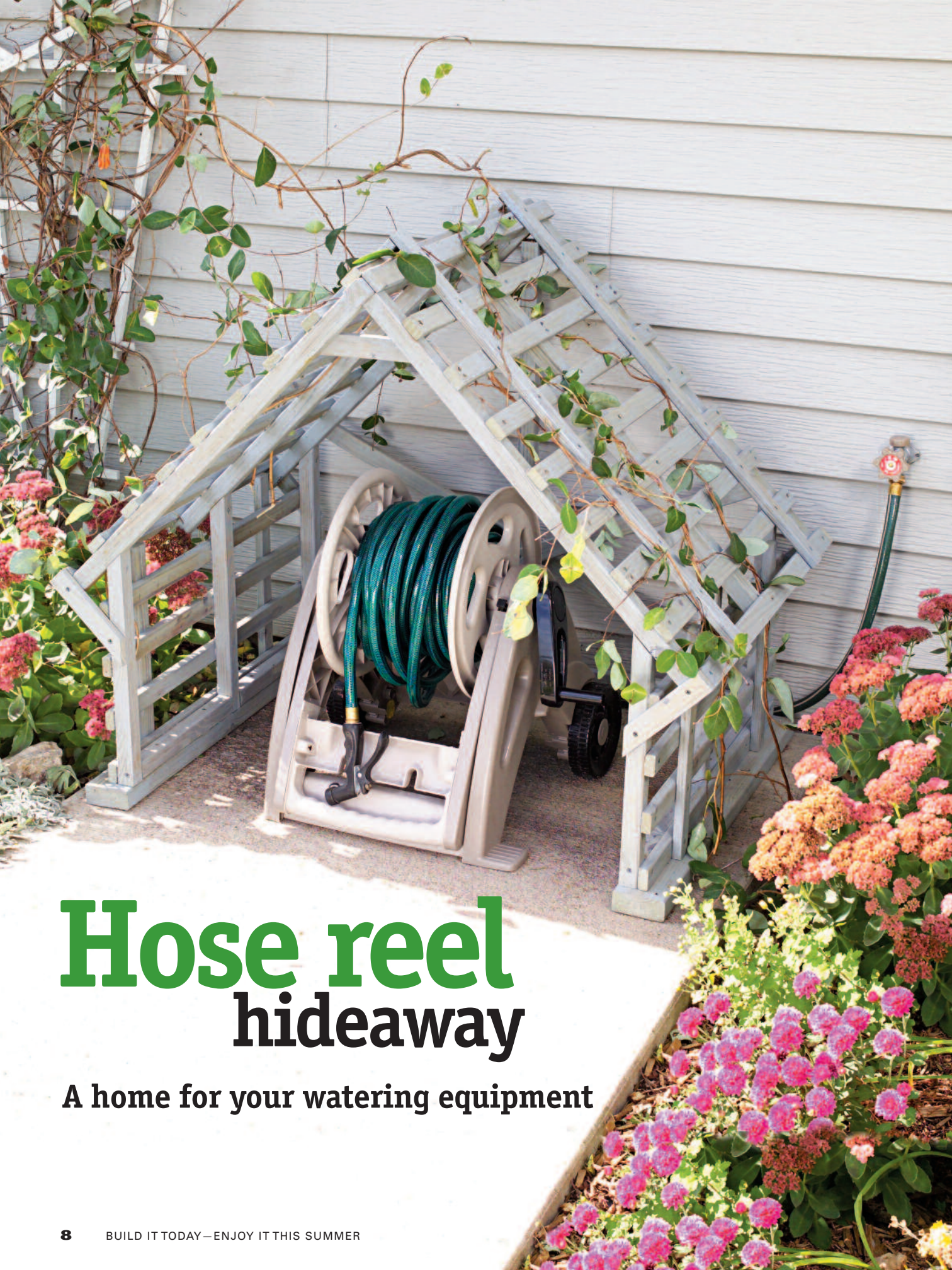
8 Test the fit of the legs in the frame by pulling the legs up from the frame. If they bind and scrape, sand the sides for a smoother fit.

spacer blocks to allow the legs to nest inside the other pair (Photo 6). Add the angled leg stop blocks, then drill and bolt on the second leg pair with the longer 3-1/2-in. carriage bolts.

With the legs flat on the underside of the table, measure for the stretchers, cut, drill and fasten them to the legs (Photo 7). To pull out the legs, lift the more widely spaced pair first so the second pair can be raised without catching on the first pair's stretcher (Photo 8).

Sand, finish, then grill

Sand the table with 100-grit paper and, with a sanding block or rasp, slightly round the top edges of the slats. Put on your favorite finish; we used two coats of Penofin penetrating oil finish (cedar color). Pull out the legs, tighten the wing nuts and throw some rib eye steaks on the grill—just in time for dinner!



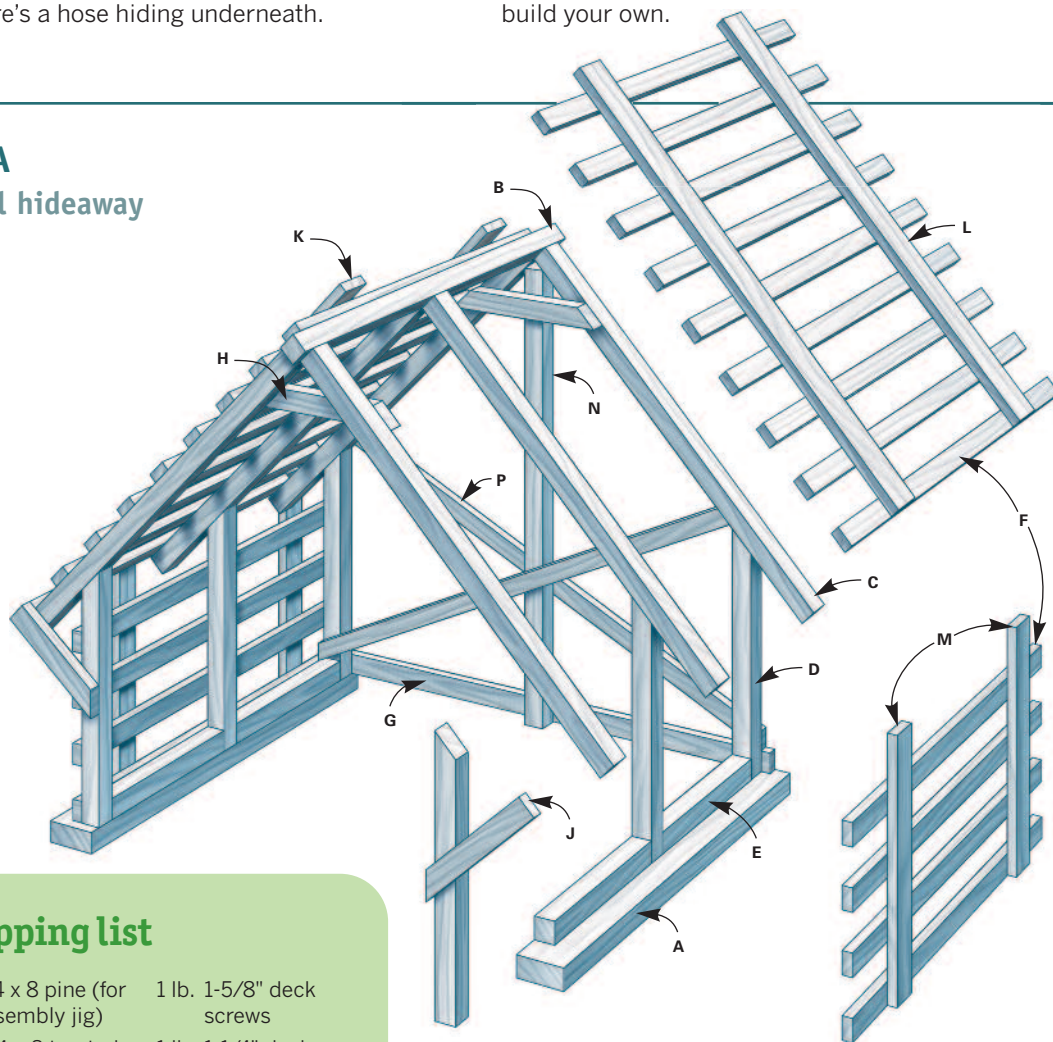
Hose reel hideaway

A home for your watering equipment

This latticework structure was designed as a hideout for clunky plastic hose reels—but it can turn into a fun shady hideout for kids and pets as well. In a few years, the lattice will be covered with a dense mound of vines, and you'll be the only person who knows there's a hose hiding underneath.

The construction is straightforward. To keep the wood from splitting, predrill all the holes with a countersink drill bit, then drive in rust-resistant deck screws. Or use a pneumatic brad nailer or narrow crown stapler. Follow the step-by-step photos on the following pages to build your own.

Figure A
Hose reel hideaway



Shopping list

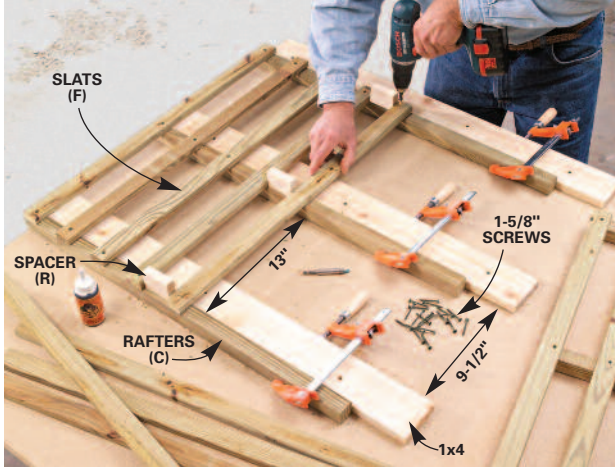
- | | | |
|-------|---------------------------------|--------------------------|
| 1 | 1x4 x 8 pine (for assembly jig) | 1 lb. 1-5/8" deck screws |
| 1 | 2x4 x 8 treated | 1 lb. 1-1/4" deck screws |
| 5 | 2x2 x 8 treated | |
| 14 | 1x2 x 8 treated | 4 oz. polyurethane glue |
| 1 lb. | 2-1/2" deck screws | |

Note: Actual wood sizes vary. Our 2x2s averaged 1-5/16 in. square, and the 1x2s were only 11/16 in. thick. Adjust the length of the base plate fillers (E) and the size of the spacers (R) if the wood you buy is a different size.

Cutting list

Key	Qty.	Size & description	Key	Qty.	Size & description
A	2	2x4 x 31-1/2" (base)	G	1	1x2 x 40" (cross tie)
B	1	2x2 x 31-1/2" (ridge)	H	3	1x2 x 11" (rafter tie)
C	6	2x2 x 31-3/4" (rafter)	J	4	1x2 x 7-3/4" (rafter brace)
D	6	2x2 x 17-1/4" (stud)	K	2	1x2 x 33-3/4" (roof lattice-left)
E	4	1x2 x 13" (base filler)*	L	2	1x2 x 34-1/2" (roof lattice-right)
F	26	1x2 x 30" (slats)	M	4	1x2 x 16" (wall lattice)
			N	1	2x2 x 35-1/4" (vertical brace)
			P	2	1x2 x 41-3/4" (diagonal brace)
			Q	3	1x4 x 31-3/4" (assembly jig)
			R	3	1x2 x 2-7/16" (spacers for slats)

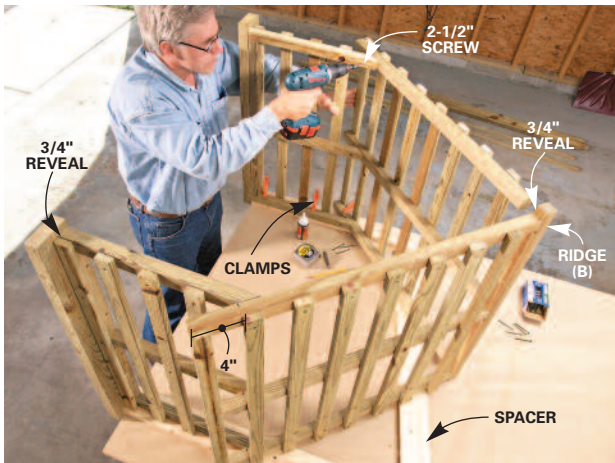
*See note above



1 Build the roof lattice on a jig, which is simply three 1x4s screwed to a square corner of your work surface. Clamp the rafters (C) to the jig, then predrill and screw the slats (F) to the rafters, using spacers (R) to keep the slats parallel. A drop of polyurethane glue at each joint makes the structure rigid. Repeat for the other roof section.



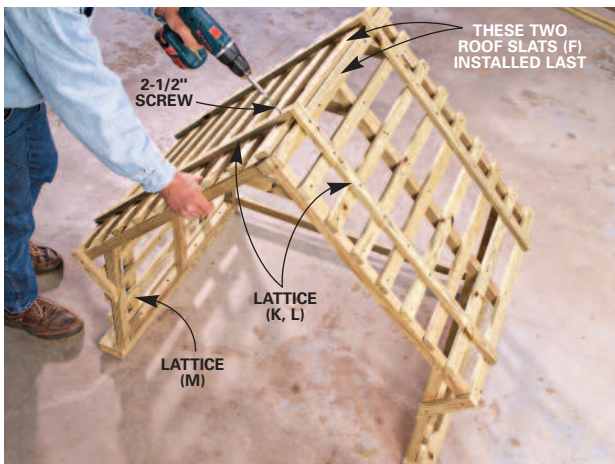
2 Assemble the walls by screwing the 2x4 base plates (A) to the bottom of each wall stud (D), leaving a 3/4-in. reveal on each end (see Figure A, p. 13). Reinforce the joint by cutting 2x2 base fillers (E) to fit between the studs, and then gluing and screwing them in place.



3 Attach the walls to the roof. Begin by attaching the 2x2 ridge (B) to one roof section. Clamp the sides upright on the worktable 36 in. apart, then set the roof sections in place. Predrill and screw the sides to the roof assembly, letting the roof hang over the walls by 4 in., as shown. Finally, join the roof pieces with screws through the ridge.



4 Reinforce the structure by first attaching the horizontal cross tie (G), then cut and install the short rafter ties (H) just below the ridge (see Figure A, p. 9). Next, hold each rafter brace (J) in place, mark the 45-degree cut on the one end and secure them in place. Use a dab of glue and one screw to secure both ends of each brace.



5 Screw the last two roof slats (F) to the 2x2 ridge. Attach the lattice pieces (K, L and M) perpendicular to the roof and wall slats with 1-1/4-in. screws. Use 2-1/2-in.-long screws at the top to secure the lattice, roof slat and 2x2 ridge together.



6 Mark the center of the back cross tie and rafter tie, and then attach the vertical brace (N). Hold the diagonal braces (P) in place, then mark, cut and secure them to the walls, roof and one another as shown. Apply an exterior stain if desired.

Storage bench

Stash your stuff in this easy-to-build project

You can never have enough storage space, especially on a deck or patio, where there are no closets or cabinets. Although this bench won't be the answer to all your outdoor storage needs, it sure will help!

It's a place to tuck a bag of charcoal, stick a pair of work shoes, hide an extension cord or watering can and hey, you can even sit and take a breather on it, too.

Even if you've never taken on a woodworking project, you can build this bench. There is no fancy joinery holding it together, and you don't need special tools. The sides are 1x4s with sheet metal sandwiched between.

The 1x4s intersect at the legs to create a strong joint. Drop in a plywood bottom and a hinged top, and you've got a sturdy attractive storage bench. It only takes about a day to build.

The tools are basic

You'll need a power miter box (a circular saw with a speed square works, too), a jigsaw and a cordless drill. Clamps aren't necessary, but they're very



A lift-up lid gives you tons of storage inside the bench. Foam weatherstrip keeps the interior fairly dry.





1 Draw an arc on each side stretcher by hooking a tape measure on a screw driven into the work surface. Draw the arcs on the legs using a compass or coffee can, then cut out all the arcs with your jigsaw.



2 Clamp together the legs and outside stretchers to make a frame. Lay the sheet metal on it, then position the inside stretchers. Use a spacer to get the stretchers centered, then screw them on to lock everything together.



3 Screw filler pieces between the stretchers, then add cleats to hold the bottom. Be sure to predrill and countersink all screws.

helpful. They'll hold the joints tight while you screw them together, and they provide an extra hand when you need it. If you don't have clamps, now might be the time to invest in a pair—inexpensive sets are less than \$25. The holes for the screws need to be predrilled and countersunk. A combination bit (\$5) works best (Photo 3). Also have a nail set on hand (Photo 4, p. 14).

Materials

This project is made primarily of 1x4s, and you can use just about any type of wood. Cedar, cypress or pine are great choices, but you'll need them smooth on all four sides. We used clear pine because it's straight and easy to work with, but it will need an annual coat of exterior stain, wood preservative or paint to protect it from the elements.

Sheet metal is used for the panels. Purchase it from a sheet metal shop or home center. You will need metal shears to cut it to size. We selected 24-gauge pre-finished steel ("Uniclad"), which is commonly used for flashing on buildings and is available in an array of colors. We used a copper color. If you prefer, cut the panels with tin snips from copper or galvanized roll flashing (available at home centers). Plywood forms the bottom and top of the bench. And 2- by 4-ft. sheets fit in a Volkswagen better than full-size sheets. The grand total for materials came to \$150.

Your first step: assemble the panels

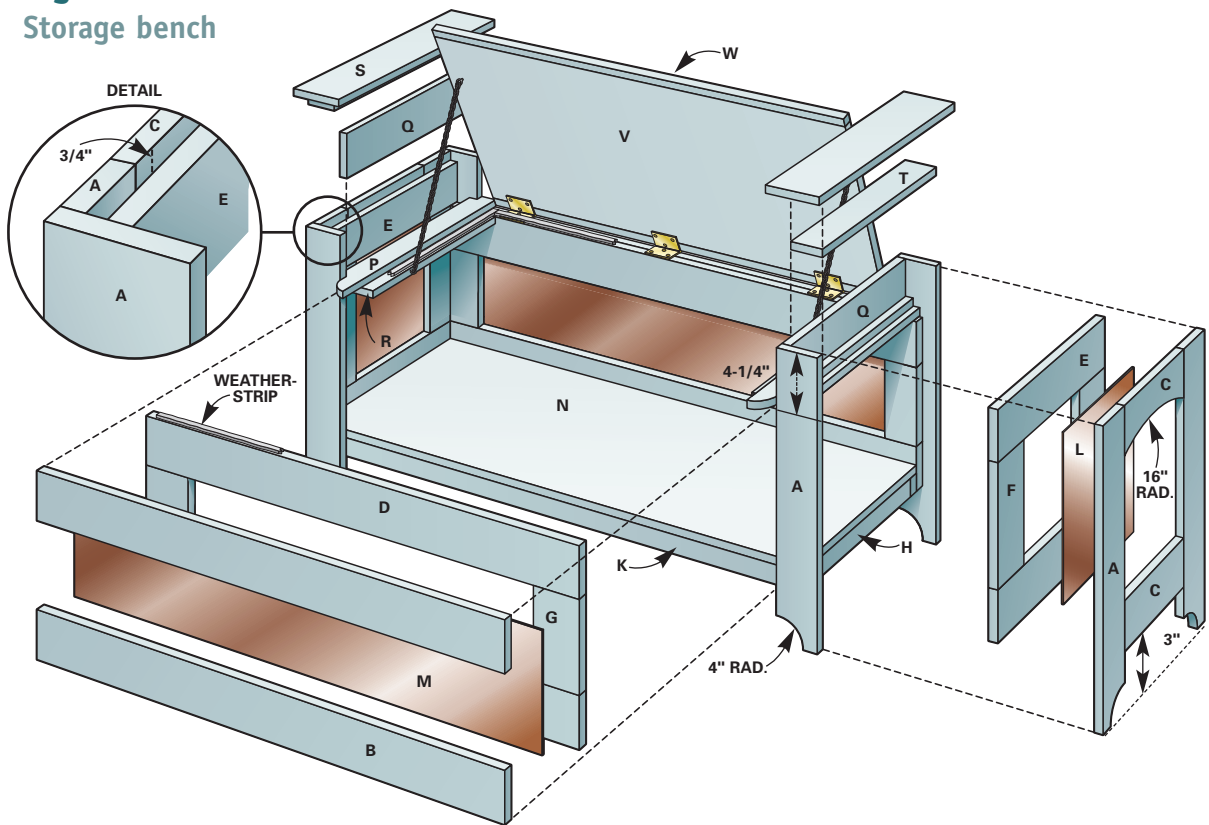
Assemble all four sides in the same manner. Here's how:

Cut the legs and outside front stretchers to size from the Cutting List. Good square ends are essential, so if you're using a circular saw, use a speed square as a guide.

Lay out arcs (Photo 1) on the legs and outside stretchers (C), then cut out the curved pieces with a jigsaw. If you don't have a jigsaw or want a simpler look, cut a 60-degree angle on the legs and eliminate the arc on the stretchers.

Clamp the stretchers between the legs. Use a scrap piece of wood between the clamps and the legs to avoid

Figure A
Storage bench



Shopping list

- 1 roll of galvanized steel flashing (12' x 18" wide)

Wood

- 10 1x4 - 8'
- 1 1x6 - 6'
- 2 1x2 - 8'
- 1 2'x4' 1/2" BC plywood
- 1 2'x4' 3/4" BC plywood
- 1 3/4" x 3/4" square molding

Hardware

- 1 lb 1-1/4"x#8 exterior screws
- 1 lb 2" galvanized casing nails
- 3 3" butt hinges
- 4 small eye screws
- 4' lightweight chain
- 12' 1/2" weatherstrip
- Exterior glue

denting your wood. Lay the sheet metal on the clamped boards, flush with the bottom and centered.

Cut one inside stretcher, then lay it on top of the clamped-together frame, as

Cutting list

Overall Dimensions: 22-3/4"H x 50"W x 23"D

Key	Name	Qty.	Dimensions	Notes
A	Legs	8	1x4 x 22"	Cut arcs in feet
B	Outside front & back stretchers	4	1x4 x 41"	
C	Outside side stretchers	4	1x4 x 12-1/2"	Cut arcs in two of them
D	Inside front stretchers	4	1x4 x 46-1/2"	Measure from bench
E	Inside side stretchers	4	1x4 x 18"	Measure from bench
F	Inside side fillers	4	1x4 x 11-1/4"	Measure from bench
G	Inside front & back fillers	4	1x4 x 7-3/4"	Measure from bench
H	Side cleats	2	1x2 x 16-1/4"	Measure from bench
K	Front & back cleats	2	1x2 x 44-3/4"	Measure from bench
L	Side panels	2	17-3/4" x 18"	24 gauge sheet metal
M	Front & back panels	2	46" x 14-1/2"	24 gauge sheet metal
N	Bottom (1/2" plywood)	1	45" x 18"	Measure from bench
P	Arm supports	2	1x4 x 21-1/2"	Cut notches and round corners
Q	Arm fillers	2	1x4 x 19-1/2"	
R	Lid supports	2	1x4 x 18"	Measure from bench
S	Arms	2	1x6 x 23"	
T	Cleats	2	1 x 19-1/2" x 2"	Rip to fit, measure from bench
V	Lid (3/4" plywood)	1	20-1/4" x 37-3/4"	Measure from bench
W	Molding	2	3/4" x 3/4" x 37-3/4"	Measure from bench



4 Nail the front, back and sides together. Pre-drill for each nail, and drive the nail heads slightly below the surface with a nail set. For additional strength, run a bead of glue along each joint before assembling.



5 Mark the notches for the arm supports directly from the bench. Cut out the notches with a jigsaw, then round off the protruding corners.



6 Clamp the arm support to the filler piece, screw them together, then add the lid support.

shown in Photo 2. Center it on the frame; it will be narrower than the width of the frame. It's important that the gap at each end equals the thickness of your wood plus the sheet metal. Adjust the length if necessary and cut the remaining inside stretchers. Screw them all in place, remembering to keep the inside stretchers on the sides 3/4 in. from the top edge (see Figure A, detail on p. 13).

The lower stretcher is flush to the bottom. Use 1-1/4-in. #8 exterior screws, predrilled and countersunk with a 3/16-in. bit. Position the screws so they're sure to catch the front 1x4s; because of the offset, it's easy to miss.

Add filler pieces (F) between stretchers, then add the 1x2 cleats (H and K) that'll hold the bench bottom (Photo 3).

Repeat this process for the other three panels.

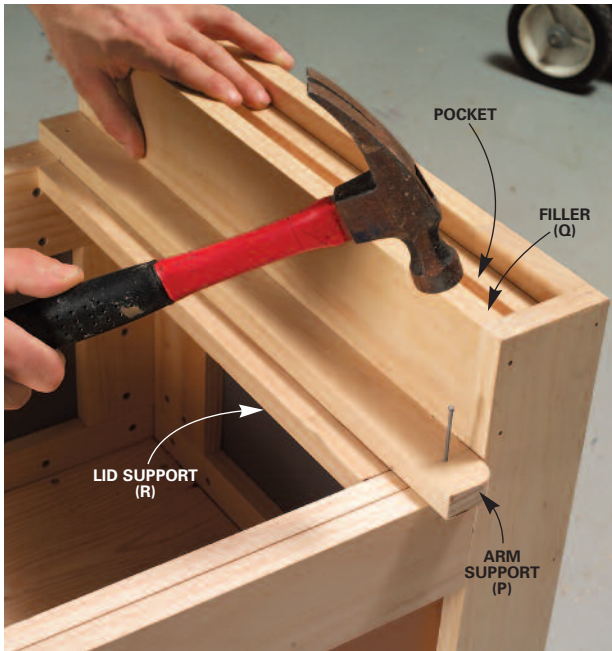
Nail the panels together

The toughest part of nailing the panels together is holding them in place. Here's where a clamp really helps. Clamp a side panel inside the front and back panels, flush up all the edges and gently tighten the clamp. This is a bit of a juggling act, so you may want to call for someone to help. Place a piece of wood or cardboard between the jaws and the legs to avoid denting the wood (Photo 4). Pre-drill 3/32-in. holes, then glue and nail the corners with 2-in. galvanized finish nails. Reposition the clamp as you nail to keep the joints tight. Repeat at the other end.

Measure the bottom and cut a piece of plywood to fit. When you drop in the bottom, it will square up the bench. Pre-drill, countersink, glue and screw the bottom to the cleats.

The arm assembly

This assembly looks a little complicated, but it's really not. It's made up of three pieces, which are measured from the bench (Photo 5) and cut to fit. After you notch the arm supports, round off the front ends shown in



7 Place the arm assembly in position and nail it to the legs and stretcher. There will be a pocket formed at the top where the arm cleat will go (see next photo).

Photo 7 (so they won't catch a pant leg), then temporarily set them in place. Hold the lid supports (R) in place underneath the arm supports and mark. Fit and nail the two assemblies to the bench.

Fastening a cleat to the bottom of each arm (Photo 8) lets you hide nails on the sides of the bench when you attach them. Measure the width of the opening of the arm and rip (cut the long way) the cleat (T) to fit. Although not the quickest, your jigsaw is the safest tool for this cut. Attach the cleats to the arms (Photo 8), then nail the arms to the bench.

The lid

Installing the lid can be a bit awkward. Here are a few techniques that'll make it go easier:

Cut the plywood 1/4 in. shorter than the width of the opening, so the lid closes easily. Then glue and nail two pieces of molding (W) to cover the exposed edges of the plywood. Place the lid on the workbench and attach the hinges to the lid. We used no-mortise hinges, but any butt hinge will work.

Flip the bench on its back with its arms overhanging each side of your workbench (Photo 9). Put a couple of 1-in. blocks under it to raise it to the level of the lid, center it, then screw on the hinge.

A few remaining details

Install a pair of screw eyes and attach a chain to keep the lid from falling back. Then place a band of foam weatherstrip around the perimeter to help keep out the rain. Finally, bore a dozen 3/8-in. ventilation holes in the bottom.



8 Attach a cleat to the underside of each arm, using diagonal lines to center it. Place the arms on the bench and nail through the cleats to secure them.



9 Fasten the hinges to the bench. Rest the bench on its back, on top of 1-inch blocks, center the lid in the opening, then screw it on. Give the whole bench a once-over with sandpaper, and you're ready to finish!

Seal the bench with a coat of deck stain and preservative. If it's used outdoors, the bench will need a fresh coat annually. And if you're like most folks, you'll have to clean it out once a year, too, because it's sure to fill up fast.

A-frame picnic table



An outdoor dining table you can build in a day

Here's a great-looking, sturdy picnic table that's strong enough to support eight or more bulky NFL linemen, even after a pregame feast. Plus, it's easy to build and inexpensive because it's made from construction-grade Douglas fir lumber.

This isn't a project that'll take weeks to build. You can buy the lumber, build the table, and apply the finish all in one day. You can do it all yourself, but an extra pair of hands comes in handy during assembly.

And it does comfortably seat eight people, even 10, if the family is in a good mood.

What you need to build it

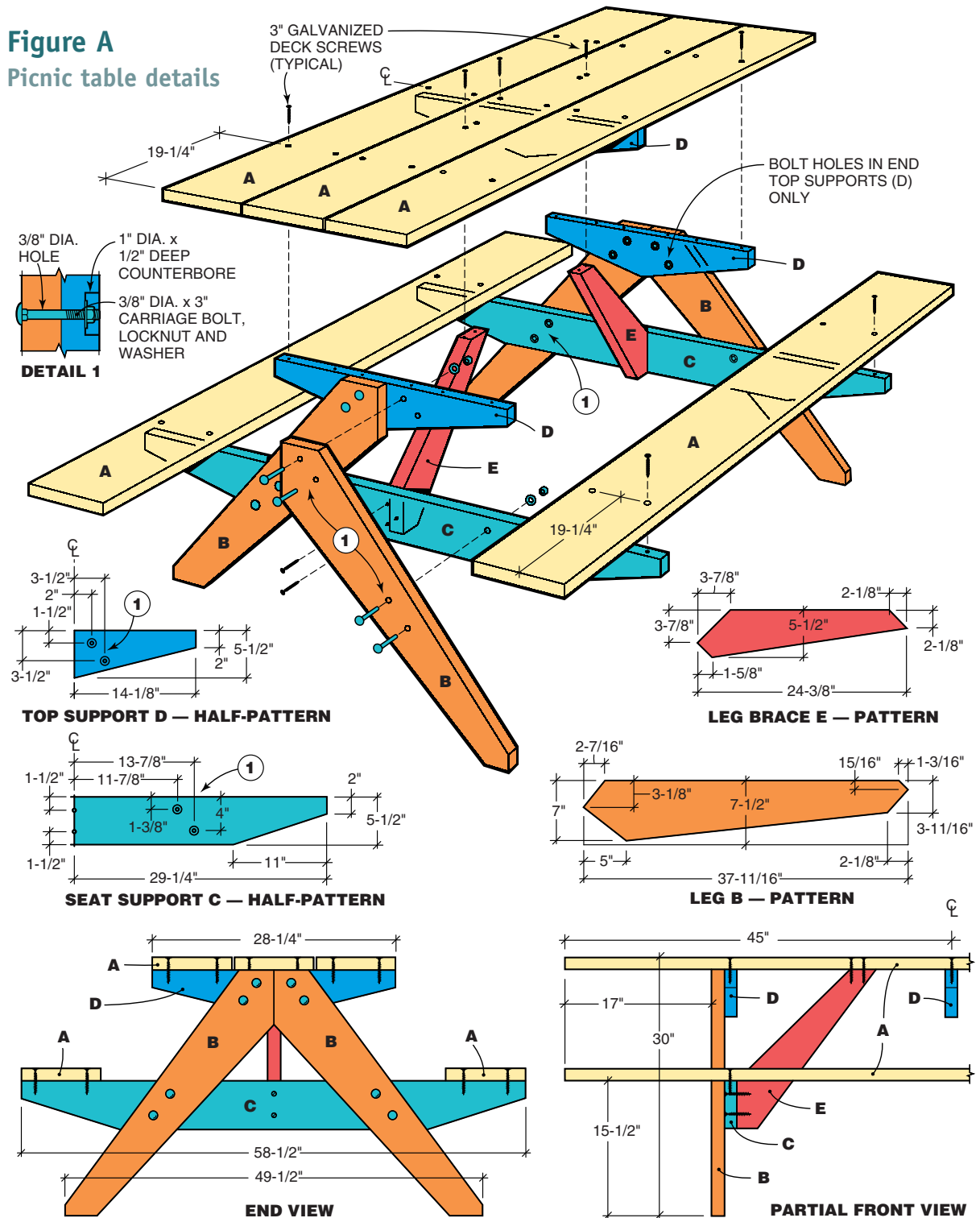
You'll need a circular saw, belt sander, electric drill, a 1-in. dia. spade bit, a few drill bits, a ratchet with a 9/16-in. socket to tighten the nuts, a hammer, tape measure, screwdriver, four bar clamps and a pair of sawhorses. If you have a Speed square, use it to guide the circular saw as you cut the ends of the top and seat boards.

The A-frame pieces (B, C and D) are joined with carriage bolts. A carriage bolt doesn't look like a regular bolt. It has a round head with a short, square nub directly under it. You drive it into its hole with a hammer, and the square part locks it into the wood to keep it from turning as you tighten the nut. We used carriage bolts to give the outside ends a more decorative look.

Shopping list

- 5 pc. 2x10 x 8' construction-grade Douglas fir
- 2 pc. 2x8 x 8' construction-grade Douglas fir
- 3 pc. 2x6 x 8' construction-grade Douglas fir
- 16 No. 16 x 3" carriage bolts, washers and nylon lock nuts
- 34 3" galvanized deck screws
- 1 qt. exterior penetrating clear wood finish and preservative

Figure A
Picnic table details

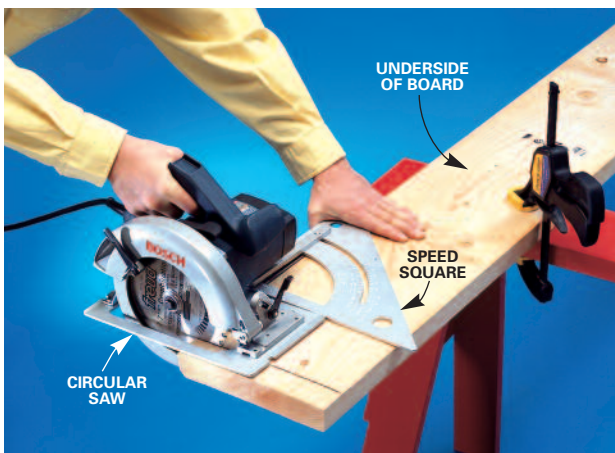


Cutting list

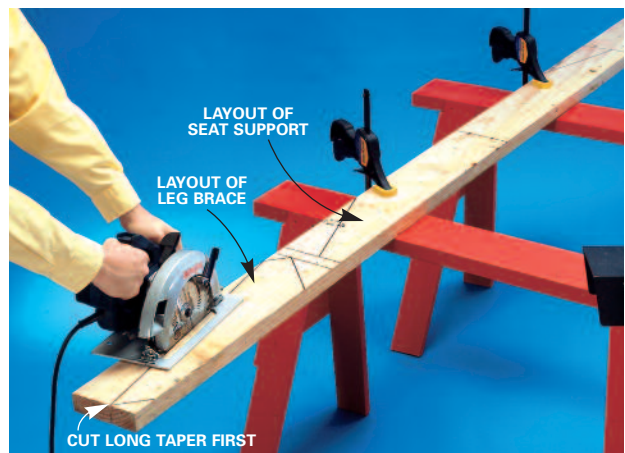
Key	Qty.	Size & description
A	5	1-1/2" x 9-1/2" x 90" fir (top and seats)
B	4	1-1/2" x 7-1/2" x 37-11/16" fir (legs)
C	2	1-1/2" x 5-1/2" x 58-1/2" fir (seat supports)

Key	Qty.	Size & description
D	3	1-1/2" x 5-1/2" x 28-1/4" fir (top supports)*
E	2	1-1/2" x 5-1/2" x 24-3/8" fir (leg braces)

*D length is equal to the total width of the three top pieces (A) plus 1/2 in.



1 Use a circular saw to cut the seat and top boards to length. Try to cut away the checks (cracks) on both ends of the boards. If you have a Speed square, use it to guide the saw as you cut the ends square.



2 Cut the long tapered sides of the leg braces (E) and legs (B) before you cut the pieces to length. This way you can easily clamp the boards to your sawhorses to hold them as you make the cuts.



3 Use a belt sander and an 80-grit belt to smooth the boards. To sand board edges, clamp them upright between your sawhorses and sand them with the belt sander or by hand.



4 Drill the pilot holes for the carriage bolts in the legs. Use the holes drilled in the seat and top supports as drilling guides.

Use galvanized deck screws to prevent rust instead of standard wood screws. The deck screws also have coarse threads for extra grip. To prevent splitting, be sure to drill pilot holes before driving the screws.

Step-by-step instructions

1. As shown in Photo 1, cut the top and seat pieces (A) to the length given in the Cutting List on p. 21.

2. Using the dimensions in Figure A, draw the shapes of pieces B through E on your boards. To get the most out of your lumber, place one leg brace (E) and one seat support (C) on one 2x6 board. Put the narrow end of the leg brace at the end of the board. Duplicate this layout on one more 2x6, then draw the three top supports (D) on the remaining 2x6. Also lay out the legs (B) on the 2x8 boards with the narrow

tip When cutting with a circular saw, cut with the underside of the board facing up. This will help eliminate nasty-looking edges.

ends of the legs at the ends. To make cutting the tapers a bit easier, cut the long sides of the leg braces (E) and legs (B) first, then cut the pieces to length (Photo 2).

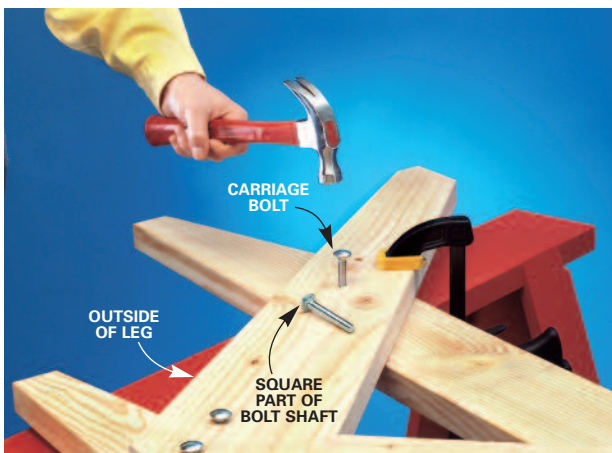
3. Drill the holes for the screws and carriage bolts in every part except the legs and leg braces. You'll drill these later during assembly.

4. Use a belt sander with an 80-grit belt to smooth all of the surfaces (Photo 3). Then finish any sharp edges by hand, sanding with 80-grit sandpaper.

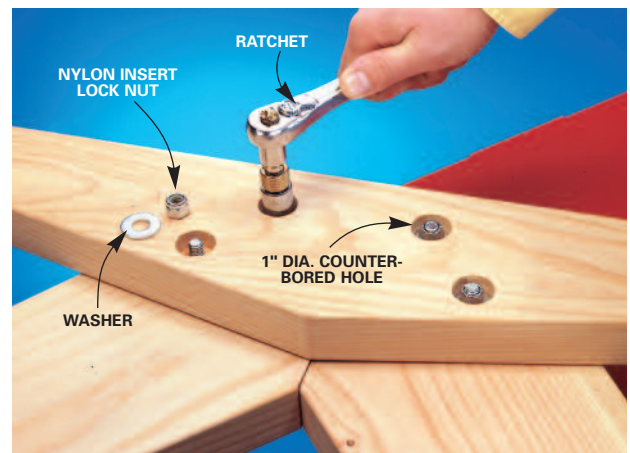
5. Now make the A-frame assembly from parts B, C and D. Align the top edge of the seat support (C) 15-1/2 in. up from the bottoms of the legs (B), and center it. Then align the top support (D) parallel to the seat support, and centered as well. Now, drill the carriage bolt holes through the legs using the counterbored holes in the seat support and top support as drilling guides (Photo 4).

6. Keeping each A-frame assembly clamped, flip the end over and hammer in the carriage bolts (Photo 5).

7. Flip the assembly again and put on the washers and nuts. Tighten them with a ratchet and 9/16-in. socket (Photo 6).



5 Hammer the carriage bolts into their holes. Insert them all the way to “seat” the square part of the bolt shafts securely in the wood.



6 Tighten the nuts with a ratchet and socket. Use nylon insert lock nuts to eliminate lock washers.



7 Screw the outside top boards to the top supports. Hold the assembled ends upright by placing bar clamps at the bottoms of the legs.



8 Align and mark the spot where the leg braces (E) land on the center top board. If you’re working alone, you can do it from underneath.

8. Align and screw the outside top pieces (A) to the top supports (Photo 7).

9. Align and screw the center top board (A) so the gaps between all the boards are equal. Square the top of the table by measuring the diagonal dimensions of the top until they’re equal.

10. A helper can make this step easier. Flip the table over and align the leg braces (E) with the top as shown in Figure A. Drill pilot holes, then screw the leg braces to the seat supports and center top board.

11. Align and screw the center top support (D) in place, then attach the seat boards (A).

12. Before applying the finish, unscrew the seat boards and the outside top boards. Removing just these pieces lets you get into tight corners without taking apart the whole table.

13. Apply the finish in a shaded area using the directions given on the can of clear wood preservative finish. Use a 3-in. disposable foam roller to apply the finish on the large surfaces, and a brush for the tight areas.

14. Let the finish dry for two days, then reattach the seat boards and top boards, and you’re ready to picnic!

Using construction-grade lumber

Construction-grade lumber is milled for use in home construction. It has lots of knots, cracks and other defects. You can use it to build this table and other outdoor furniture, if you’re cautious.

Look for straight, flat boards with no loose knots. Inspect the edges and ends for defects and cracks. Look for bad edges that may turn into nasty splinters later. If you’re stuck with bad edges, hide them underneath and on the insides of the seat and top boards.

Finding boards with no end checks is nearly impossible. The table is 90 in. long so you could cut off a total of 6 in. from the checked ends. Don’t worry about minor surface roughness; you can sand the wood smooth with a belt sander.

If you plan to buy your wood a few days before you start, store it in a shaded area. When you build the table, pick a shaded area so the sun doesn’t dry the wood too fast and cause more cracking.

Space-saving tool holder

Organize your gardening tools in an afternoon



If you are constantly contending with backyard-tool clutter, this handy holder is just the ticket. It's a great way to organize your rakes, shovels and other long-handled tools.

The versatile design fits a variety of long-handled garden and yard tools, including those with "D-shaped" handles. Before getting started, measure your tool handles—especially the ones with D-shaped handles—to make sure they'll fit the dimensions shown in the plan at far right. If not, you can easily adjust the grid measurements to fit your own tools.

Step-by-step instructions

1. Rip the sides and ends for the top and bottom frames from the 1-in. x 8-in. pine board according to the board layout at bottom right.
2. Assemble the top and bottom sections by fastening the sides to the ends with 2-in. finishing nails. Be sure to square the corners as you nail. (When nailing close to the end of a board as you are here, it's best to predrill the nail holes using the same size finishing nail as a drill bit.)
3. Cut four 26-in. lengths from the 2x2s. Set these pieces (labeled G in Figure A) aside.
4. Rip a second 1-in. x 8-in. board into 1-in. strips following the board layout in Figure B. These pieces will form the grid that holds your long-handled tools.

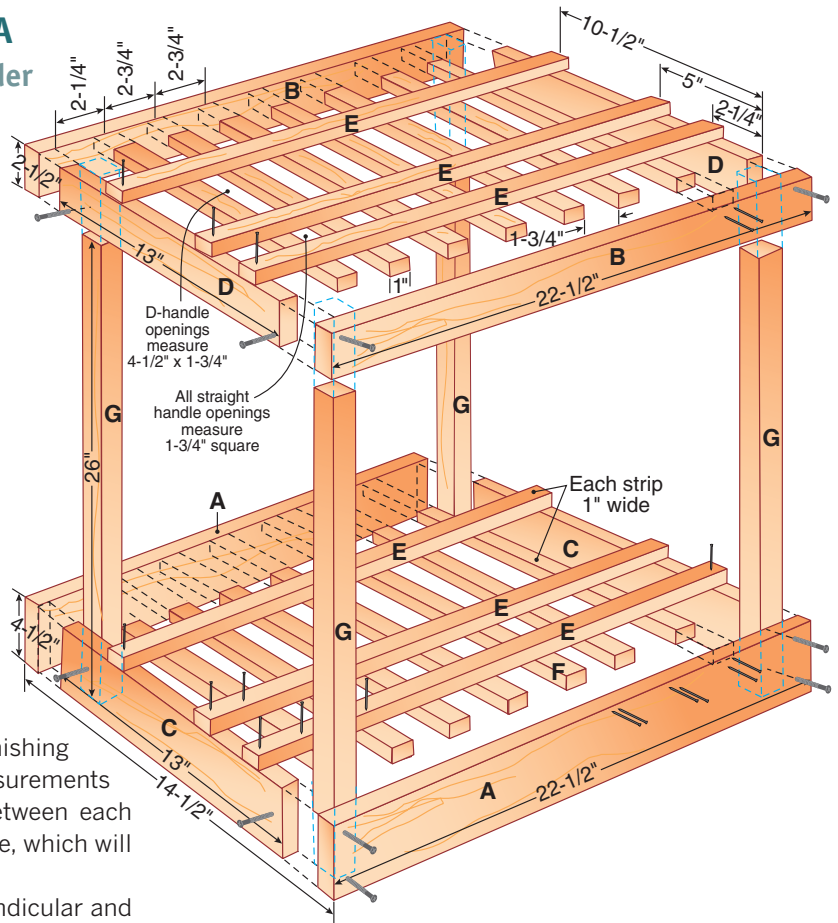
Shopping list

- 12' of 1" x 8" No. 2 pine board
- Two 8' 2x2s
- 2", 1-1/2" and 1-1/4" finishing nails
- 1-5/8" deck screws

Recommended tools

- Table saw
- Combination square

Figure A
Tool holder



The larger openings will provide a 4-1/2-in. space for holding D-handled tools. Measure your tool handles to be sure this space will accommodate them. Adjust the size of the grid as needed.

5. It's time to sharpen your measuring skills. Starting from either end of the 22-1/2-in. side of one of the frames, measure 2-1/4 in. from the inside edge of the frame (mark this measurement on the top edge of the frame on both sides).

6. Place one of the 13-in. strips inside the frame so it's centered on the two marks you made and flush with the top of the frame with the 1-in. side facing up. Using the first marks as a starting point, position the remaining six strips 2-3/4 in. apart on center (see Figure A).

7. Nail the strips in place with 1-1/2-in. finishing nails. Before you do, make sure your measurements are accurate. There should be 1-3/4 in. between each strip. Repeat this process for the other frame, which will be identical in spacing.

8. Nail the 1-in. x 22-1/2-in. strips perpendicular and on top of the 13-in. strips you just attached.

To position them, start from either end of the 14-1/2 in. side of one of the frames and measure 2-1/4, 5 and 10-1/2 in. from the inside edge (again, mark these measurements on the opposite end of the frame, too). Center three of the 22-1/2-in.-long strips on those marks and check your measurements (all the spaces will be 1-3/4-in. square, except for the D-handled ones, which will measure 4-1/2 in. x 1-3/4 in.) and nail them into place with 1-1/2-in. finishing nails.

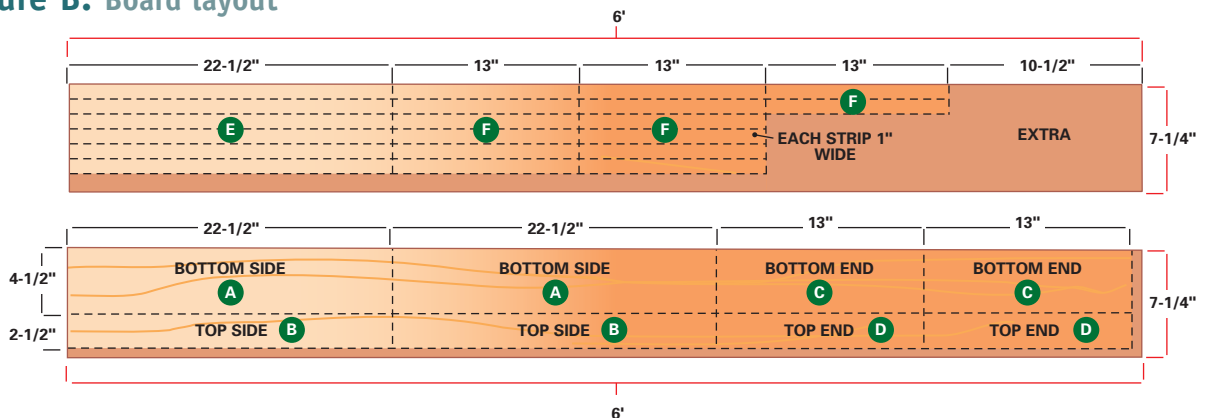
9. Every intersection of the grid should be secured with 1-1/4-in. finishing nails. To provide support as you nail, simply cut the end of a scrap piece of 2x4 so it fits snugly

under the strips. Repeat this process for the other frame.

10. Use the four 26-in. 2x2 uprights which you cut in step 3 to attach the top and bottom frames to one another. Fasten these pieces with 1-5/8-in. deck screws to the corners of the bottom frame (drive screws through both the sides and the ends for added strength). Attach the top in the same manner, but first double check that the spaces in the top grid align with the spaces in the bottom grid.

Your project's complete! Now the only thing left to do is pick up those tools off the garage or shed floor and fill your handy new organizer.

Figure B: Board layout



3-hour cedar bench

Build it for 100 bucks in one afternoon!

The beauty of this cedar bench isn't just that it's easy to assemble and inexpensive—it's that it's so doggone comfortable. You can comfortably sit on your custom-fit bench for hours, even without cushions. In this story, you'll learn how to build the bench and how to adjust it for maximum comfort.

Sloping the back and the seat is the secret to pain-free perching on unpadded flat boards. But not all bodies are the same, and it's a rare piece of furniture that everyone agrees is seatworthy. This bench has a bolted pivot point where the back and the seat meet that lets you alter the backrest and seat slopes to fit your build



during one of the final assembly steps (Photo 10). The materials will cost about \$100, and cutting and assembly will only take about three hours. Follow the step-by-step photo series for details on the simple construction.

Build it from eight 8-ft.-long boards and a handful of fasteners

A circular saw and a screw gun are the only power tools you really need for construction, although a power miter saw will speed things up and give you cleaner cuts. Begin by cutting the boards to length. Figure A shows you how to cut up the eight boards efficiently, leaving little waste. When you're picking out the wood at the lumberyard, choose boards that above all are flat, not twisted. That's especially important for the seat and back parts. Don't worry so much about the leg assembly 2x4s because you cut them into such short pieces that warps and twists aren't much of a concern.

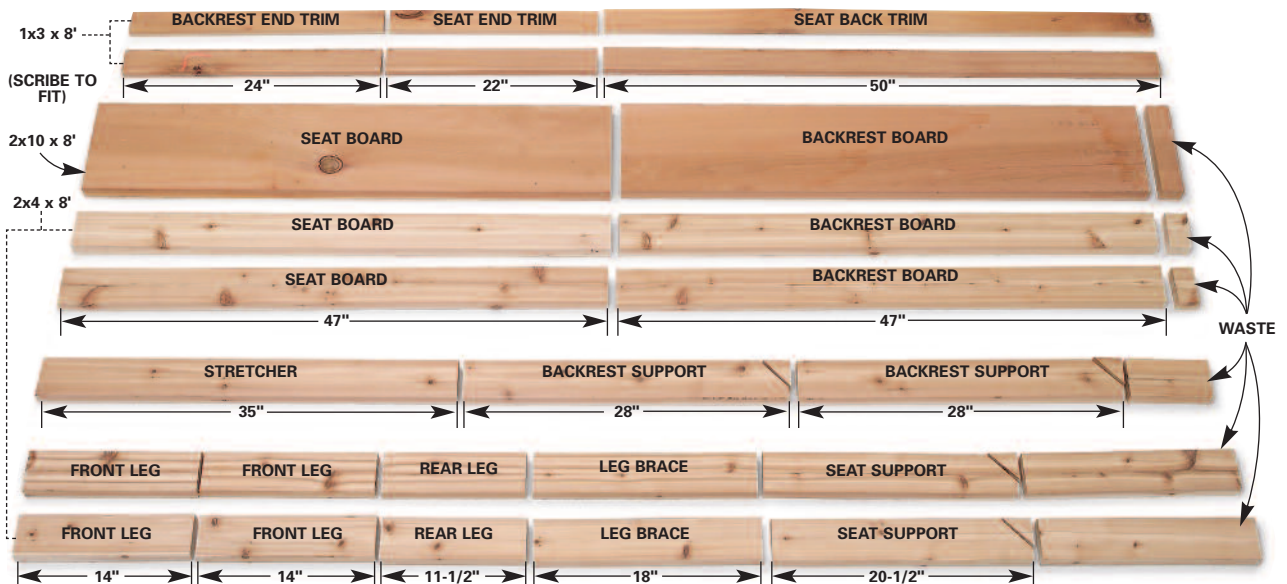
Shopping list

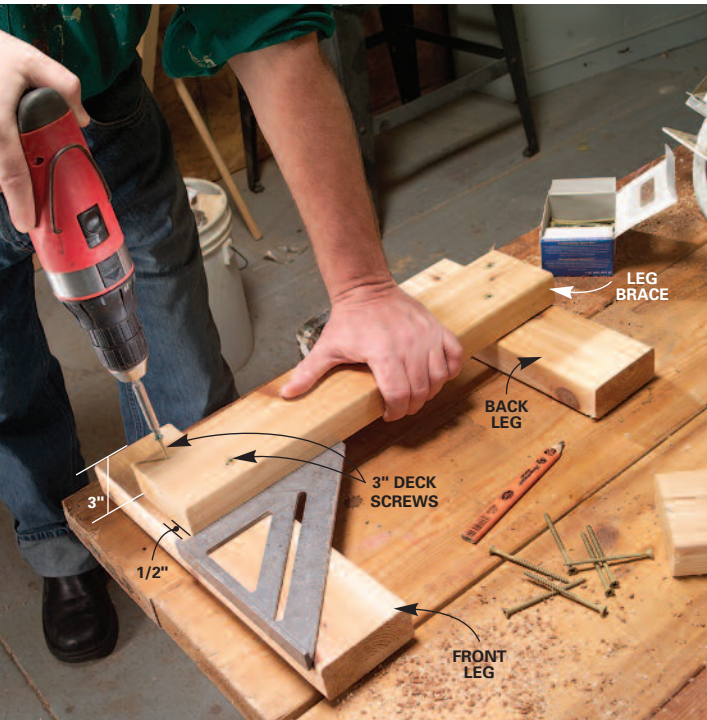
- 2 1x3 x 8' cedar
- 1 2x10 x 8' cedar
- 5 2x4 x 8' cedar
- 1 lb. 3" deck screws
- 1/4 lb. 6d galv. casing nails
- 2 3/8" x 5" bolts with nuts and washers



1 Cut out the bench parts following the measurements in Figure A. Use a square to guide the circular saw for accurate, square cuts. Cut 45-degree angles on the ends of the seat and back supports 1 in. down from the ends as shown (also see Photos 4 and 5).

Figure A
Bench parts





2 Fasten the leg brace to the legs 3 in. above the bottom ends. Angle the 3-in. screws slightly to prevent the screw tips from protruding through the other side. Hold the brace 1/2 in. back from the front edge of the front leg. Use a square to make sure the brace and legs are at exact right angles.



3 Align the second part of the front leg with the first one using a square and screw it to the leg brace as shown.



4 Slip the seat support between the two front legs, positioning it as shown. Drive a single 3-in. screw through the front leg into the seat support.



5 Position the backrest support on the leg assembly as shown, making sure it's at a right angle with the seat support, and mark the position on the seat support. Then drive a 3-in. screw through the middle of the backrest support into the leg brace.



6 Clamp the backrest support, seat support and rear leg as shown using the line as a guide. Drill a 3/8-in. hole through the center of the assembly. Drive a 3/8-in. x 5-in. bolt fitted with a washer through the hole and slightly tighten the nut against a washer on the other side.

After cutting the pieces to length, screw together the leg assemblies (Photos 2 – 6). It's important to use a square to keep the leg braces square to the legs (Photo 2). That way both leg assemblies will be identical and the bench won't wobble if it's put on a hard, flat surface. The leg brace is spaced 1/2 in. back from the front of the legs to create a more attractive shadow line. Then it's just a matter of connecting the leg assemblies with the stretcher (Photo 7), screwing down the seat and backrest boards, and adjusting the slopes to fit your body.

tip If you want to save a few bucks—or if cedar is difficult to find in your area—you can build this bench from pressure-treated lumber. Just make sure the boards are relatively dry and don't contain too many large knots.

The easiest way to adjust the slope is to hold the four locking points in place with clamps and then back out the temporary screws (Photo 10). To customize the slopes, you just loosen the clamps, make the adjustments, retighten and test the fit. When you're satisfied, run a couple of permanent screws into each joint. If you don't have clamps, don't worry—you'll just have to back out the screws, adjust the slopes, reset the screws and test the bench. Clamps just speed up the process.



7 Assemble the other leg assembly to mirror the first as shown. (The back support and rear leg switch sides.) Prop the stretcher 3 in. above the workbench, center it between the front and rear bench legs and screw the leg braces into the ends with two 3-in. deck screws.



8 Center the first 2x4 seat board over the leg assemblies and flush with the front ends of the seat supports. Screw it to the seat supports with two 3-in. deck screws spaced about 1 in. away from the edges. Line up the 2x10 with the first 2x4, space it about 5/16 in. away (the thickness of a carpenter's pencil) and screw it to the seat supports with two 3-in. deck screws. Repeat with the rear 2x4.



9 Rest the bottom backrest 2x4 on carpenter's pencils, holding the end flush with the seat boards and screw it to the seat back braces. Then space and screw on the center 2x10 and the top 2x4 backrest boards.



10 Sit on the bench and decide if you'd like to tilt the seat or the backrest or both to make the bench more comfortable. To make seat or back adjustments, loosen the bolts and clamp the bottoms of the seat back supports and the fronts of the seat supports. Then back out the four screws at those points. Loosen the clamps, make adjustments, then retighten and retest for comfort. When you're satisfied with the fit, drive in the four original screws plus another at each point. Retighten the pivot bolts.



11 Tack the seat trim boards to the seat with the ends flush with the front and top. Scribe and cut the trim boards to fit. Nail the boards to the seat and backrest boards with 6d galvanized casing nails, keeping the nails 1 in. back from the seat edges.

You can use the same design and techniques for building a 4-, 6- or 8-foot-long bench

Round over the edges

We show an option of rounding over the sharp edge of the 1x3 trim, which is best done with a router and a 1/2-in. round-over bit (Photo 12). Rounding over the edges can protect shins and the backs of thighs and leave teetering toddlers with goose eggs on their melons instead of gashes. So the step is highly recommended. If you don't have a router, round over the edge either by hand-sanding or with an orbital or belt sander. In any event, keep the casing nails 1 in. away from the edge to prevent hitting the nailheads with the router bit or sandpaper (Photo 12).

Building a longer bench

We demonstrate how to build a 4-ft.-long bench, plenty of space for two. But you can use the same design and



12 Ease the edges of the trim boards with a router and a 1/2-in. round-over bit. Hold the router sideways to get at the seat/back corner.

techniques for building 6- or 8-ft. long benches too. You'll just have to buy longer boards for the seat, back, stretcher and the trim boards. While you're at it, you can use the same design for matching end or coffee tables. Just match the double front leg design for the rear legs, and build flat-topped leg assemblies with an overall depth of 16-3/4 in.

Seal the legs to make it last

If you want to stain your bench, use a latex exterior stain on the parts after cutting them to length. After assembly, you won't be able to get good penetration at the cracks and crevices. Avoid clear exterior sealers, which will irritate bare skin. But the bench will last outside for more than 20 years without any stain or special care even if you decide to let it weather to a natural gray. However, the legs won't last that long because the end grain at the bottom will wick up moisture from the ground, making the legs rot long before the bench does. To make sure the legs last as long as the bench, seal the ends with epoxy, urethane or exterior woodworker's glue when you're through with the assembly.

Building a better bench

About 15 years ago, I decided to throw together some simple outdoor benches so my growing family could relax outside and enjoy the yard. But they had to be better looking and more comfortable than the flat benches they were replacing. I wanted them to feel more like a chair, be light enough to move around easily and stand up to the elements. After much experimentation, I came up with a version of this design and used it to make three benches. At times they'll be arranged around the fire ring, or for larger social gatherings, placed on the patio or deck. Most often, however, all three encircle the herb garden, our favorite outdoor hangout.

After all those years without any shelter or finish, the benches are showing their age. The crisp, new look has long passed, now replaced with puppy teeth marks, a few cracks, a deep gray hue and even some rot at the bottom of the feet. But they're still as sturdy and comfortable as the day they were made. This new version has a few improved features. I wanted to make it easier to build (no fancy angles and fewer parts), even more comfortable (adjustable to fit), and even more durable (the feet bottoms are sealed).

— Travis, editor and bench designer



Stone-top table

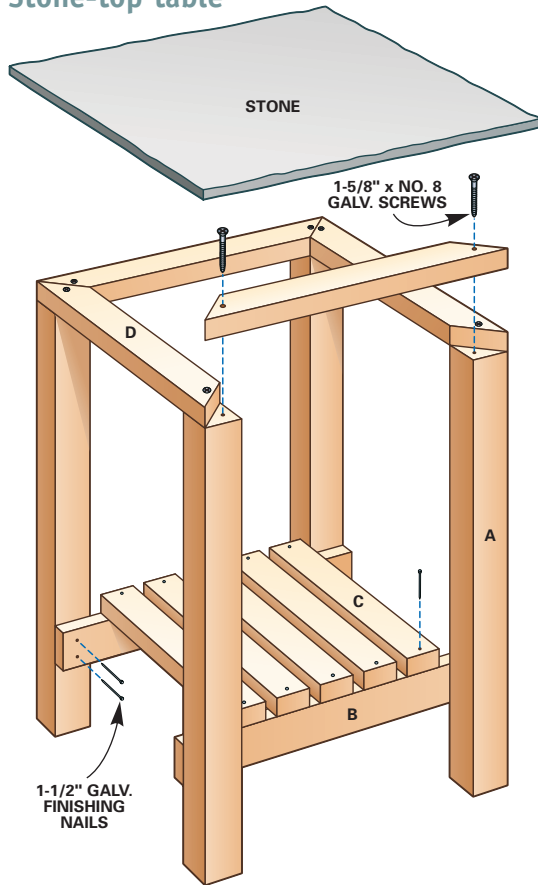


**An attractive roost for books,
beverages and bric-a-brac**

The inspiration for this small end table came while browsing through a local tile store, looking at the huge variety of slate, granite, limestone and marble that's now available. The table top shown here is 16-in.-square copper slate—a perfect match for the oak base—but many other stone tiles in the same \$5 to \$10 per square foot range are available.

To make this table, you'll need a power miter saw, drill and hand tools. The stone top doesn't need cutting—just soften the sharp edges with 120-grit sandpaper. The base is made from standard dimension oak (\$25), available at home centers. And once you put together the simple cutting and assembly jigs shown in the photos on the next pages, the table base almost builds itself.

Figure A
Stone-top table



Shopping list

Wood

- 2 2x2 - 3' oak
- 14' 1x2 oak

Stone Tile

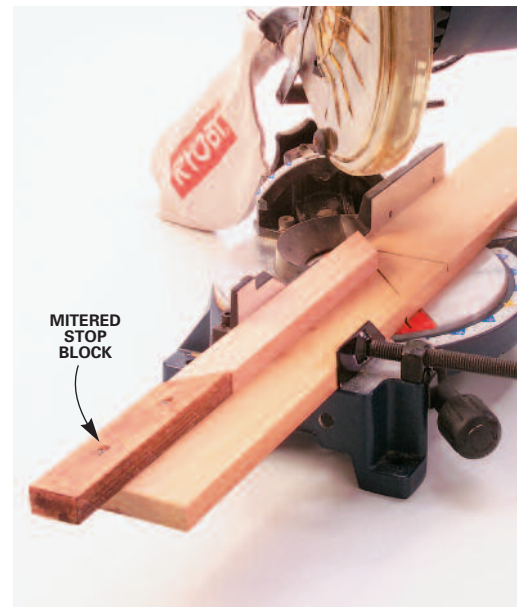
- 1 16" x 16" x 1/2"

Hardware

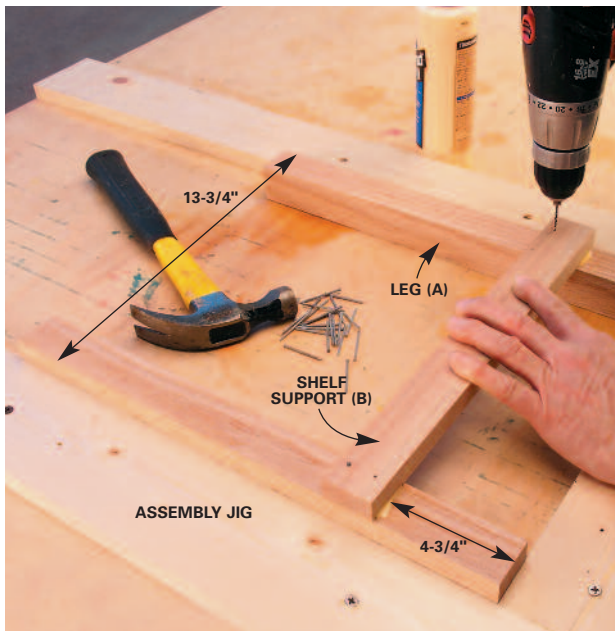
- 1 lb. 1-1/2" galvanized finishing nails
- 8 1-5/8" x No. 8 galvanized screws
- 4 Nylon chair glides
- Exterior wood glue
- Exterior construction adhesive

Cutting list

Key	Name	Qty.	Dimensions
A	Leg	4	2x2 x 16-3/4"
B	Shelf supports	2	1x2 x 13-3/4"
C	Shelf slats	5	1x2 x 10-3/4"
D	Mitered top support	4	1x2 x 13-3/4"



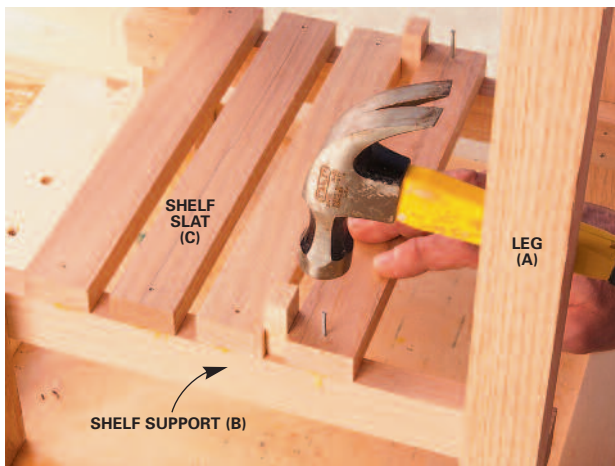
1 Make a jig with square and mitered stop blocks screwed to a straight 1x4. Slide the 1x4 to the right length for each piece and clamp it down. When you cut the miters, set the saw for 45-1/2 degrees. That way, the outside corners of the top—the only part that shows—will be tight even if the top isn't perfectly square. Sand all the oak pieces before beginning assembly.



2 Set up a square assembly jig with 1x4s attached to your workbench. Use two shelf supports as spacers to ensure that the jig is the correct width. Set two table legs (A) in the jig and attach a shelf support (B) with glue and nails. Pre-drill with a 5/64-in. drill bit, or use one of the nails with the head clipped off as the drill bit.



3 Screw down the mitered top supports (D) with the table still in the jig, using glue and 1-5/8-in. galvanized screws. Pre-drill and countersink with a combination bit at a slight angle, toward the center of the leg.



4 Pre-drill and nail the shelf slats with the legs tight and square against the sides of the assembly jig. Attach the center slat first, centering it on the shelf support. Wipe off excess glue and set the remaining slats, using two 1/2-in. spacers. Set the nails, fill the holes, then sand.



5 Glue the stone top to the base. First, center the table and trace the top onto the tile. Lay a bead of construction adhesive within the outline, keeping the glue away from the outer edge to avoid oozing. Press the table into the glue. Place a weight on the table for 24 hours until the glue sets. Leave excess glue until it's dry, and then peel it away. Finish the wood with exterior oil or varnish and add a nylon chair glide on the bottom of each leg.

