

Tall Outdoor Chair Set

March/April 2018



Traditional, low-slung Adirondack chairs are an enduring favorite among woodworkers, because their casual styling makes them easy to build. But, once you're seated in them, getting up and out again can feel like you're stuck in quicksand. That's why these taller, bar-stool height varieties are gaining such popularity — they have the laid-back, slatted styling of their ground-hugging distant cousins, but with much better ergonomics. We've designed ours as a set, with an upper and lower table that bolt between them for even more versatility. But, feel free to make just one chair or two — with or without the tables — by adjusting the material list parts quantities as you wish.

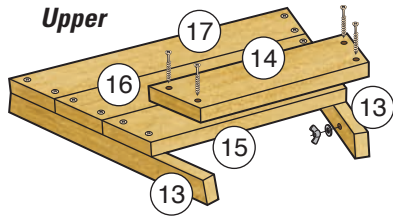
Woodworker's Journal April 2018

Making the Seat

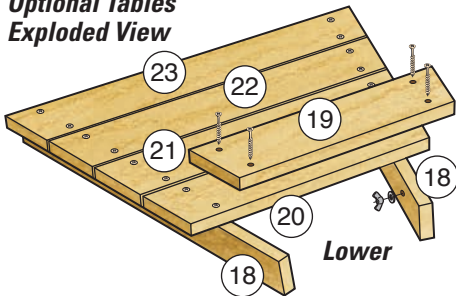
Start the construction process by using the gridded drawing on page 2 to lay out a full-size template of the seat rail on a piece of scrap sheet stock. Having a template you can re-use will be helpful, as you'll have four seat rails to make for these two chairs — and their assembly will go together more smoothly all around if these parts match one another exactly. I made a pattern of 1" squares on a piece of 1/4" Baltic birch plywood, then marked a series of dots on it to plot the shape of the seat rail profile. Connecting these dots with a large French curve kept the layout line smooth and flowing. (Note: The back angle of the seat rail tips inward 11 degrees from

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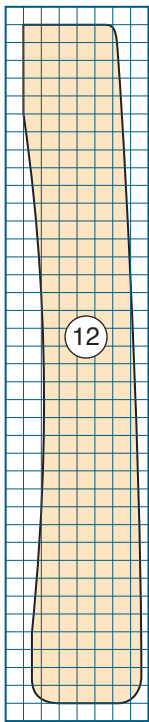
Upper



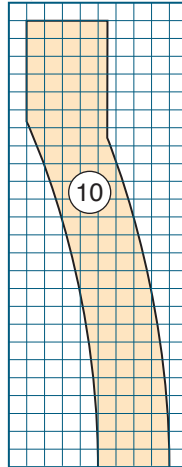
**Optional Tables
Exploded View**



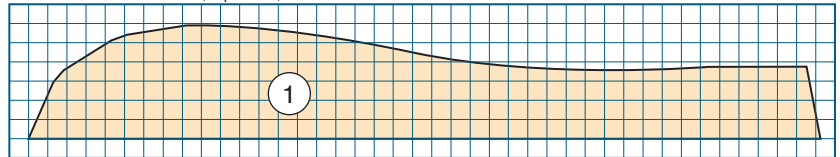
**Armrest Pattern
(Top View)**



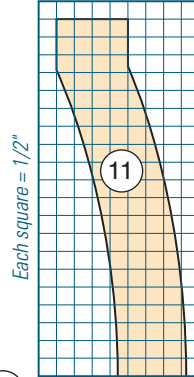
**Upper Back
Support Pattern
(Top View)**



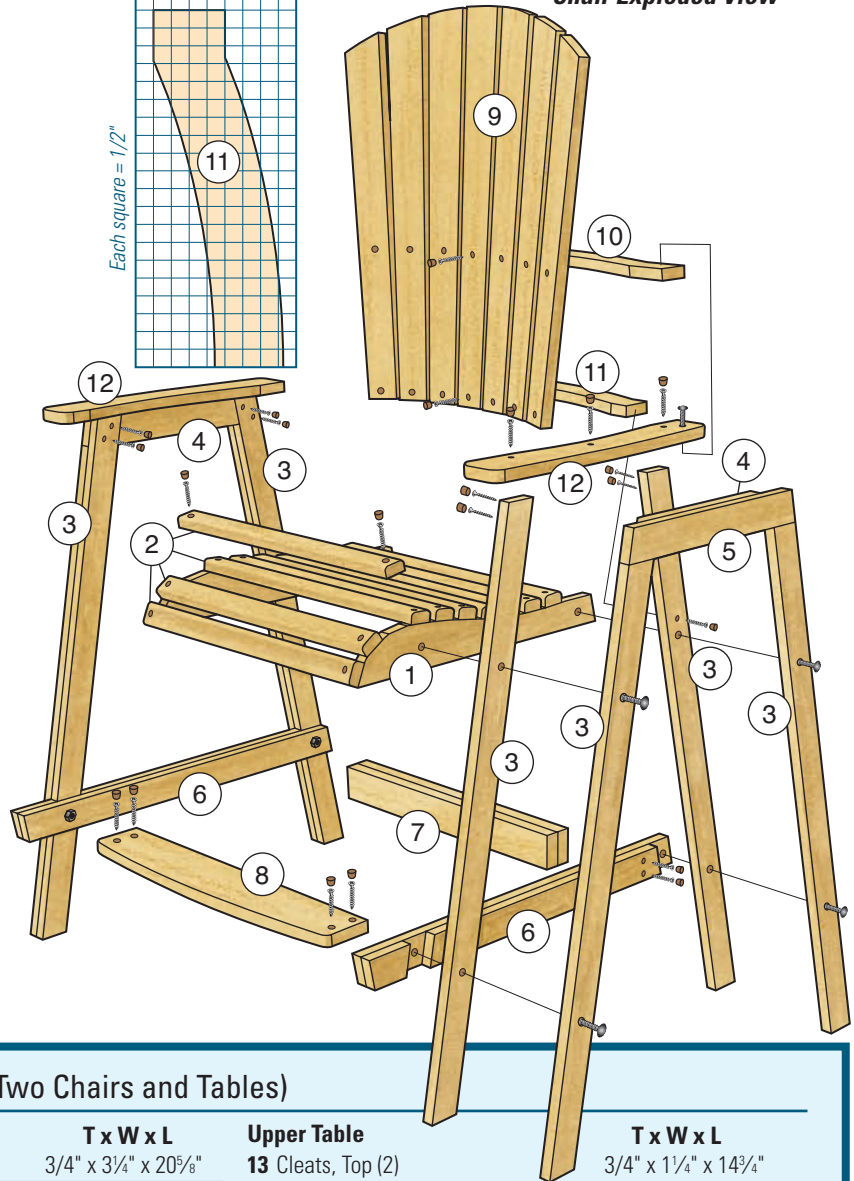
Seat Rail Pattern (Top View)



**Lower Back
Support Pattern
(Top View)**



Chair Exploded View



MATERIAL LIST (For Two Chairs and Tables)

Chairs	T x W x L	Upper Table	T x W x L
1 Seat Rails (4)	3/4" x 3/4" x 20 ⁵ / ₈ "	13 Cleats, Top (2)	3/4" x 1 ¹ / ₄ " x 14 ³ / ₄ "
2 Seat Slats (20)	3/4" x 1 ¹ / ₂ " x 20"	14 Top Slat 1 (1)	3/4" x 3/4" x 11 ¹ / ₈ "
3 Leg Laminations (16)	3/4" x 2" x 37"	15 Top Slat 2 (1)	3/4" x 3/4" x 13"
4 Top Inner Cross Braces (4)	3/4" x 2" x 10 ⁵ / ₈ "	16 Top Slat 3 (1)	3/4" x 3/4" x 14 ³ / ₄ "
5 Top Outer Cross Braces (4)	3/4" x 2" x 14 ³ / ₄ "	17 Top Slat 4 (1)	3/4" x 3/4" x 16 ⁵ / ₈ "
6 Bottom Cross Brace Laminations (8)	3/4" x 2" x 27 ³ / ₄ "	Lower Table	
7 Bottom Stretcher Laminations (4)	3/4" x 2" x 18 ¹ / ₂ "	18 Cleats, Bottom (2)	3/4" x 2" x 20 ³ / ₄ "
8 Footrests (2)	3/4" x 4" x 23"	19 Bottom Slat 1 (1)	3/4" x 3 ¹ / ₂ " x 14 ³ / ₄ "
9 Back Slats (14)	3/4" x 2 ³ / ₄ " x 26"	20 Bottom Slat 2 (1)	3/4" x 3 ¹ / ₂ " x 16 ³ / ₄ "
10 Upper Back Supports (2)	3/4" x 4" x 25"	21 Bottom Slat 3 (1)	3/4" x 3 ¹ / ₂ " x 18 ³ / ₄ "
11 Lower Back Supports (2)	3/4" x 3 ³ / ₄ " x 20"	22 Bottom Slat 4 (1)	3/4" x 3 ¹ / ₂ " x 20 ³ / ₄ "
12 Armrests (4)	3/4" x 3 ¹ / ₂ " x 19"	23 Bottom Slat 5 (1)	3/4" x 3 ¹ / ₂ " x 22 ³ / ₄ "

vertical.) [Photo 1]

Cut out your seat rail template and sand the edges smooth. Now trace its shape onto four seat rail blanks (two per chair). Cut the seat rails out with a band saw or jigsaw, staying about 1/16" outside your layout line. Secure the seat rail template to a workpiece with strips of double-sided tape, and shave the rough edges flush to the template using a bearing-guided flush-trim bit at the router table. Repeat this template-routing procedure on the other three seat rails. Carefully sand away any burn marks left by the router bit. [Photo 2, Photo 2 Inset]

Switch to a random-orbit sander, and sand the seat rails up to 180-grit, then ease their bottom flat edges with a 1/8" roundover bit in a handheld router or at the router table.

Now head to the table saw to rip and crosscut 20 seat slats to size, and knock off their top edges and ends with a 1/8" roundover bit to add seating comfort and to prevent splinters. Once those edges are gone, drill a single counterbored screw hole, 3/8" back from the end of each slat and centered on its width. Counterbore these holes for #8 screws; they will be filled with wood plugs, later, to hide the screw heads.

Starting along the front, curved edge of two seat rails, fasten nine of the 10 seat slats in place with 1 5/8" weather-resistant deck or stainless-steel screws to create the chair's seat assembly. I spaced these slats 1/2" apart using dowels, to ensure even spacing between them. If you have a 23-gauge pin nailer, you might also consider driving a single pin nail at each joint to "tack" the slats in place all at once, before driving the screws. We'll leave the rearmost seat slat off for now, until the seat back assembly is installed. [Photo 3]



Photo 1



Photo 2



Photo 2 Inset



Photo 3

Building the Leg Sets

The four 1½"-thick legs of each chair are made up of two ¾" laminations for added stiffness and to take advantage of common lumber thickness. I started by face-gluing and clamping two 4½"-wide, 37"-long blanks together to form a "sandwich" for making two legs. You'll need four of these sandwiches to yield the eight legs of these two chairs. When the glue dries, joint the long edges of the glue-ups flat and square.

Rip each sandwich into two, 2"-wide leg blanks. Now swivel your table saw's miter gauge to 79 degrees — or your miter saw to 11 degrees, and cut the eight legs to length. Their long edges measure 36⅞"; make sure the angles on their ends face the same direction. [Photo 4]



Photo 4

Set the legs aside for the moment so you can rip and crosscut four inner and four outer top cross braces to width and length. Miter-cut the ends of each piece so the angles point in opposite directions. Set these angles to 79 degrees or 11 degrees, depending on whether you use a miter gauge or miter saw to cut them.

Next, make up four top cross brace assemblies, gluing a long outer brace to a short inner brace. Arrange each glue-up so the direction of their angles matches and so the shorter cross brace is centered on the length of the longer cross brace. Doing this will create two angled and equally sized rabbets on the ends of these assemblies that fit into the leg rabbets, forming angled half-lap joints.

When you study the drawings on page 2, you'll see that the top ends of the legs require a wide rabbet that will house a top outer cross brace. I cut these 3/4"-deep, 2"-wide rabbets at the table saw using my miter gauge swiveled to 11 degrees and with a long fence attached to it for added support. It's easy to do, but be careful: the rabbets on the front legs are mirror images of one another and of the back legs — they are not exact duplicates. In order to avoid cutting mistakes, set pairs of front and back legs together for the sides of each chair, and mark their outer faces so you can keep their position and orientation clear. Then lay out the rabbet cuts on these outer faces for each leg, using a cross brace assembly as a tracing guide. When you mill the rabbets, you'll need to swivel the miter gauge 11 degrees in one direction for cutting two of the leg rabbets, then swivel it the opposite direction to cut the rabbets on the remaining two legs. [Photos 5, Photo 6 and 6 Inset]

I sanded the sharp, bottom corners of the legs into 3/8"-radius curves to make them less likely to splinter when dragged over concrete or other rough surfaces.

Glue and clamp a top cross brace between each pair of legs so the legs splay apart from top to bottom. Reinforce these half-lap joints with a few 1 1/4" screws driven through them into counterbored holes. Orient the screws on the inside faces of the leg assemblies to help hide them. [Photo 7]

Sand the leg sets to flatten the joints, plug the screw holes and trim those flush when the glue dries.



Photo 5



Photo 6



Photo 6 Inset

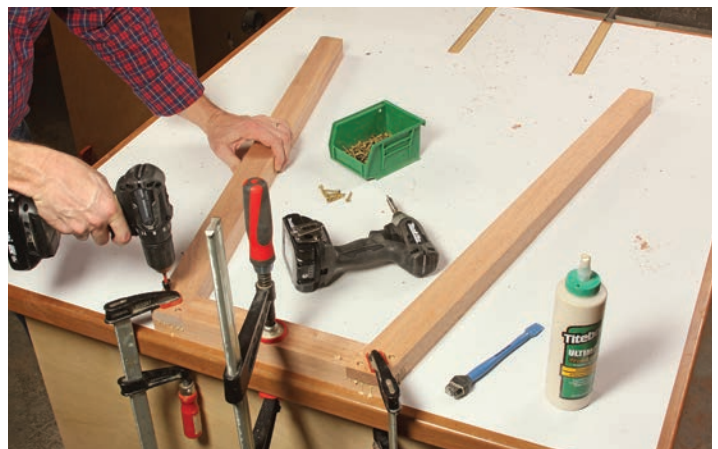


Photo 7

Assembling the Chair Bases

Similar to what you did for preparing the legs, glue up 1½"-thick laminations for making a pair of bottom cross braces per chair. When these blanks come out of the clamps, rip the cross braces to 2" wide, and crosscut them to 27¾" long. Trim their ends to 79 or 11 degrees as you've done previously, with their miter angles facing the same direction.

Glue up a lamination for making a bottom stretcher for each chair, too. Rip these stretchers to 2" wide, and crosscut them to 18½" long.

Flip back to the technical drawings again, and you'll see that these bottom cross braces also require a pair of ¾"-deep half-lap joints — one at the back end and another ¾" in from the front end — to engage with the legs. Cut these at your table saw with a wide dado blade, and be careful: while the half-lap area on the back end faces the same direction as the mitered end of these components, the front half-lap is oriented in the opposite direction to engage with the front leg. Be sure to lay out the cuts carefully, paying close attention to your cutting angle when milling these joints. You'll also need to swing your miter gauge 79 degrees to the left and right in order to make all of these cuts. Take your time to avoid making mistakes! [Photo 8]

Next, make a pair of footrests, starting with a 4" x 23" blank. Use a thin metal straightedge or a narrow strip of ¼" hardboard flexed inside of a long clamp to trace a gradual curve on the front edge of one of the footrests. Make the curve meet the center of the footrest at 4" and diminish to ¾" at the ends. Cut this curve with a band saw or jigsaw, and fair it with a disc, drum or belt sander. [Photo 9]

Sand the bottom cross braces, stretcher and footrest smooth. Ease all edges of the footrest, and the long edges of the cross braces and stretcher, with a 1/8" roundover bit.

To assemble this framework, fasten the stretcher to the inside faces (the faces without half-laps) of the bottom cross braces with counterbored, 3" weather-resistant screws. Position it 2" in from the top back ends of the braces. Now install the footrest on the top front ends of the cross braces. Position its back edge 1/2" forward of the front half-lap joints. Drive four counterbored, 2" screws through the footrest and into the cross braces to secure the parts.



Photo 8



Photo 9

It's time to put some big components together! Mark the inside faces of the leg sets at 8" and 25" up from their bottom ends (measuring along the inner edges): the lower marks locate the bottom edges of the footrest framework, and the upper marks establish where the bottom edges of the seat frames should align. Take a few minutes to ease the inside and outside edges of the legs with a 1/8" roundover bit in a trim router.

Clamp the seat and footrest frames into place between the leg sets. Attach the legs to the frames with stainless steel or galvanized 5/16" carriage bolts, washers and lock nuts. Drive a 3"-long bolt through the front leg and another through the back leg where they meet the seat assembly. Attach the legs to the footrest framework with a 3" bolt at each connection point. [Photo 10]

Building the Back

The chair back consists of seven tapered back slats that connect to a pair of curved upper and lower back supports. You'll need a long trammel (basically an oversized compass with a metal point on one end and a pencil on the other end) to draw the back support curves.

Start by cutting 14 back slat blanks from strips of 2 3/4" wide stock that's 26" long. The slats taper to 2 1/8" on their bottom ends. You can cut these long, gradual angled edges with a tapering jig on the table saw or band saw [Photo 11], or make a scrap template and template-rout the slats to final shape that way instead.

Next, shape the tops of the back slats into a gentle, 21"-radius curve. To do that, clamp them together with their ends aligned, and draw a full-length reference line down the center of the middle slat. Align the pencil point with the top edge of the middle back slat and the metal point on the slat center line when you draw the curve. You'll notice that the bottom ends of the slats form a gradual curve when held together this way. To make them easier to install later, draw a straight line across all the slat bottoms that's aligned with the bottom end of the middle slat. Cut out the curve and bottom flat ends with a jigsaw or at the band saw, and sand their faces and edges smooth.



Photo 10



Photo 11

Ease all the sharp edges and ends of the slats with a 1/8"-radius roundover bit in a handheld router, and sand the roundovers to blend them as needed. Set the slats aside for now.

Now, rip and crosscut a pair of 4" x 25" blanks for the upper back supports and two 3 3/4" x 20" blanks for the lower back supports. Then look closely at the drawings for these parts. Both supports have a broad, 2"-wide curved section that cradles the back slats, plus "doglegged" ends that provide attachment points for the armrests and seat. To lay out the curves, draw a reference line across each workpiece that marks its center. Mark this line 2" in from one edge of each upper back support and 1 3/4" from one edge of the lower back supports (these marks set the deepest sweep of the inner curved edges). Set your trammel for a 26" radius, and draw the inner curve on the upper back supports. (Its span, from end to end, should measure about 20" along the front edge of the parts when you're done.) Using the same radius, scribe a second arc 2" back from the first to lay out the top back supports' rear curved edges. Repeat the same process for drawing a pair of curves on the lower back supports, only this time change the radius to 24" instead. The span of the inside curve, along the front edge of the lower supports, should be about 17 3/4". [Photo 12]

Follow the drawings on page 2 to lay out the squared-off portions on the ends of the upper and lower back support. These areas of the upper back supports will be shaped to match the back corners of the armrests, later.

With the layout penciled, grab just the upper back support workpieces and head to the table saw: their front edges need to be bevel-ripped in order to rest against the angled back ends of the back legs. Tilt your saw blade to 11 degrees, and set the rip fence so the blade will intersect the top front edge of the parts but won't make these workpieces any narrower, after ripping. Bevel-rip the edges. [Photo 13]

Take all four back supports to the band saw next. Cut the straight-ended sections first, using your band saw's rip fence to keep these flat edges aligned and straight. Then cut out the rear

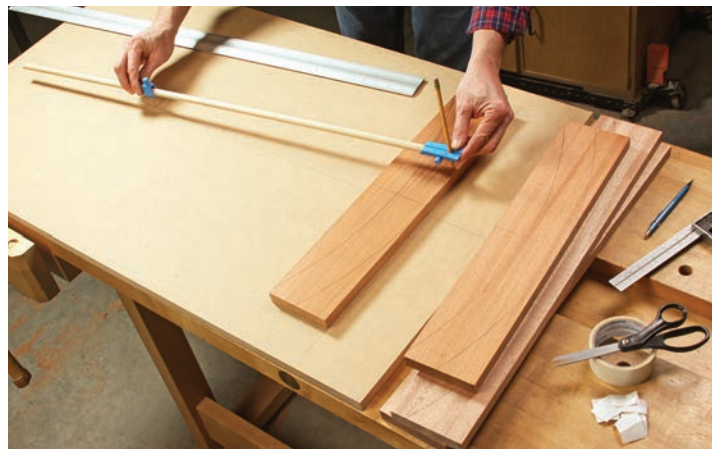


Photo 12



Photo 13

curves with the band saw table set square to the blade. But, in order to provide the inclined angle of the chair backs, you'll need to cut the inside curves of the back supports differently. To do that, tilt your saw table to 7 degrees instead. Now follow your inner-curve layout lines carefully: cutting along a layout line with the table tilted takes some getting used to — if you're in doubt of your skills, cut just slightly to the waste side of these curves. [Photo 14]

Sand the inner and outer back support curves smooth, and remember, if you use a spindle sander to smooth the inner beveled edges, be sure to tip your sander's table to 7 degrees to preserve the angles! Then ease the top and bottom outer curved edges of these parts with a 1/8" roundover.

At this point, you're ready to attach the back slats to the lower back support. Align their bottom edges with the bottom face of the lower back supports. Center the middle back slat on the lower supports, and fasten it in place with a #8 x 2" counterbored screw. Now space the other slats 5/16" apart — I used 5/16"-dia. dowels to make this easy. Attach the remaining six slats to each lower back support with single screws. [Photo 15]

Plug these screw holes, trim off the excess and sand the plugged areas flush and smooth.

Connecting the Arms and Back

Making a pair of armrests for each chair is straightforward template work. First create a template on scrap sheet stock, using the gridded drawing shown on page 2. Cut it out and smooth the edges. Now duplicate this shape onto four arm workpieces by tracing the template onto them. Cut out the shapes on a band saw or with a jigsaw, making them slightly oversized. Then attach the armrest template to each blank with double-sided tape, and use a flush-trim bit in a router or router table to template-rout the arms to perfect match. [Photo 16]

Once the arms are ready, clamp a pair of them to the ends of each upper back support. When doing this, align the flat back inside edges of the arms with the inner beveled curve cuts on the supports so the arms are spread about 19" apart.



Photo 14



Photo 15



Photo 16

Set the clamped-up back slat assemblies into position on the chair seats. Adjust the lower back supports so the flat back edges of their doglegs are even with the back edges of the back legs, and clamp the lower supports to the seat rails. Then set the arm assemblies into position on the top cross braces of the legs. Adjust the upper back supports so their front beveled edges are resting flush against the back ends of the cross braces, and move each arm left or right until their flat inner edges overlap the inside faces of the legs by about 1/2". Adjust the clamps as needed to do this.

With the arms properly positioned on the chair, you can trace [Photo 17] their back rounded corners onto the top faces of the upper back supports. Unclamp the arms and upper back supports, and band saw the ends of the upper back supports to final shape. Sand the supports and arms smooth, and ease the top edges of the arms with a 1/4" roundover bit to minimize splintering.

Reclamp the arms and supports together again, and attach the parts with a 2" carriage bolt, washer and locknut at each joint. Center the bolts on the overlapping part areas. Clamp this assembly to the chair.

Lay out and install three 2" counterbored screws to secure each armrest to the top cross braces of the legs. Drive one 3" counterbored screw through the back legs and into the ends of the lower back supports too, to anchor the back rest assembly here. Install the rearmost seat slat that you set aside initially. [Photo 18]

Now you can fan out the seat slats along the upper back support, with 3/8"-dia. dowels placed between them, and fasten the slats to the support with a 2" counterbored screw centered on each slat.

Wrap up the building process for the two chairs by plugging the remaining screw holes and trimming the plugs flush and smooth. Knock off any remaining sharp corners with a sanding block, as needed.



Photo 17



Photo 18

Adding Tables

If you choose to connect your two chairs with slatted tables, building them couldn't be much simpler: both consist of just two cleats and a series of top slats screwed together. But, be sure to make and install both tables — not just the top one. That's because the bottom table adds rigidity to the system. If you were to install just the top table, when you attempt to lift the set of chairs to move them around, you'll stress the top table joints. The bottom table eliminates that problem by turning the chairs and tables into a single rigid assembly. It also provides some additional off-the-ground storage space.

To build the top table, rip a pair of cleats to 1 1/4" wide, and miter their ends to 11 degrees to match the splay of the legs. Now make up four 3 3/4"-wide blanks for the table slats. Miter-cut their ends to 15 degrees; this angle will position the chairs 30 degrees apart, which makes for comfortable conversation and plenty of access for climbing into and out of the chairs without interfering with a companion.

Align the shortest slat with its front edge flush to the top front corners of the cleats. The ends of the slat should be flush to the outside faces of the cleats. Drive two countersunk 1 5/8" screws at each joint. [Photo 19] Now position the three other slats along the cleats, leaving 1/8" spaces between them, and fasten these slats in place. Sand the tabletop smooth, and round over the top edges of the slats, if you prefer, to help safeguard against splinters.

The top table fits up underneath and flush against the bottom faces of the armrests. You'll attach it with four 5/16" x 3" carriage bolts driven through the top cross braces. In order to drill through holes for these bolts that are both straight and even, I first bored a 5/16" hole through a thick scrap block at the drill press. It served as a convenient drilling guide for my handheld drill. I drilled through-holes in the top cross braces with the drilling guide first [Photo 20], then clamped the table into place between the chairs and extended these holes through the table cleats with just the drill/driver — the cross brace through holes serve as a secondary drilling guide all on their own. Be sure to position these bolt holes low enough on the cross braces to account for the fastener you plan to use to secure the bolts. I used wingnuts: they'll make the chairs and tables easy to disassemble for more compact off-season storage. So, the width of the wingnuts required me to position the carriage bolt through holes just 5/8" up from the bottom edges of the cross braces (and that also centers the holes on the cleat widths). Once you've extended the holes, install the table.

Constructing the bottom table is, for the most part, a repetition of building the top table, but there are a few points of departure. For one, the cleats and slats are wider. And second, pay attention to where you attach the five table top slats this time: they attach to the cleats, not the lower leg cross braces. So, you'll need to inset the attachment screws 1 7/8" from the ends of the slats to center them on the cleats. [Photo 21] The goal here, obviously, is to make this bottom table removable, just like the top table.

I eased the edges of the slats on the bottom table and rounded



Photo 19



Photo 20



Photo 21

their corners before attaching them to the cleats with countersunk, 2" screws. And, I also found it easiest to attach the cleats to the bottom cross supports first, before even attaching the slats. Here again, the cleats and bottom cross supports connect with 5/16" x 3" carriage bolts — two per cleat. Once those are secured, align the slats evenly along their length, leaving 1/8" spacing between them. Since you'll be working low to the floor where visibility can be more challenging, some 12D framing nails make handy spacers between the slats: no need to "eyeball" tiny layout marks this way.

Driving the front- and rear-most screws will be a bit of a challenge, given their close proximity to the legs. But, it's no problem, really: just unbolt the table, remove it and drive those last four screws at your workbench instead.

Plug the screw counterbores on the lower table, cut them flush and sand them smooth.

Finishing Up

There are a LOT of nooks and crannies on this project; applying finish will be much easier if you remove the two tables and finish the chairs and tables separately. Apply your favorite outdoor finish to complete this chair set. I'm a fan of simple deck stain/preservative blends. They're easy to apply with a brush, rag or sponge, and they offer a low-maintenance, UV-shielding option. Deck stain is also easy to refresh by just scrubbing or power-washing the chairs and tables clean when the time comes, and applying a fresh coat of finish. But, if you're a fan of film-forming finishes, you could apply an exterior-grade urethane finish instead.

Enjoy the leisure time these chairs will bring to your poolside, deck, porch or patio this spring!



Photo 22

Key Layout Dimensions

