



Appendix XI Suggested Plans for Woodworking Projects

Nine Block Puzzle

Materials needed

- Use ¼-inch plywood for sides and base. Use 1-inch lumber (actual thickness ¾ inch) for the blocks. See illustration for the dimensions.
- Glue
- ½-inch brads

Tools needed

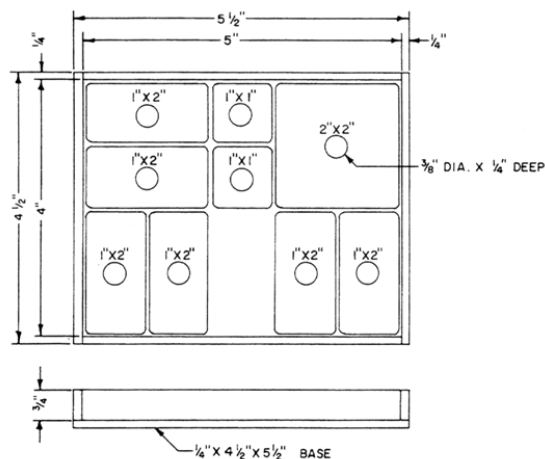
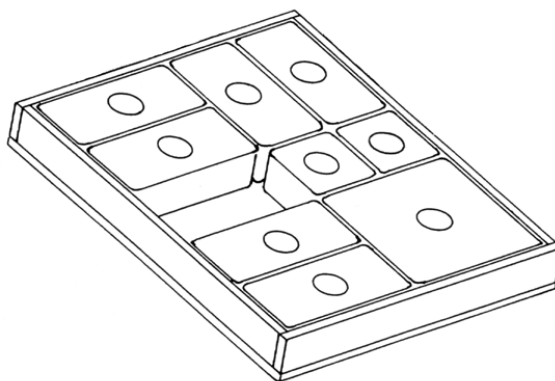
- Tack hammer
- Saw
- Drill with ⅜" countersink bit
- Sandpaper
- Paint or stain and varnish

Instructions

1. Cut all pieces to size.
2. Glue and nail frame together and then glue and nail to base.
3. Drill a shallow countersink hole in the middle of the nine blocks so they can be moved easily.
4. Sand all pieces and round corners so they will move easily in frame.
5. Finish as desired.

Playing instructions

Start from position shown. The object of the game is to move the large block from the upper right corner to the upper left corner. This takes a minimum of 47 moves.





Bed for Dog or Cat

Materials needed

- 1 piece lumber 1" × 8" (actual size ¾" × 7½") × 18" for back
- 2 pieces lumber 1" × 8" × 12" for ends
- 1 piece lumber 1" × 8" × 10" for front
- 1 piece lumber 1" × 8" × 2" for front
- 2 pieces lumber 1" × 2" (actual size ¾" × 1½") × 18" for floor supports
- 1 piece ½" plywood 11¼" × 18"
- 6d finishing nails

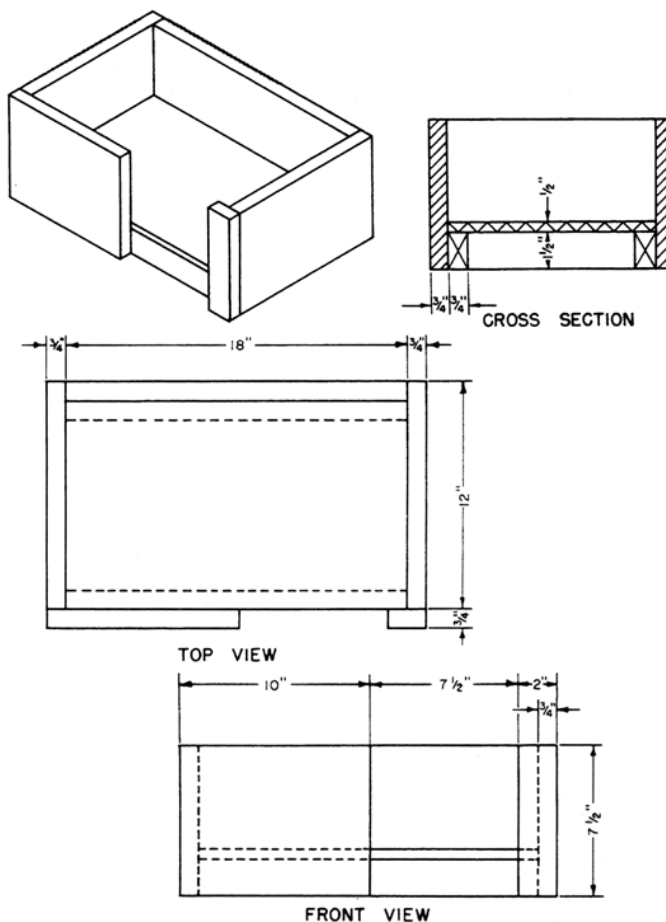
Tools needed

- Saw
- Hammer
- Sandpaper
- Shellac or paint

Instructions

1. Cut pieces to size.
2. Nail ends to back.
3. Nail front pieces to ends.
4. Set floor supports in place and nail through end pieces into ends of supports.
5. Nail floor to supports.

Note: If pet is larger or smaller, dimensions can be changed accordingly.



Nail & Tool Box

Materials needed

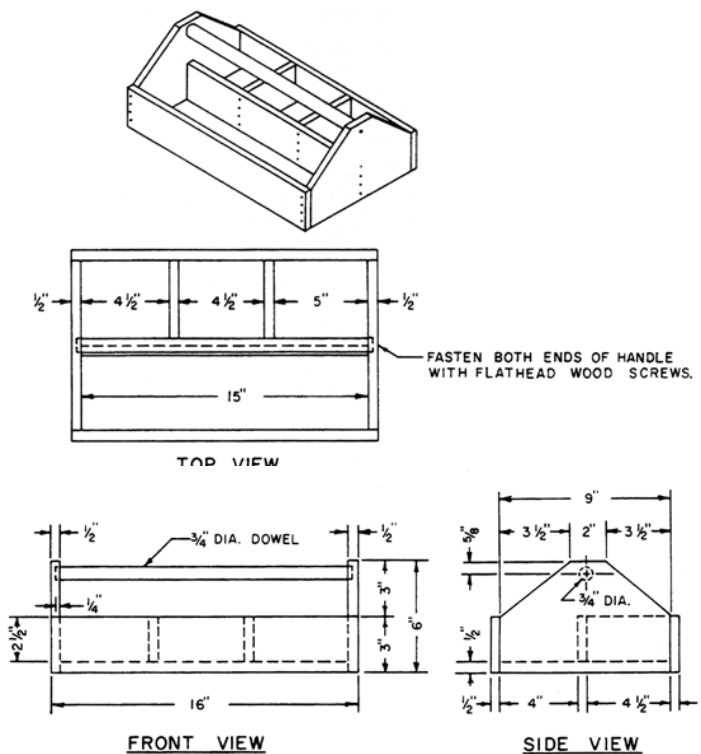
- 1 piece wood ½" × 24" × 24" (use exterior plywood)
- 1 piece of ¾" dowel stock, 15½" long
- Finishing nails 1¼" or 1½"
- 2 No. 8, 1" flathead wood screws
- Glue

Tools needed

- Hammer
- Saws
- Screwdriver
- Drill with ¾" bit
- Sandpaper
- Paint or shellac

Instructions

1. Cut pieces to size.
2. Drill end pieces ¼" deep for dowel.
3. Sand all pieces before assembly.
4. Glue and nail partitions to base.
5. Glue dowel between ends and fasten with screws.
6. Fit end/handle section over base. Glue and nail.
7. Glue and nail side pieces to unit.
8. Apply finish.





Firewood Basket

Materials needed

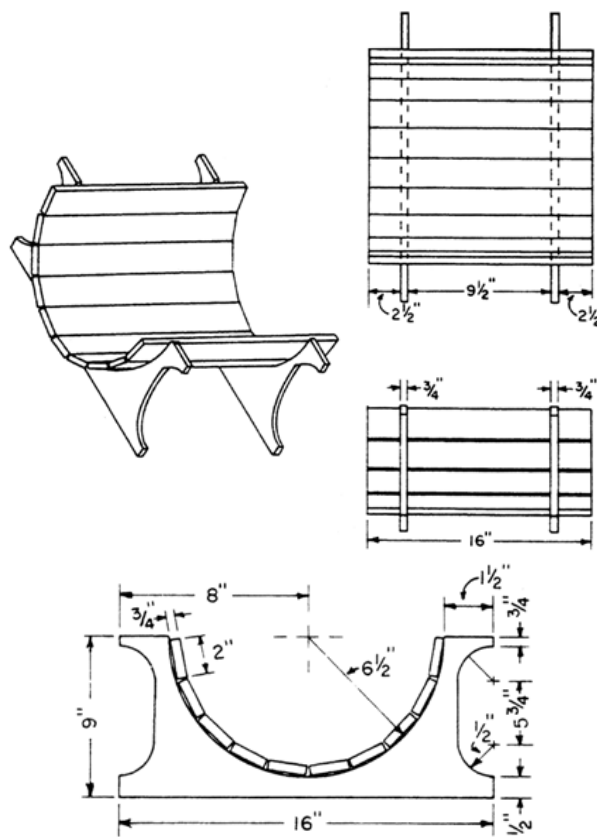
- 2 pieces of $\frac{3}{4}$ " \times 9" \times 16" plywood for ends
- 10 pieces lumber 1 \times 2 (actual size $\frac{3}{4}$ " \times 1 $\frac{1}{2}$ ") \times 16" for slats

Tools Needed:

- Table saw or hand saw
- Jig saw or saber saw
- Hammer
- Hand plane
- Sandpaper on block
- 50 6d box nails

Instructions:

1. Leave ends of plywood square. (Note: If notched out, keep notch shallow or nails will stick through.)
2. Find center on plywood pieces.
3. Use compass on a string and pencil to lay out semi circle to be cut out for basket ($6\frac{1}{2}$ " radius).
4. Smooth all surfaces.
5. Cut 10 pieces $\frac{3}{4}$ " \times 2" for slats.
6. Start at top of semi circle to nail on slats. Keep at 90° angle while nailing. Alternate nailing on slats, first one end then the other.
7. Paint to preference or finish as desired.



Lawn Stool

Materials needed

- 2 pieces lumber 2 \times 3 (actual size $1\frac{1}{2}$ " \times 2 $\frac{1}{2}$ ") \times 2'6"
- 6 pieces lumber 2 \times 3 (actual size $1\frac{1}{2}$ " \times 2 $\frac{1}{2}$ ") \times 1'4"
- 2 pieces of 1" dowel stock, 19 $\frac{1}{4}$ " long
- Waterproof glue
- 8 No. 12, 2 $\frac{1}{2}$ " flathead screws
- 16 No. 12, 1 $\frac{1}{2}$ " flathead screws
- About 23' of $\frac{3}{8}$ " manila rope
- Foam rubber or other waterproof cushioning material

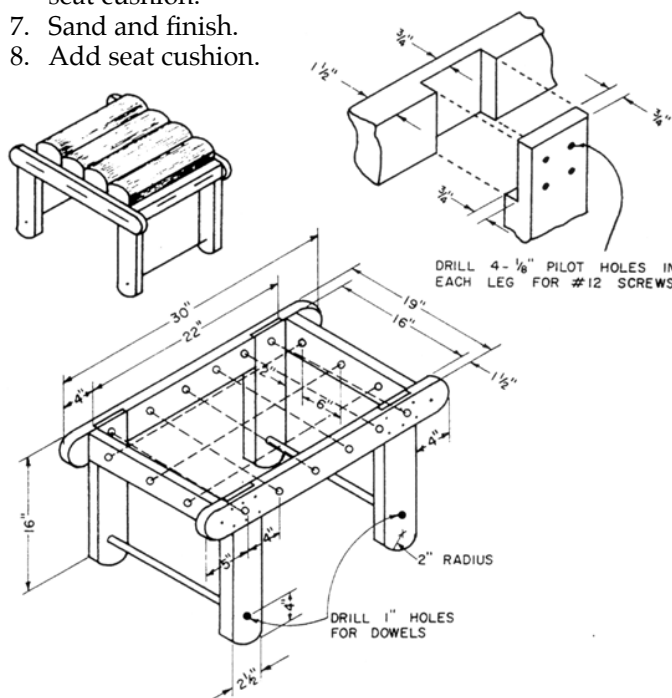
Tools needed

- Saw
- Drill with 1", $\frac{7}{16}$ ", $\frac{1}{8}$ ", $\frac{3}{8}$ ", and countersink bits
- Screwdriver
- Knife
- Wood file
- Sandpaper
- Exterior paint or stain and exterior varnish

Instructions

1. Cut pieces to size. Round corners as shown with wood file.
2. Glue rails to legs.
3. Drill 1" holes in legs and glue dowels in place.
4. Drill $\frac{1}{8}$ " pilot holes through legs into rails and fasten with No. 12, 1 $\frac{1}{2}$ " screws (4 per joint).

5. Glue braces between rail ends. Drill $\frac{1}{8}$ " pilot holes and fasten with No. 12, 2 $\frac{1}{2}$ " screws (2 per joint).
6. Drill $\frac{7}{16}$ " holes in frame (6 per side and 3 per end) for rope, as seen in illustration. Weave rope through holes, forming a webbed support for the seat cushion.
7. Sand and finish.
8. Add seat cushion.





Book Shelf

Materials Needed:

- 1 piece of $\frac{3}{8}$ " \times 40" \times 41 $\frac{1}{2}$ " interior plywood for back (A)
- 2 pieces of $\frac{3}{4}$ " \times 15 $\frac{3}{8}$ " \times 41" interior plywood for sides (B)
- 1 piece of $\frac{3}{4}$ " \times 10" \times 40 $\frac{1}{2}$ " interior plywood for shelf (C)
- 1 piece of $\frac{3}{4}$ " \times 12 $\frac{1}{2}$ " \times 40 $\frac{1}{2}$ " interior plywood for shelf (D)
- 1 piece of $\frac{3}{4}$ " \times 15" \times 42" interior plywood for bottom (E)
- 4 pieces of lumber 2 \times 2 (actual size 1 $\frac{1}{2}$ " \times 1 $\frac{1}{2}$ ") \times 7" for legs (F)
- 1 piece of lumber 1 \times 2 (actual size $\frac{3}{4}$ " \times 1 $\frac{1}{2}$ ") \times 29" for rail (G)
- 2 pieces of lumber 1 \times 2 (actual size $\frac{3}{4}$ " \times 1 $\frac{1}{2}$ ") \times 9" for rails (H)
- 8 12d finishing nails
- 6d finishing nails
- Glue
- Wood filler

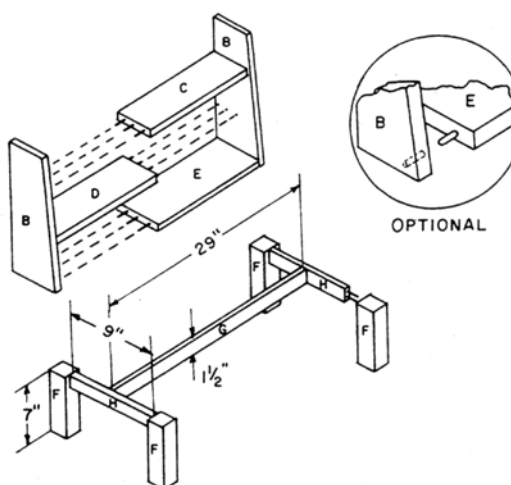
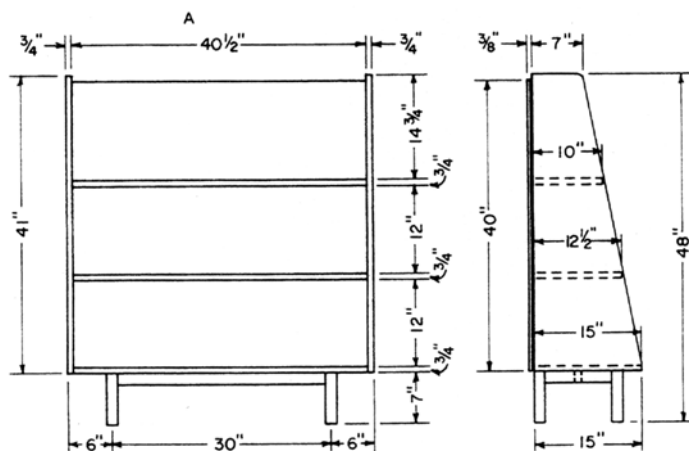
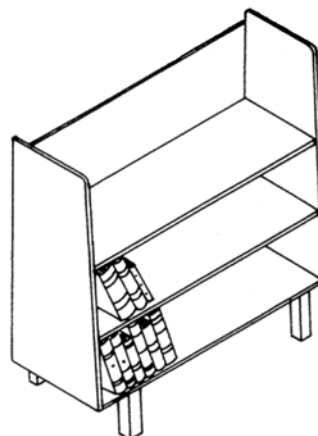
Tools needed

- Saw
- Hammer
- File
- Nail set
- Sandpaper
- Stain and varnish

Instructions

1. Cut pieces to size. Round front top corners of side pieces with file.
2. Glue and nail shelves (C, D) and bottom (E) to one end piece (B). Note: Wood dowels may be used in place of nails.
3. Glue and nail other end (B) piece to shelves and bottom.
4. Glue and nail back (A) in place.
5. Glue and nail legs (F) to rails (H) using two 12d nails per leg.
6. Glue and nail end/leg unit to each end of rail (G).
7. Set shelf unit on stand unit and glue and nail in place.
8. Sand and finish.

Note: An optional way to join the rail/leg assembly and put the shelving in is to use dowel pins (see circled diagram).





4-H Wood Science Leader Guide

Revolving Tie Rack

Materials needed

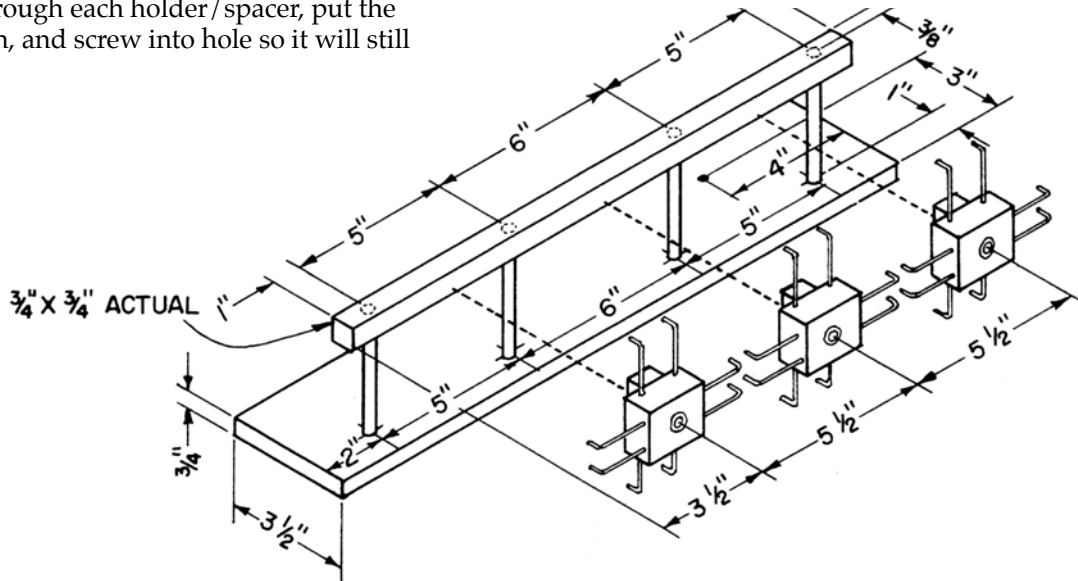
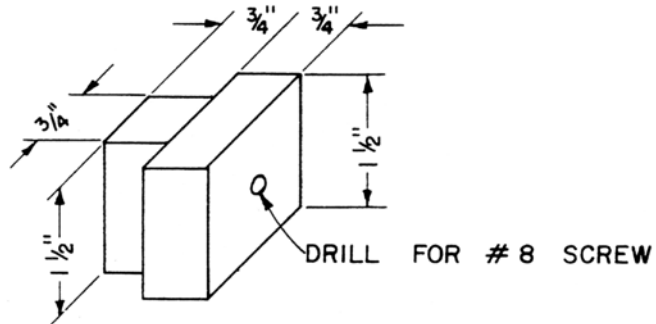
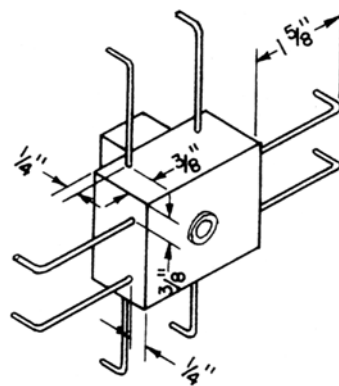
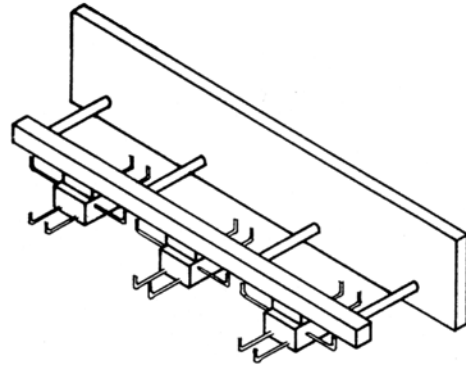
- 1 piece of lumber 1×4 (actual size $\frac{3}{4}$ " × $3\frac{1}{2}$ ") × 20" for back
- 1 piece of lumber $\frac{3}{4}$ " × $\frac{3}{4}$ " × 18" for bar
- 3 pieces of lumber 1×2 (actual size $\frac{3}{4}$ " × $1\frac{1}{2}$ ") × $1\frac{1}{2}$ " for hook holders
- 3 pieces of lumber $\frac{3}{4}$ " × $\frac{3}{4}$ " × $1\frac{1}{2}$ " for spacers
- 4 pieces $\frac{1}{4}$ " dowel stock, $3\frac{1}{2}$ " long
- 24 metal screw hooks, $3\frac{1}{2}$ " long
- 3 No. 8 roundhead woodscrews 2" long
- 6 washers for No. 8 screws
- Glue

Tools needed

- Drill press or drill with stop gauge and $\frac{1}{4}$ ", $\frac{1}{8}$ ", and $\frac{1}{32}$ " bits
- Screwdriver
- Sandpaper
- Stain and varnish

Instructions

1. Cut pieces to size.
2. Drill $\frac{1}{4}$ " holes in bar, $\frac{1}{2}$ " deep. Use drill press or drill with stop gauge for uniform depth holes.
3. Drill $\frac{1}{4}$ " holes in back.
4. Drill $\frac{1}{32}$ " pilot holes for screws in the bottom of bar.
5. Drill $\frac{1}{8}$ " mounting holes in back, 4" in from ends and 1" from top edge.
6. Center spacers on hook holders and glue in place.
7. Drill a hole through the center of each holder for the No. 8 screw. Holder should turn free on screw.
8. Sand all pieces.
9. Drill pilot holes in holders for hooks, install hooks leaving them protruding about $1\frac{5}{8}$ ".
10. Mount the bar to the back using the four dowels. Be sure holes for screws are on bottom side of bar.
11. Attach holders to the bar by putting a screw with a washer up through each holder/spacer, put the other washer on, and screw into hole so it will still turn.
12. Apply finish.





Shop Tool Rack & Shelf

Materials Needed:

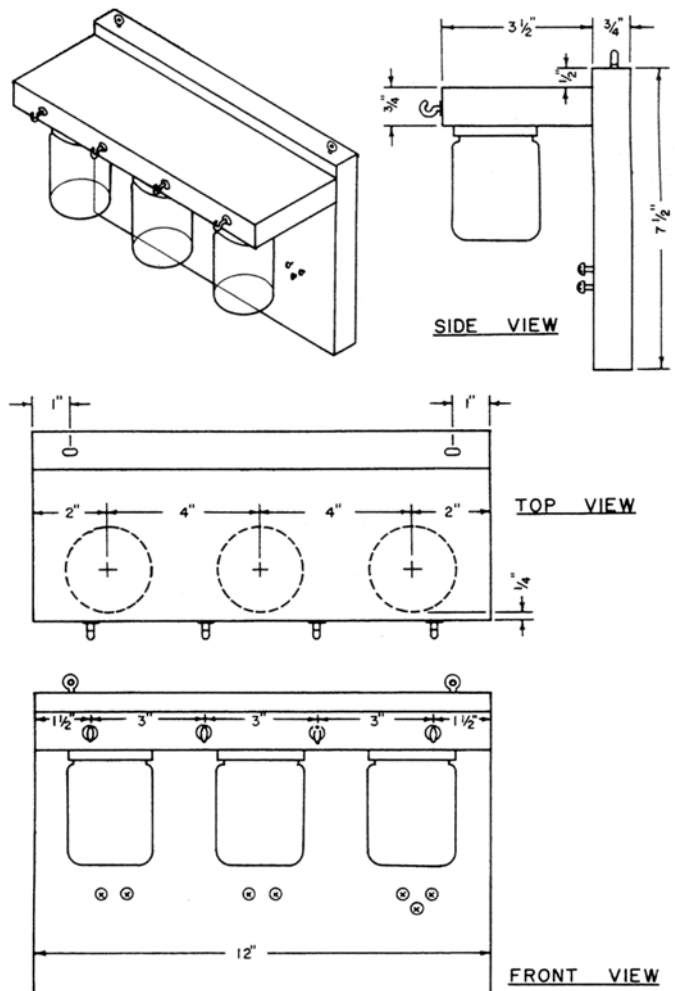
- 1 piece of lumber 1×8 (actual size $\frac{3}{4}$ " × $7\frac{1}{2}$ ") × 12" for back
- 1 piece of lumber 1×4 (actual size $\frac{3}{4}$ " × $3\frac{1}{2}$ ") × 12" for shelf
- 3 baby food (or similar) jars with screw type lids
- No. 6, $1\frac{1}{4}$ " round head wood screws
- 3 Round head wood screws $\frac{1}{2}$ inch long
- 4 small cup hooks
- 2 screw eyes
- 3 No. 6 finishing nails
- Glue

Tools needed

- Screwdriver
- Hammer
- Sandpaper
- Shellac

Instructions

1. Cut pieces to size, sand, and finish before assembly.
2. Punch a hole in each jar lid (center) and fasten the 3 lids to one side of shelf.
3. Glue shelf to back and nail.
4. Locate screws in front to hold tools desired.
5. Put screw hooks on front edge of shelf.
6. Put screw eyes in top edge of back.
7. Fasten to wall with nails or screws through eyes.



Shadow Box

Materials needed

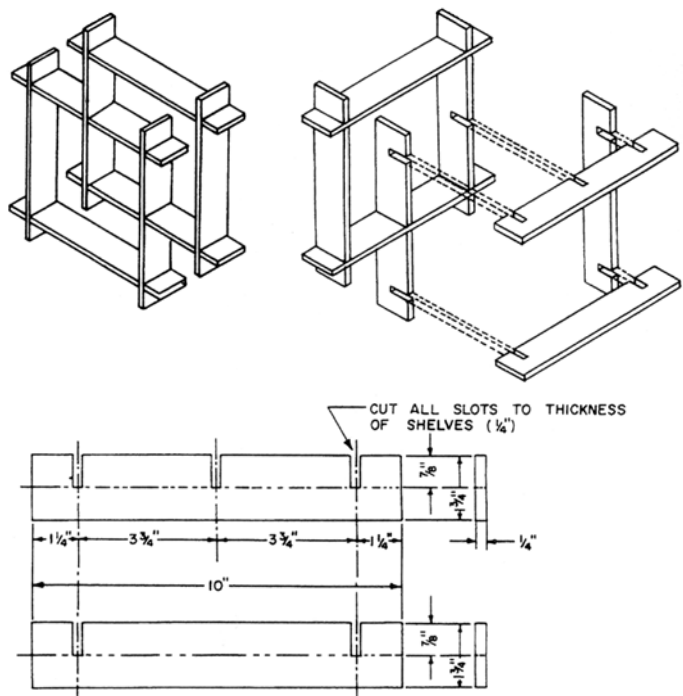
- 8 pieces of interior plywood, $\frac{1}{4}$ " × $1\frac{3}{4}$ " × 10" each
- 2 screw eyes for hanging

Tools needed

- Table saw, bench saw, or fine hand saw
- Square
- Wood file
- Sandpaper

Instructions

1. Cut 4 boards to width and length.
2. Lay out slots to be cut, using small square.
3. Use miter saw, bench saw, or fine hand saw. Be sure to make cuts very accurate. Note: Half of the boards have 3 seats. Others have 2.
4. Sand all surfaces smooth.
5. Try fitting pieces together.
6. Finish boards with stain and clear varnish or, enamel before final fitting.
7. Use two screw eyes to mount shadow box on wall.





Picnic Table with Bench

Materials needed

Table

- 3 pieces lumber 2×4 (actual size $1\frac{1}{2}'' \times 3\frac{1}{2}''$) $\times 3'6''$
- 4 pieces lumber $2 \times 4 \times 2'6''$
- 2 pieces lumber $2 \times 4 \times 4'$
- 11 pieces lumber $2 \times 4 \times 7'$
- 2 pieces lumber $2 \times 4 \times 6'4''$

Bench

- 3 pieces lumber $2 \times 4 \times 3'$
- 4 pieces lumber $2 \times 4 \times 1'5''$
- 2 pieces lumber $2 \times 4 \times 1'$
- 2 pieces lumber $2 \times 4 \times 1'3''$
- 2 pieces lumber $2 \times 4 \times 1'4''$
- 12d galvanized nails for frame or $\frac{3}{8}'' \times 4\frac{1}{2}''$ carriage bolts
- 20d spikes

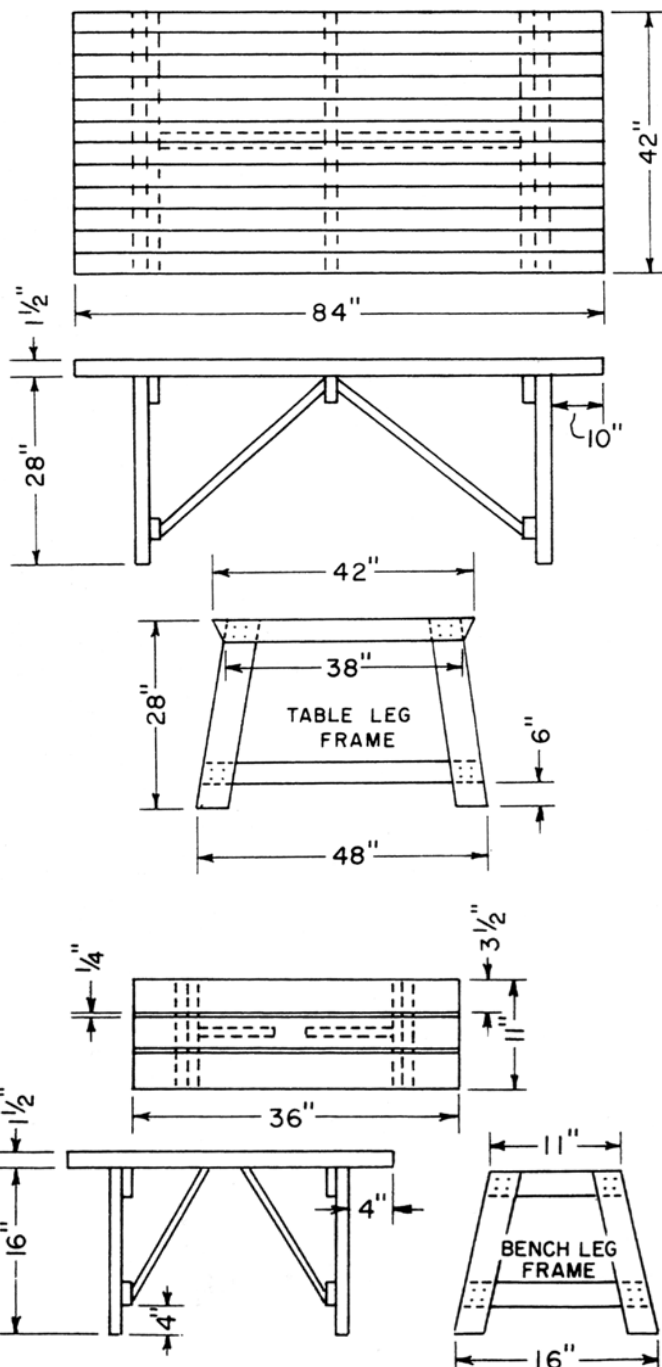
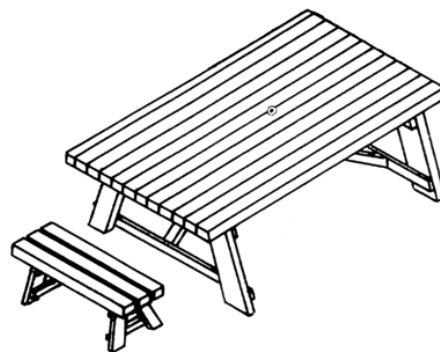
Tools needed

- Saw
- Wood file
- Hammer
- Sandpaper
- Exterior paint or stain and varnish

Instructions:

1. Cut pieces to size.
2. Make 2 table leg frames as shown in drawing. Fasten together using 12d nails.
3. Lay the twelve top pieces flat on the floor. Nail a piece of scrap across them at each end to hold them temporarily; this is removed after table is assembled.
4. Set the leg frames upside down on the top, 10" from either end, and toenail cross members of frames to each top board using 12d nails.
5. Toenail center cross member in place. Mark off diagonal braces and nail them in place with 12d nails.
6. Set table right side up and nail each top board to the cross members of the leg frames using 20d spikes.
7. Use wood file to round rough edges and corners.
8. Bench is made in the same fashion as the table except that the top cross member of each leg frame doesn't extend past legs (i.e., it isn't tapered out).
9. Sand and finish bench and table.

Note: For maximum durability, especially if the table and bench are to remain outdoors, use preservative-treated, decay-resistant lumber.





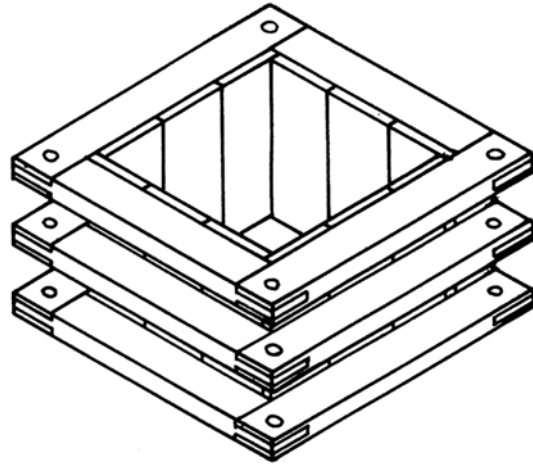
Planting Box

Materials needed

- Redwood or cypress
- 12 pieces lumber 2 × 4 (actual size 1½" × 3½") × 26" for frames
- 12 pieces lumber 1 × 6 (actual size ¾" × 5½") × 12" for sides
- 2 pieces lumber 1 × 10 (actual size ¾" × 9½") × 18" for bottom
- 1 piece of ½" dowel stock, 24" long
- Waterproof glue
- 6d aluminum nails

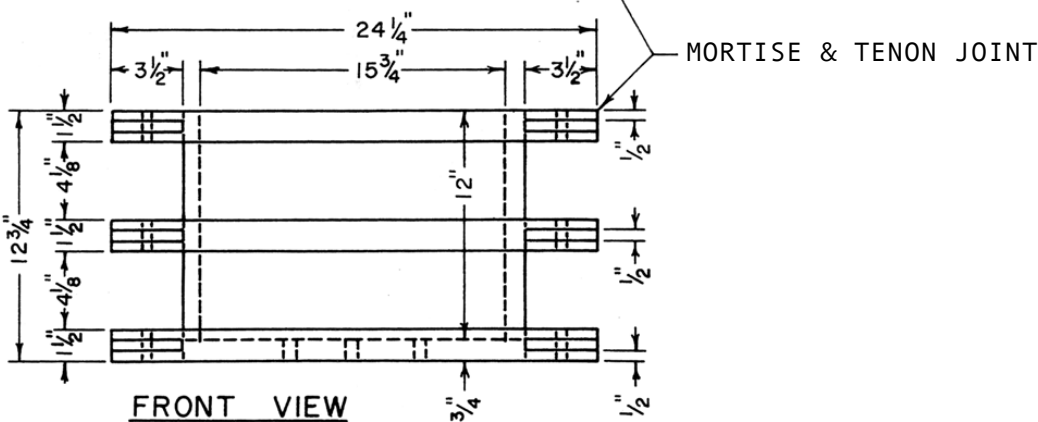
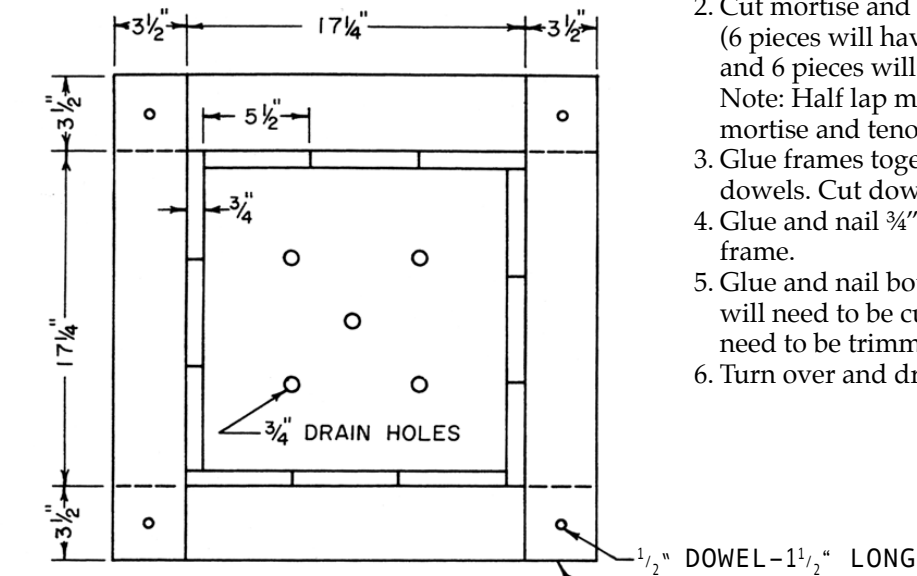
Tools needed

- Hammer
- Drill with ½" and ¾" bits
- Saw



Instructions:

1. Cut all pieces to size as illustrated.
2. Cut mortise and tenon on corners of frame pieces (6 pieces will have female type joint on both ends and 6 pieces will have male type joint on both ends). Note: Half lap may be used as an alternative to mortise and tenon.
3. Glue frames together and drill holes in corners for dowels. Cut dowel pieces 1½" and glue in each hole.
4. Glue and nail ¾" × 5½" × 12" pieces to inside of frame.
5. Glue and nail bottom in place. Note: Bottom boards will need to be cut to 17¼" long, and one board will need to be trimmed to 7¼" wide.
6. Turn over and drill ¾" drain holes in bottom.





Portable Shelving

Materials needed

- 6 pieces of lumber 2 × 4 (actual size 1½" × 3½") × 6' for ladder posts
- 12 pieces of lumber 1 × 8 (actual size ¾" × 7½") × 10' shelving
- 24 pieces of lumber 1 × 4 (actual size ¾" × 3½" × 22" for shelving supports (rungs of ladders)
- 96 8d common nails
- 3d and 5d nails for shelving supports

Tools needed

- Saw
- Scale
- File
- Hammer
- Marking pin
- Chisel

Instructions

1. Cut six posts to size, 6 feet long, using 2 × 4 pieces.
2. Measure 8" from one end on each post and draw a line on the narrow edge using the square. Repeat process at 28", 48", and 68". These mark the tops of the rungs.
3. Cut the rungs 22" long from the 1×4 boards. Nail in place with 8d common nails. Now check the "ladders" to be sure they stand level.
4. Cut the shelves from the 1×8 boards, 10 feet long each. There will be three of these per level (12 total). Notch out side edges to fit around posts. The two outside shelves need to have three notches cut in them, one at each end and one in the center. These notches should be 1½" × 3½" in size (see illustration).
5. Assemble shelving with 3d and 5d nails. Check for any wobble. If it does not stand level, trim ends of posts to level it.

