

**Kentucky  
4H  
Wood  
Science  
Plans Notebook**



**Plans – Level 3**





## Ky 4-H Wood Science Plans - Level 3

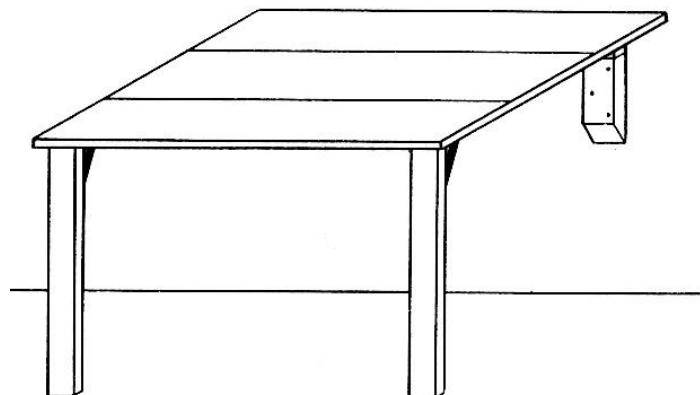


### FOLDUP PORCH TABLE

#### WS301

#### MATERIALS:

- 2 pieces wood 3/4" x 10" x 4'
- 1 piece wood 3/4" x 12" x 4'
- 2 pieces wood 3/4" x 3" x 2' 5 1/2"
- 2 pieces wood 3/4" x 3" x 1' 8"
- 1 piece wood 2" x 4" x 3' 2"
- 2 pieces wood 2" x 4" x 10"
- 2 locking hinges w/screws
- 2 butt hinges w/screws
- 12d nails
- 13, #12 x 3 1/2" screws  
or 3/16" x 3 1/2" Lag bolts  
(wall fastening)



#### TOOLS:

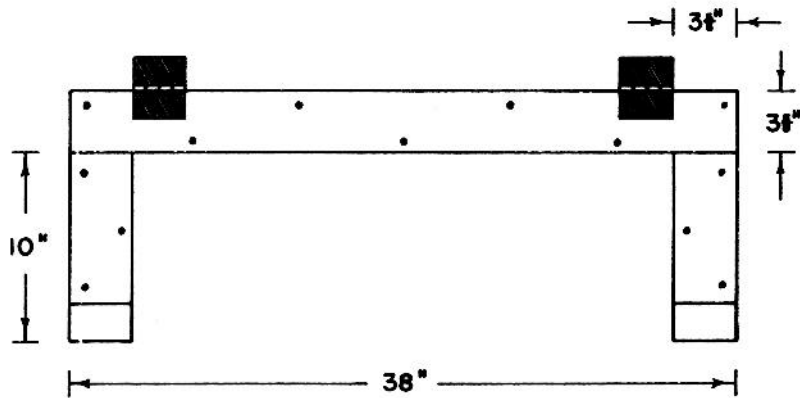
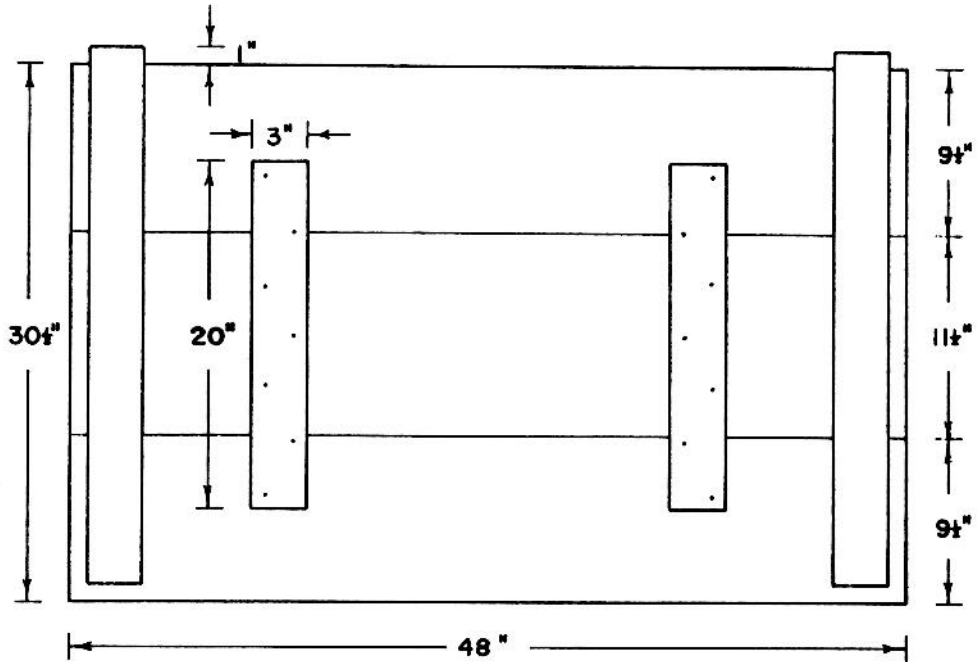
- Hammer
- Saw
- Screwdriver
- Sandpaper

#### INSTRUCTIONS:

1. Cut pieces to size.
2. Assemble the top (48" x 30 1/2") from a piece 11 1/2" wide, and two 9 1/2" wide, all 30 1/2" long. The boards are cleated together on the underside by two 3/4" x 3" cleats, each 20" long.
3. The two legs, each 3/4" x 3" by 29 1/2" long should then be hinged to the bottom of the table, 1" from the outer edge, using card-table type, locking hinges.
4. On the wall, fasten a hanger, using 2" x 4" lumber, 38" long for a rail. Support this on a pair of 2" x 4" blocks, 10" long, tapered at the bottom so as not to bump the knees of persons using the table. The upper edge of the rail should be 29 1/2" from the floor. Use # 12 x 3 1/2" screws.
5. Mount the butt hinges on the rail of the hanger.
6. Mount the table on the butt hinges.
7. Sand the table smooth rounding sharp edges. Table can be left natural or finished using appropriate varnish, paint or oil.



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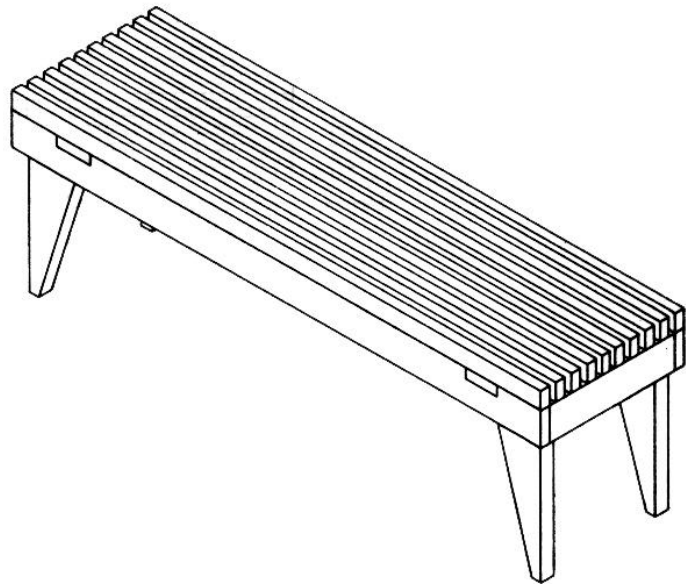
### GARDEN BENCH WS302

#### MATERIALS:

10 pieces wood 3/4" x 2" x 5'  
2 pieces wood 3/4" x 4" x 16 1/2"  
4 pieces wood 2" x 4" x 17"  
2 pieces wood 3/4" x 4" x 5'  
2 pieces wood 3/4" x 4" x 15"  
20 ea #6 x 1 1/2" flathead screws  
4 ea 1/4" x 2 1/2" bolts  
4 ea 1/4" x 4 1/2" bolts  
Small angle braces  
Paint or varnish

#### TOOLS NEEDED:

Wrench  
Screwdriver  
Saw  
Drill and 1/4" bit  
Carpenter's square  
Sandpaper  
Paint brush



#### INSTRUCTIONS:

1. Cut pieces to size.
2. Fasten the 10, 3/4" x 2" strips, each 60 inches long to the two cleats, of 3/4" x 4" lumber, each 16 1/2" long. The cleats will be on the under side of the bench seat, and the cleats held securely to the seat with #6 x 1 1/2" wood screws, countersunk, spaced 13/16" apart.
3. Take the 4 legs of 2" x 4" lumber, 17" long and saw one side of each to a taper, starting 4" from the top, leaving the base of the leg a 1" x 2" square.
4. Before assembling the frame make appropriate cuts on the sides to accommodate the cleats under the bench seat.
5. Bolt the sides and ends of the frame together with the legs using 1/4" bolts. The top of the legs should come flush with the top of the frame.
6. Fasten frame assembly to bench seat. By joining the cleats to the legs and frame with small angle braces. The bench will show no hardware on top.

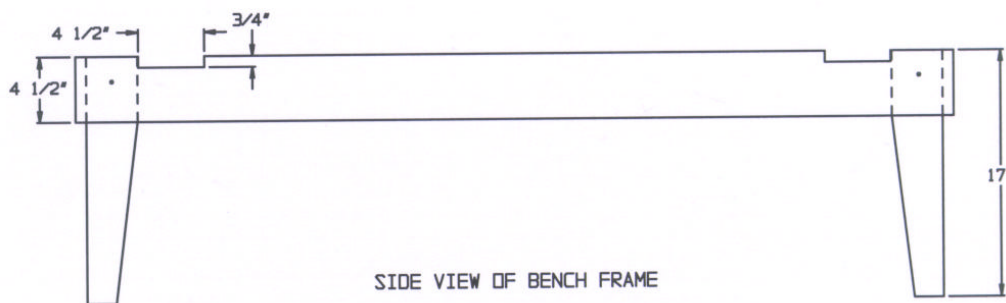
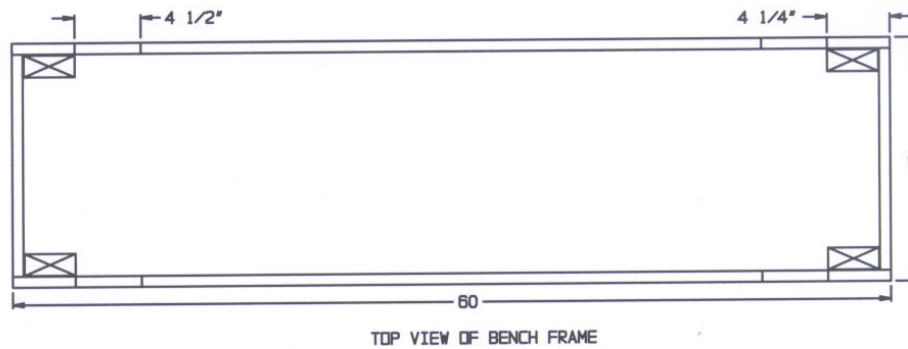
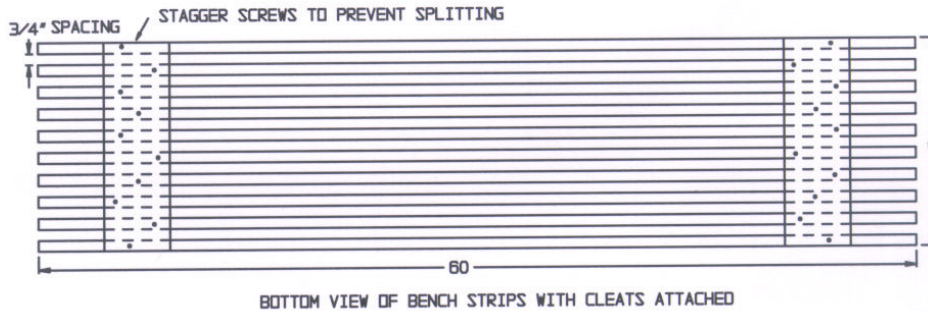


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- Finish the bench by sanding it smooth, rounding off all sharp edges. If desired, it can be left natural or it may be given a finish with two coats of exterior varnish or

For Strip Thickness	Spacing Distance	Width W of Bench
3/4"	3/4"	14 1/4"
7/8"	3/4"	15 1/2"
1"	3/4"	16 3/4"



## THINGS LEARNED:

- How to cut pieces to size from stock lumber.
- How to join wood together using cleats.
- How to sand a project, including breaking and beveling sharp edges.



## Ky 4-H Wood Science Plans - Level 3



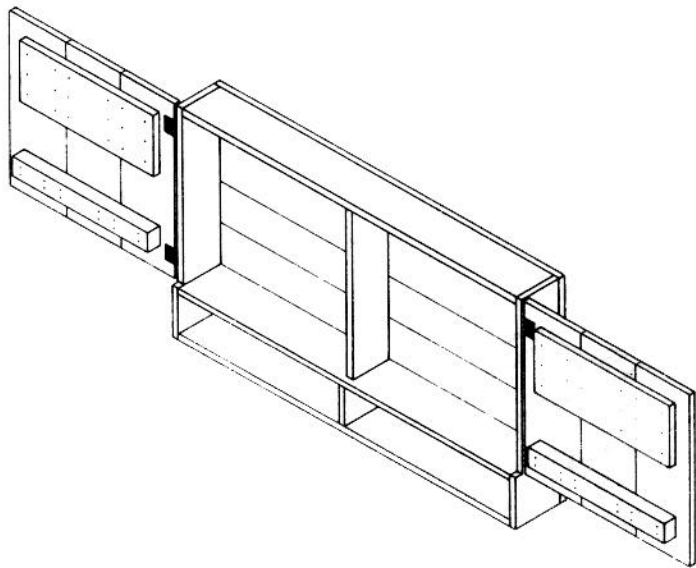
### TOOL CABINET WS303

#### MATERIALS NEEDED:

- 6 pieces wood 3/4" x 12" x 2 1/2'
- 2 pieces wood 3/4" x 12" x 30 1/2"
- 1 piece wood 3/4" x 8" x 67 3/4"
- 1 piece wood 3/4" x 8" x 28 5/16"
- 5 pieces wood 3/4" x 8" x 6 5/8"
- 2 pieces wood 3/4" x 9" x 67 3/4"
- 2 pieces wood 3/4" x 9" x 36 1/4"
- \_ ea #6 x 1 3/4" wood screws
- 4 ea 3" butt or strap hinges
- \_ ea 3/8" x 3" lag screws

#### TOOLS NEEDED:

- Hammer
- Screwdriver
- Saw
- Drill (assorted bits)
- Chisel
- Wrench
- Carpenter's square



#### INSTRUCTIONS:

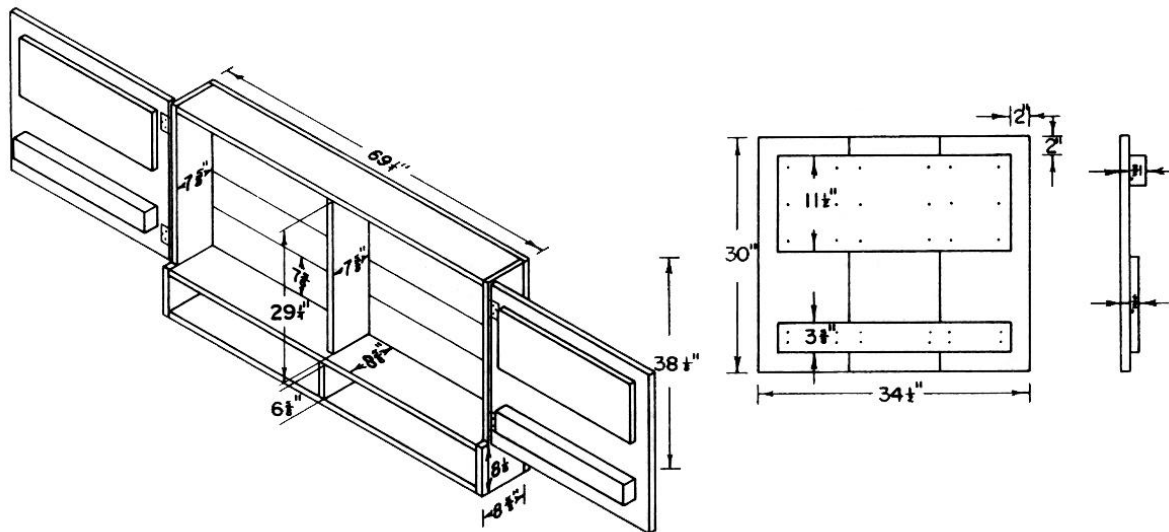
1. Cut pieces to size.
2. Fasten the two ends to the bottom board, using #6 wood screws 1 3/4" long. Holes should be drilled first to accommodate the screws. Heads of screws should be countersunk.
3. Add shelf board and top.
4. Insert the large partition piece in the middle of the cabinet between the shelf and top board, fastening it with screws through the bottom of the shelf and through the top board.
5. Insert the bottom partition piece, with screws through the bottom of the cabinet and one screw near the front edge of the shelf.
6. Add the back boards, fastened with screws to the end pieces and partition boards.
7. Assemble doors by fastening 3 boards 11 1/2" wide with a cleat also 11 1/2" wide and one piece of 2" x 4" lumber. A series of holes may be drilled in the 2" x 4" strip to accommodate small hand tools and drill bits.



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8. Mount the doors using 3" hinges, recessed into both doors and the sides of the cabinet to the thickness of one hinge leaf. Mark the doors with the hinges; chisel out the recess and mount the hinges on the doors. Then, hold the door up to the cabinet side marking carefully the hinge location; recess and mount doors.
9. Cabinet can be mounted on a bench or for space economy fastened to the wall 1 to 2 feet above. To do this have cabinet held to desired location, drill holes near the four corners of the back, and on into the wall. Drive the lag screws without moving the cabinet. Tighten with a wrench.





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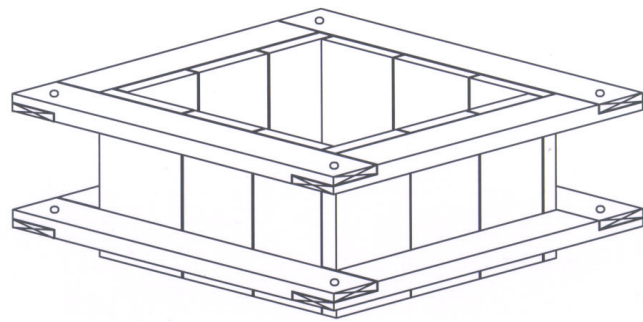
### PLANTING BOX WS304

#### MATERIALS NEEDED:

Redwood or Cypress  
12 pieces 2" x 4" x 26" for frames  
12 pieces 1" x 6" x 12" for sides  
1 piece 1" x 18" x 18" for bottom  
1 piece 1/2" dowel, 24" long  
Waterproof Glue  
6d Aluminum Nails

#### TOOLS NEEDED:

Hammer  
Drill with 1/2" and 3/4" bits  
Saw

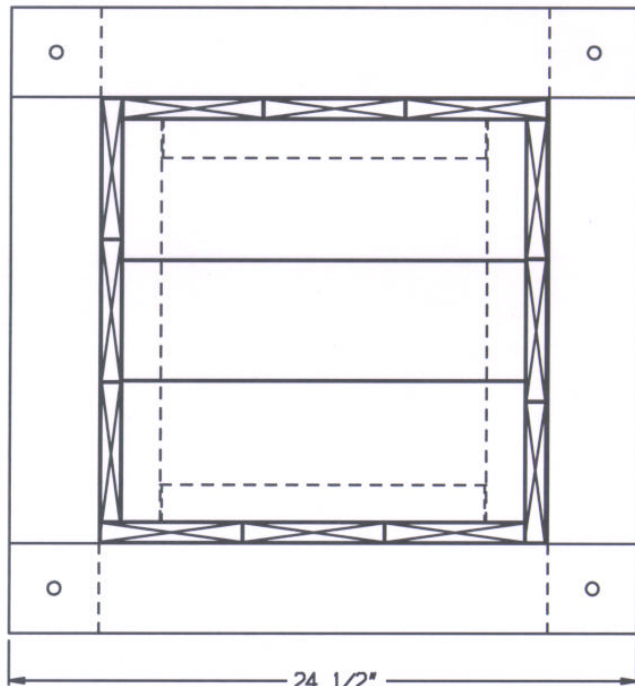


#### INSTRUCTIONS:

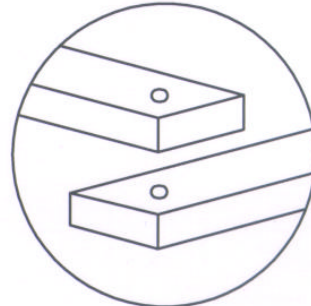
1. Cut all pieces to size on drawing.
2. Cut ship lap mortise and tenon on corners of frame pieces (6 pieces will have female type joint on both ends and 6 pieces will have male type joint on both ends).
3. Glue frames together and drill holes in corners for dowels. Cut dowel to 1 5/8 inch and glue in each hole.
4. Glue and nail 7/8 inch x 5 inches x 12 inches pieces to inside of frame.
5. Glue and nail bottom in place.
6. Turn over and drill 3/4" drain holes in bottom.



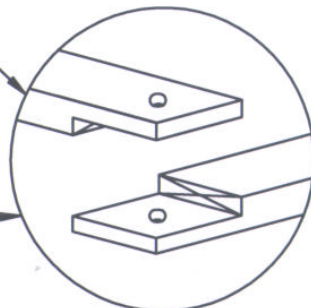
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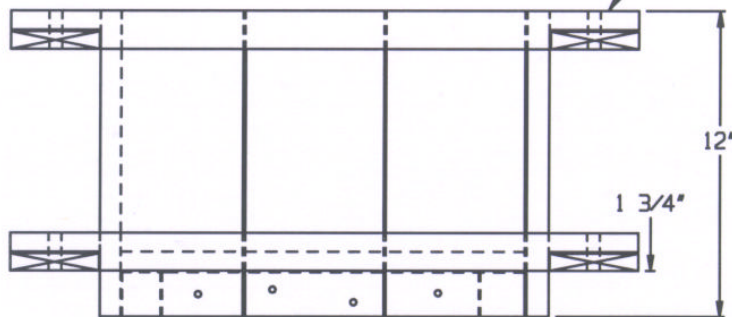
24 1/2"  
 or width of 3 boards  
 + thickness of 1  
 + width of 2 framing pieces.  
 TOP VIEW



Alternative  
 Corner Joint  
 Detail



Corner Joint  
 Detail



If taller box is desired,  
 increase length of boards  
 and add 3rd framing in middle.  
 SIDE VIEW



## Ky 4-H Wood Science Plans - Level 3



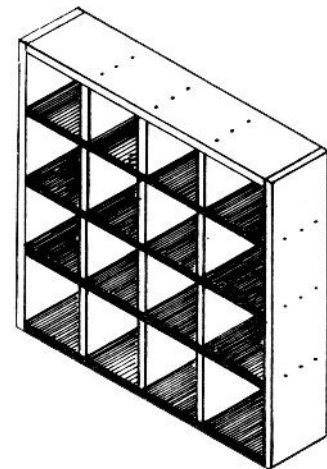
### A FLOWER MATRIX WS305

#### MATERIALS NEEDED:

8 pieces wood 3/8" x 5 1/2" x 23 3/4" (A, B, D)  
2 pieces wood 3/8" x 5 1/2" x 24 1/2" (C)  
4 – 2 1/2" angle brackets with screws  
\_ 2d finishing nails  
Glue

#### TOOLS NEEDED:

Hammer  
Band saw  
Screwdriver  
Sandpaper  
Paint or stain and varnish

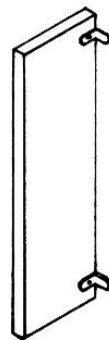
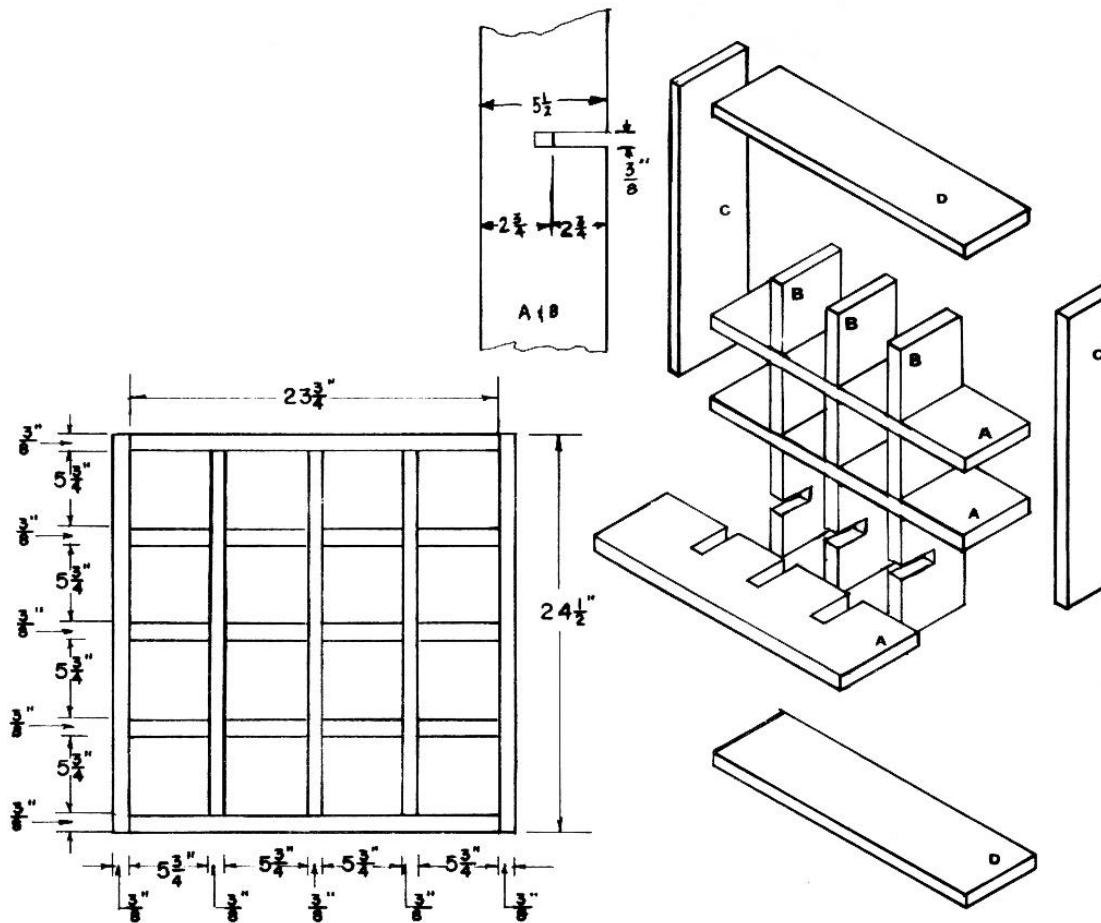


#### INSTRUCTIONS:

1. Cut pieces to size.
2. Cut notches in six of the 23 3/4" long pieces (A & B).
3. Glue the inner partitions (A & B) together.
4. Glue and nail outer frame (C & D) together.
5. On insides of pieces C, put the angle irons about 2" in from the ends
6. Set frame over partitions and glue and nail.
7. Sand and finish.



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inside face of c

angleirons



## Ky 4-H Wood Science Plans - Level 3



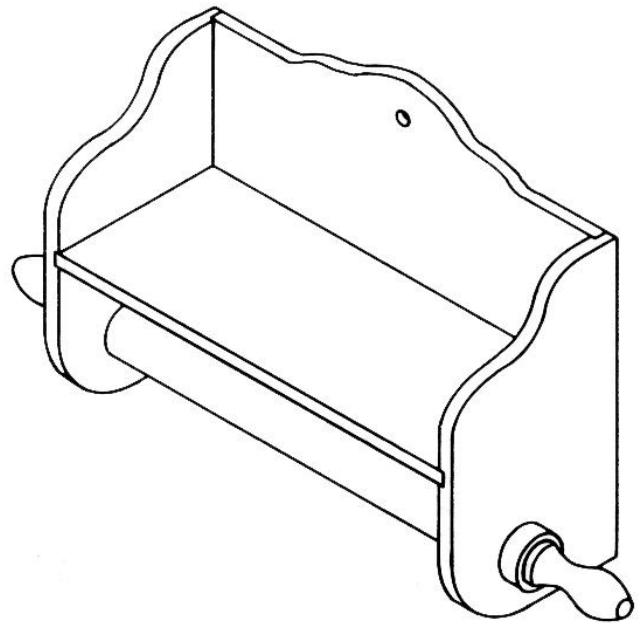
### COMBINATION SHELF & TOWEL HOLDER WS306

#### MATERIALS NEEDED:

All dimensions given are actual size of pieces.  
1 piece wood 5/16" x 7 1/4" x 11 5/8" – back  
2 pieces wood 5/16" x 4 13/16" x 10" – sides  
1 piece wood 5/16" x 4 1/2" x 11 5/8" – shelf  
1 piece wood 1 3/4" x 1 3/4" x 20" – spindle  
Glue  
3/4" brads  
Wood filler

#### TOOLS NEEDED:

Jig saw  
Table saw  
Drill with 3/8" and 1 3/8" bits  
Hammer  
Chisel  
Nail set  
Wood lathe and turning chisels  
Sandpaper  
Paint or stain and varnish

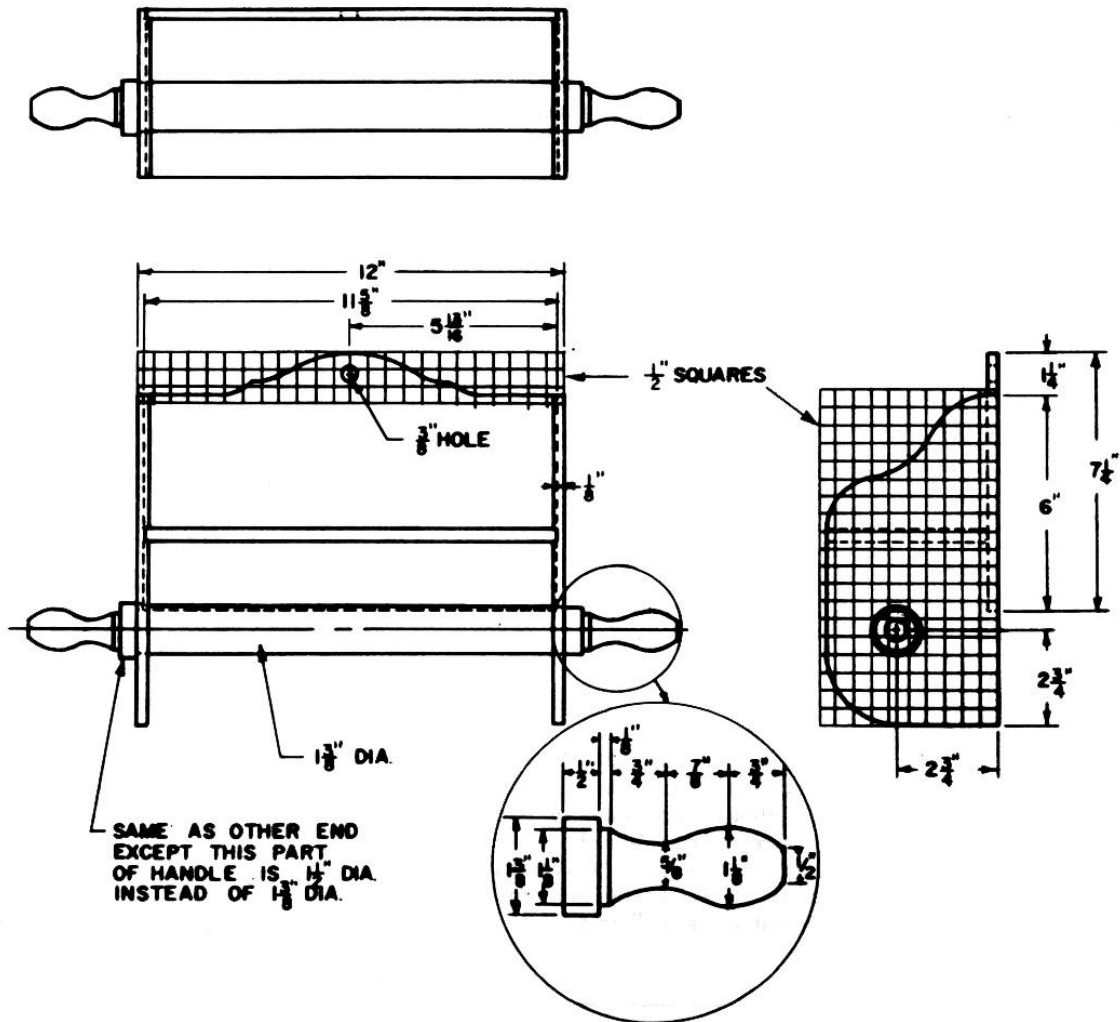


#### INSTRUCTIONS:

1. Cut pieces to size and shape.
2. Cut dados (grooves) in sides for the back and shelf. The ones for the shelf can be done on the table with blade set at 1/8" deep cut, but the ones for the back should be done as much as possible with the table saw and finish with hammer and chisel.
3. Drill 3/8" hole in back and 1 3/8" holes in sides.
4. Set up 1 3/4" square stock in lathe and turn to shape of spindle. The full length of the spindle is 18" with 12 1/2" of it as 1 3/8" diameter as shown on drawing.
5. Glue and nail shelf between sides.
6. Glue and nail back to sides and shelf.
7. Set all nails and fill with wood filler.
8. Sand and finish all pieces.
9. Spindle is then inserted through one side, through the tube of a roll of paper towels and then through other side.



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### CLOSET DOOR SHELVES WS307

#### MATERIALS NEEDED:

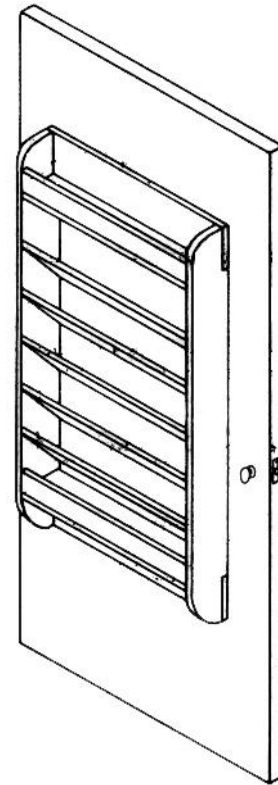
2 pieces wood 1" x 6" x 50" –sides  
2 pieces wood 1" x 6" x 25 1/2" – top and bottom rails  
2 pieces wood 1" x 6" x 24" – top and bottom shelves  
2 pieces wood 1" x 3" x 24" – shelf rails  
5 pieces wood 1" x 8" x 24" – slanted shelves  
Glue  
4d finishing nails  
Flathead screws to fasten unit to door

#### TOOLS NEEDED:

Band saw  
Hammer  
Block plane  
Sandpaper  
Paint or stain and varnish

#### INSTRUCTIONS:

1. Cut pieces to size, cut curves and notches at ends of side pieces.
2. Mark for shelves on sides, glue and nail top and bottom rails to sides.
3. Glue and nail shelves in place. Glue and nail shelf rails to top and bottom shelves.
4. Sand and finish.
5. Mount on door with two flathead wood screws in the top rail and one in the center of the bottom rail.







## Ky 4-H Wood Science Plans - Level 3



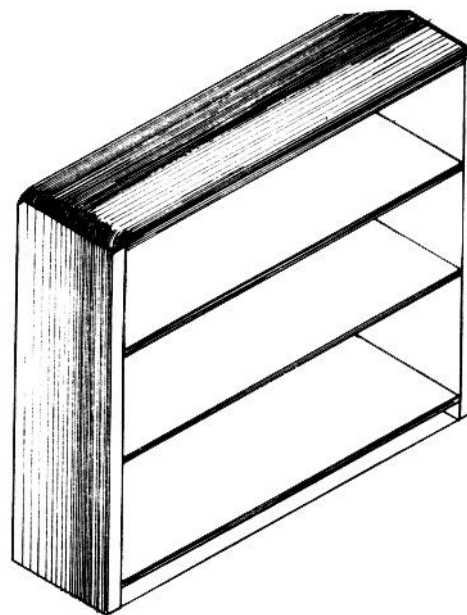
### BOOK CASE WS308

#### MATERIALS NEEDED:

White Pine Top, Sides and Shelves  
1 piece wood 1" x 12" x 44" for top  
2 pieces wood 1" x 12" x 41" for sides  
3 pieces wood 1" x 12" x 43" for shelves  
1 piece wood 1" x 2" x 43" for shelves  
Glue and Finish Nails Set and Filled  
1 piece 1/4" x 42 3/4" x 38 1/4" plywood for back

#### TOOLS NEEDED:

Hand saw  
Hammer  
File-Wood and Metal  
Sandpaper

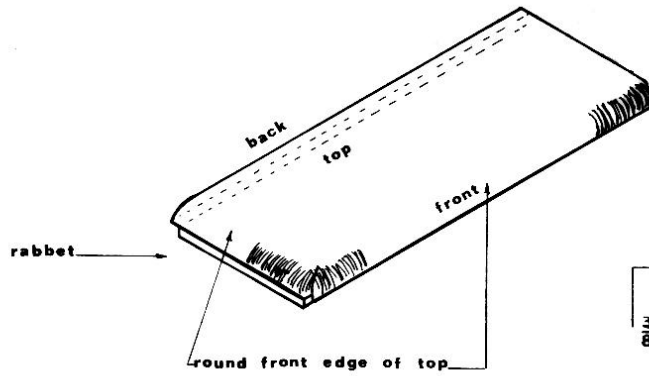


#### INSTRUCTIONS:

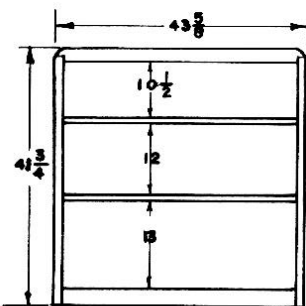
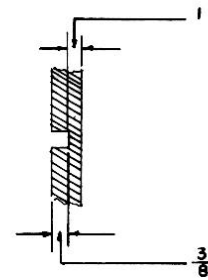
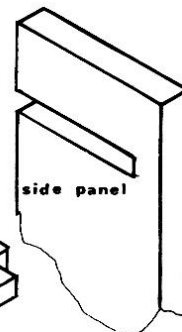
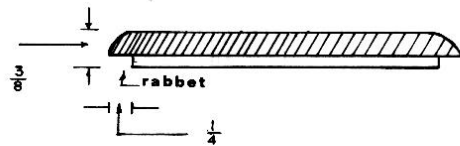
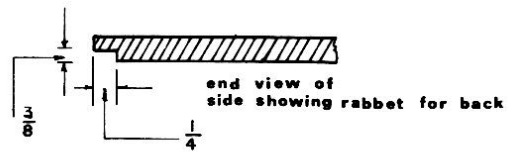
1. Cut boards as per dimensions specified.
2. The top is rounded off at corners on 3 sides as shown in drawing, using the file.
3. Be sure to make the cuts accurate.
4. Sand all the sides smooth and accurate.
5. Note the rabbet provided.
6. Assemble all the pieces prepared.
7. Nail the boards, spacing them uniformly.
8. Give a finish as desired.



# Ky 4-H Wood Science Plans - Level 3



end view of top  
back edge rabbeted to  
receive plywood back



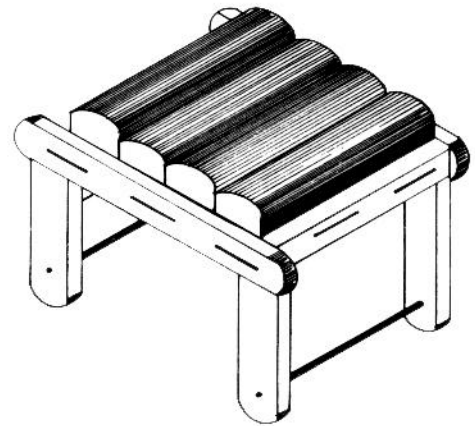
## Ky 4-H Wood Science Plans - Level 3



### LAWN STOOLS WS309

#### MATERIALS NEEDED:

2 pieces wood 1 1/4" x 2" x 2'6"  
6 pieces wood 1 1/4" x 2" x 1' 4"  
2 pieces wood 1" x 19 1/4" dower  
water proof glue  
8 No. 12, 2 1/2" flathead screws  
16 No. 12, 1 1/2" flathead screws  
About 23' of 3/8" manila rope  
Foam rubber or other water proof cushioning materials



NOTE: All dimensions are in inches.

#### TOOLS NEEDED:

Saw  
Drill with 1", 7/16", 1/8", and 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 1/8" pilot holes through legs into rails and fasten with No. 12, 1 1/2" screws (4 per joint).
5. Glue braces between rail ends. Drill 1/8" pilot holes and fasten with No. 12, 2 1/2" screws (2 per joint).
6. Drill 7/16" holes in frame (6 per side and 3 per end) for rope. Weave rope through holes.
7. Sand and finish.
8. Add seat pad.





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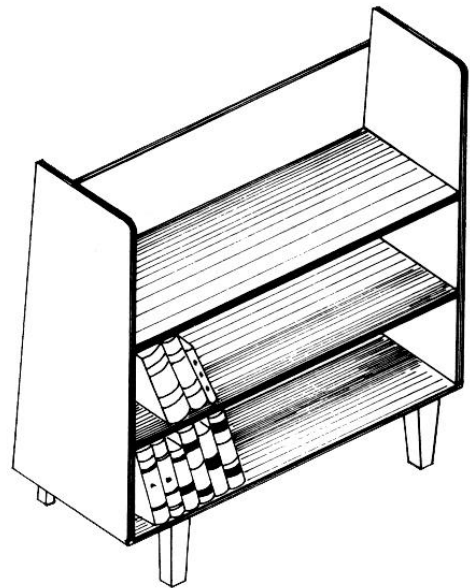
### BOOK SHELVES WS310

#### MATERIALS NEEDED:

- 1 piece wood 1/2" x 40" x 41 1/2" - back (A)
- 2 pieces wood 3/4" x 13" x 41" - sides (B)
- 1 piece wood 3/4" x 10" x 40" - shelf (C)
- 1 piece wood 3/4" x 12 1/2" x 40 1/2" - shelf (D)
- 1 piece wood 3/4" x 15" x 42" - bottom (E)
- 4 pieces wood 1 1/2" x 1 1/2" x 7" - legs (F)
- 1 piece wood 1" x 1 1/2" x 29" - rail (G)
- 2 pieces wood 1" x 1 1/2" x 9" - rail (H)
- 8 10d finishing nails
- 6d finishing nails
- Glue
- Wood filler

#### TOOLS NEEDED:

- Saw
- Hammer
- Wood rasp (file)
- Nail Set
- Sandpaper
- Stain and varnish



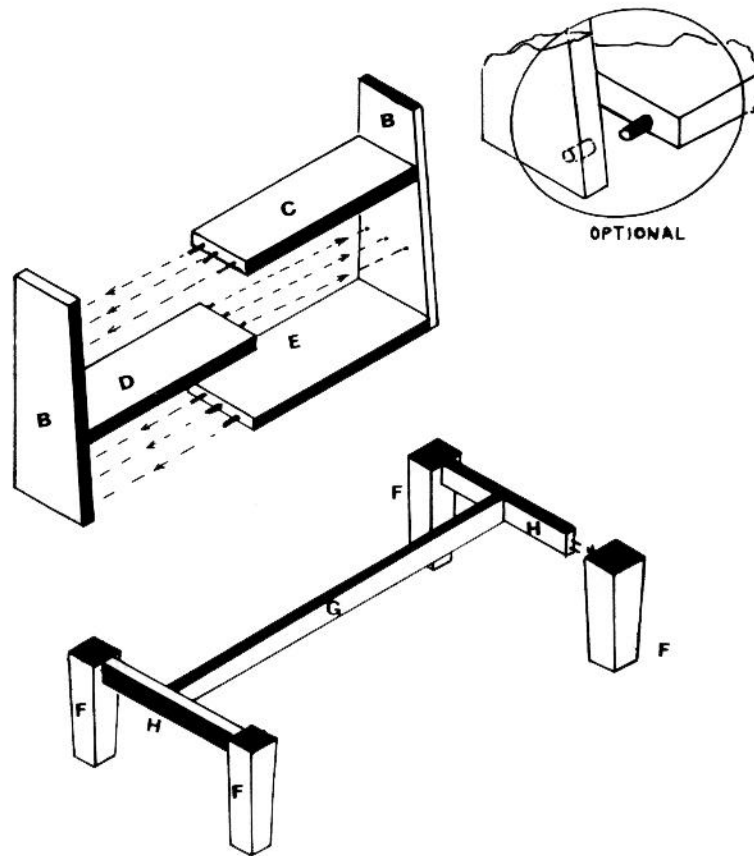
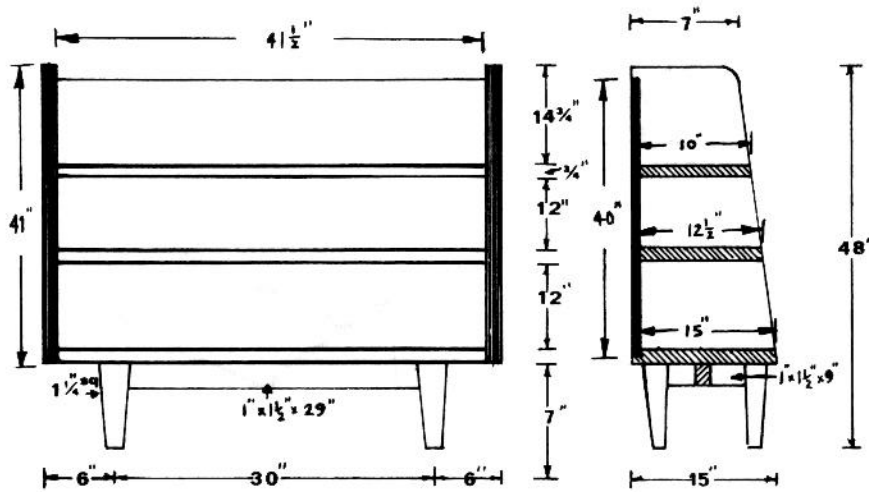
#### INSTRUCTIONS:

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 (B).
3. Glue and nail other end (B) to shelves and bottom.
4. Glue and nail back (A) in place.
5. Glue and nail legs (F) to rail (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 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 place is to use dowel pins (see circled diagram)



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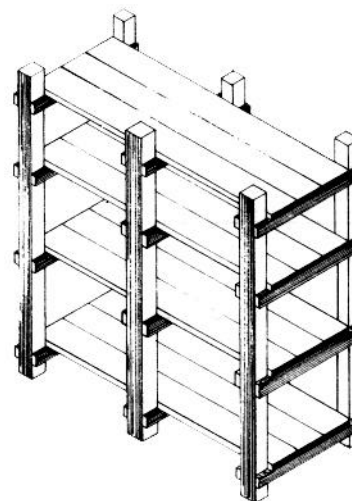
### PORTABLE SHELVING WS311

#### MATERIALS NEEDED:

6 pieces wood 2" x 4" x 6'  
12 pieces wood 1" x 6" x 10'  
24 pieces wood 1" x 4" x 1' x 10"  
96 – 8d box nails  
3d and 5d finishing nails for cleats

#### TOOLS NEEDED:

Saw  
File  
Marking pin  
Scale  
Hammer

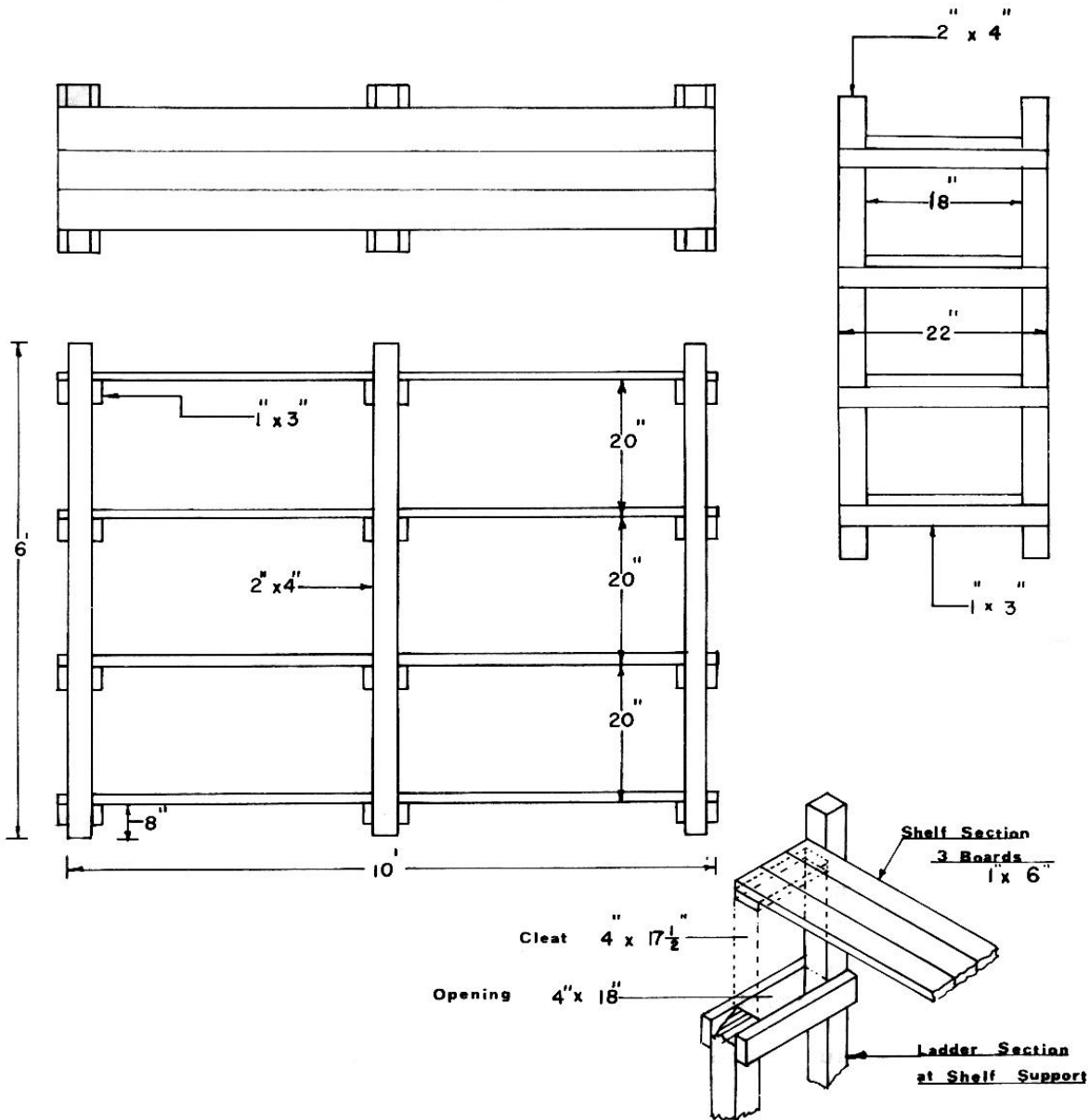


#### INSTRUCTIONS:

1. Cut six 2" x 4" posts, each 6' long.
2. Measure 8" from one end on each post and draw a line on the small side of 2" x 4" using the square. Repeat process at 28", 48", and 68". These mark the tops of the rungs.
3. Cut the rungs 1" x 3" x 22" long and nail in place with 8d common nails. Now check the "ladders" to be sure they sand level.
4. Cut the shelves (1 x 6 boards, 10 feet long), there will be three of these per level (12 total).
5. Nail the cleats across the ends of each set of three and one across the middle (58" from one end to edge of cleat).
6. Assemble shelving to check for any wobble. If it is out of level, trim ends of posts to level it.



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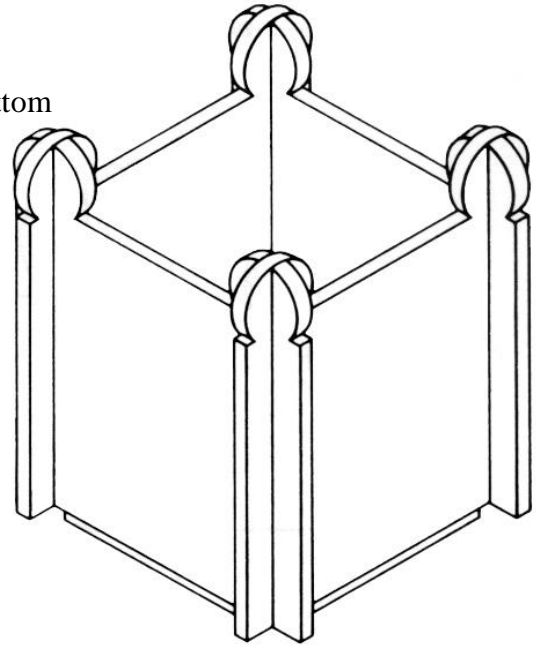
### PLYWOOD SLOT -TOGETHER POX WS312

#### MATERIALS NEEDED:

4 pieces 5/8" exterior plywood, 17" x 19 1/2" – sides  
1 piece 5/8" exterior plywood, 12 3/8" x 12 3/8" – bottom  
4 pieces wood 1 1/2" x 1 1/2" x 9" – base  
Waterproof glue  
4d galvanized finishing nails

#### TOOLS NEEDED:

Band saw  
Drill with 3/8" bit  
Hammer  
Sandpaper  
Exterior paint  
Waterproof paint

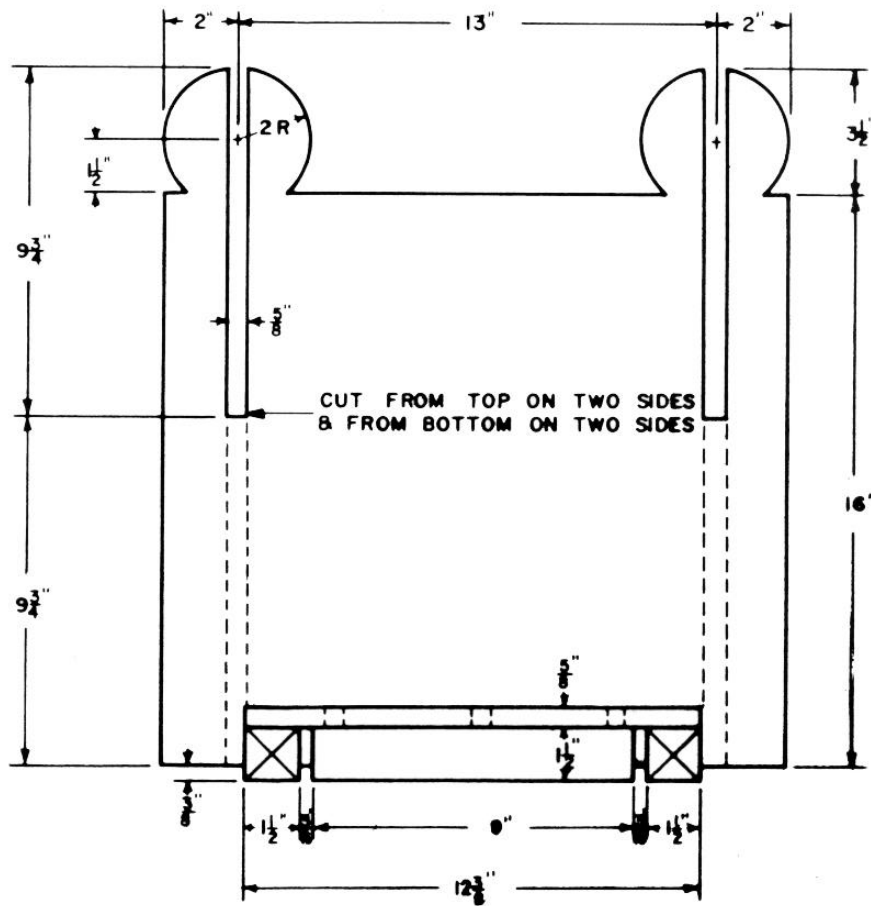
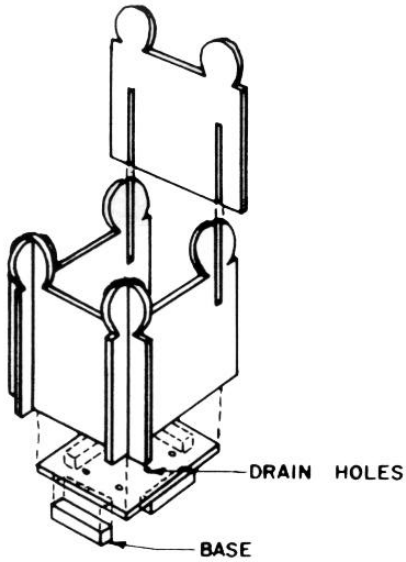


#### INSTRUCTIONS:

1. Cut pieces to size, cut decorative tops on sides. Cut slots in sides, two sides with the slot cut in from the top and the other two sides with the slot cut in from the bottom.
2. Drill drain holes in bottom.
3. Glue and nail base pieces to bottom.
4. Glue and nail box sides together. Set over bottom and glue and nail box to bottom and base pieces.
5. Sand entire box. Paint inside of box with waterproof paint and outside with exterior paint. Be sure to paint all cracks and gaps really well to prevent early decay.



# Ky 4-H Wood Science Plans - Level 3



## Ky 4-H Wood Science Plans - Level 3



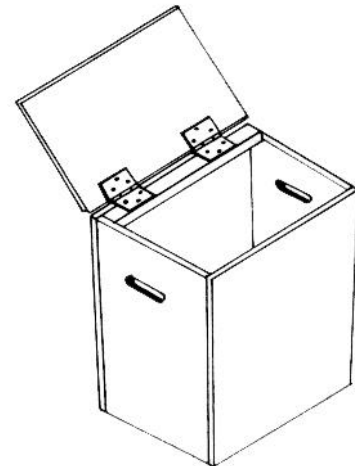
### LAUNDRY HAMPER WS313

#### MATERIALS NEEDED:

- 1 piece of 1/2" plywood 48" x 53" or individual pieces of dimensions shown on plan.
- 1 piece 3/4" x 1" x 19", cleat for hinges
- 2 hinges, 3", narrow butt, brass, with screws
- Assemble with #5 x 1 1/4" flathead wood screws

#### TOOLS NEEDED:

- Band saw
- Drill
- Screwdriver
- File
- Sandpaper

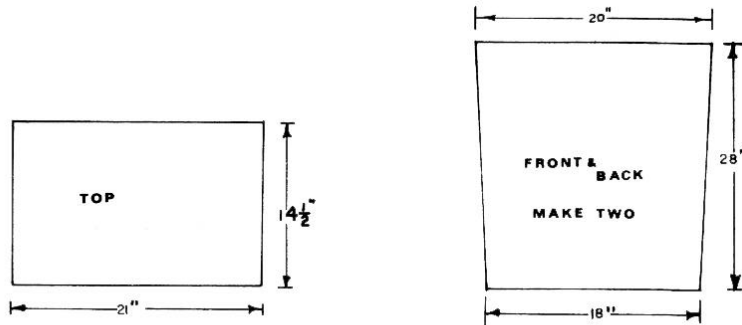


#### INSTRUCTIONS:

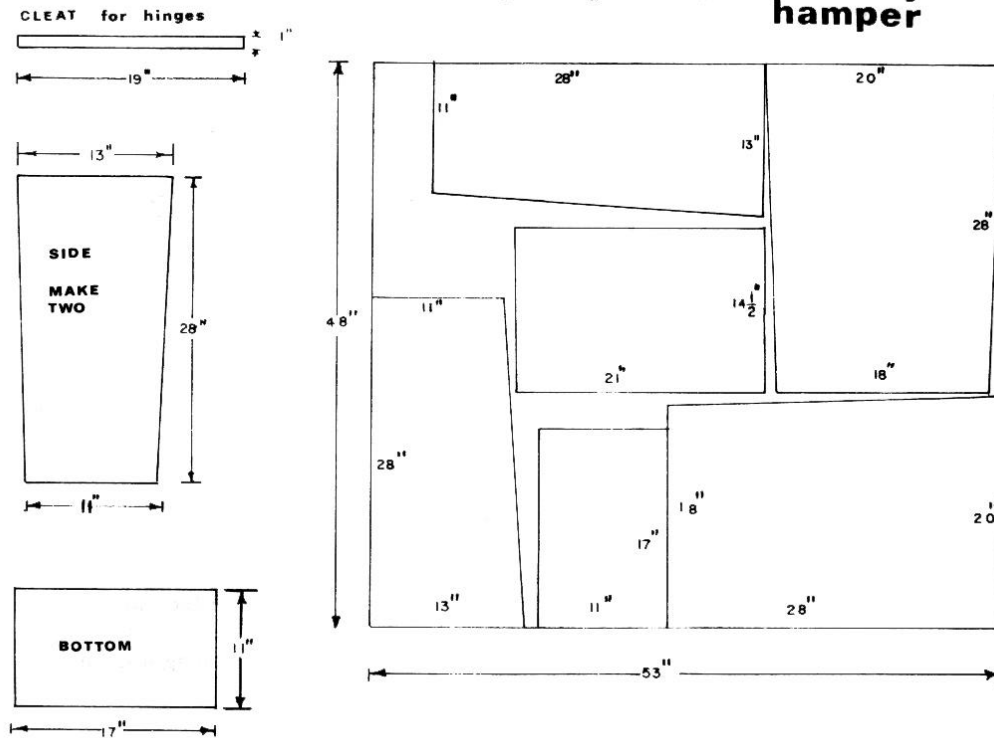
1. Draw the pattern of the pieces on the board and cut them out.
2. Sand the pieces and clean up the edges.
3. Make the handles in the sides by drilling 2-1 1/2" holes centered 4 1/2" from either end of the top, and on a horizontal line 5" down from the top edge. Continue to drill out the remaining material between the outside holes. Smooth with a file and sandpaper.
4. Screw the sides to the 17" side edges of the bottom.
5. Screw the front to the 17" front edge of the bottom and edges of the sides.
6. Screw the back to the other 17" edge of the bottom and edges of the sides.
7. Mount the hinges on the underside of the top, spaced one hinge length from either 14 1/2" sided.
8. Mount the top via the hinges on the hinge cleat.
9. Complete sanding and paint if desired.



# Ky 4-H Wood Science Plans - Level 3



## cutting layout for laundry hamper





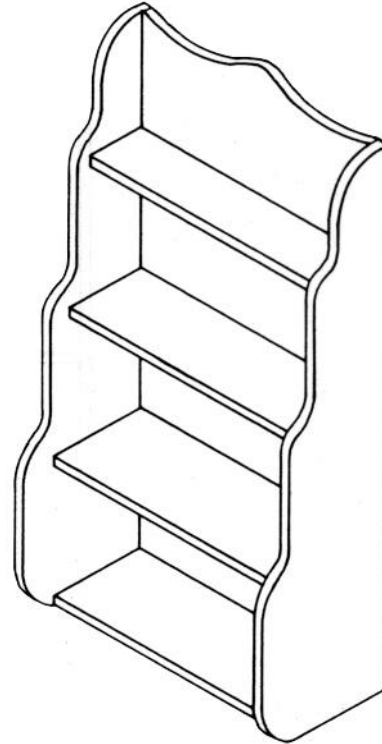
## HANGING COLONIAL WALL SHELF WS314

### MATERIALS NEEDED:

2 pieces wood 5/16" x 6" x 24 1/2" – sides  
1 piece wood 5/16" x 11 1/4" x 24 1/2" – back  
1 piece wood 5/16" x 2 1/2" x 11 1/4" – shelves  
1 piece wood 5/16" x 3 3/4" x 11 1/4" – shelves  
2 pieces wood 5/16" x 4 1/4" x 11 1/4" – shelves  
Glue  
3/4" brads  
Wood filler

### TOOLS NEEDED:

Jig saw  
Small Hammer  
Small nail set  
Bar clamps  
Sandpaper  
Stain and varnish

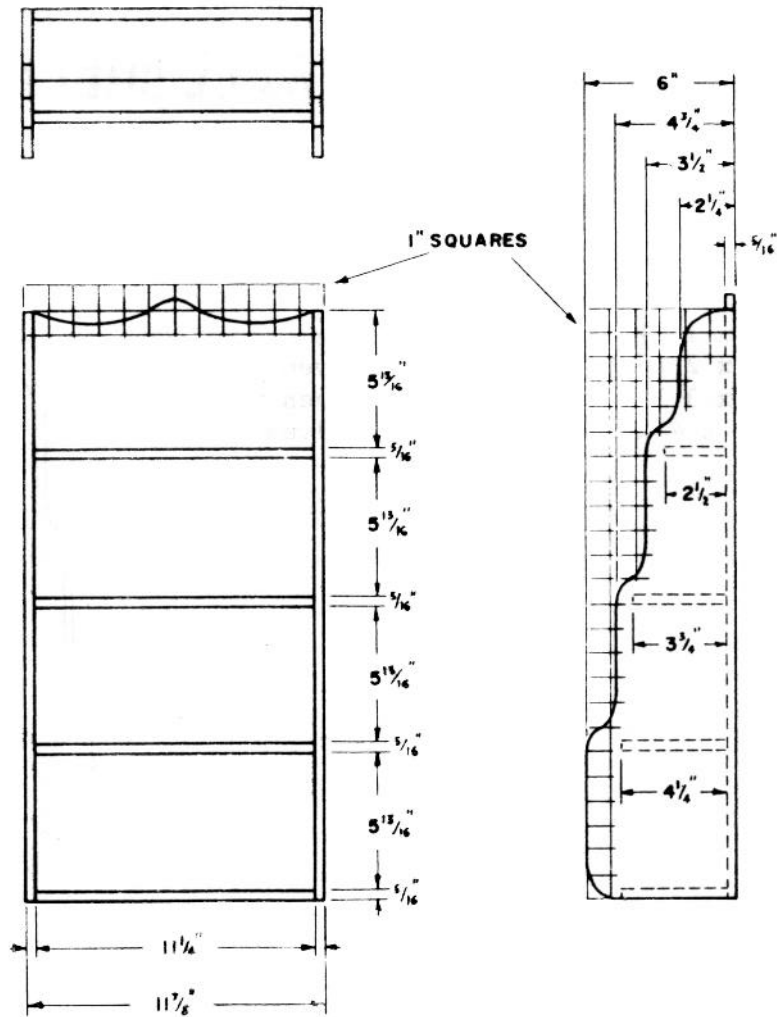


### INSTRUCTIONS:

1. Cut pieces to size. Cut out curves on sides and back.
2. Mark on sides for shelves and back. Glue and nail shelves between sides and clamp.
3. Glue and nail back piece in place.
4. Set all nails and fill depressions with wood filler.
5. Sand and finish.



# Ky 4-H Wood Science Plans - Level 3



## Ky 4-H Wood Science Plans - Level 3



### LUMBER BOX AND TRELLIS WS315

#### MATERIALS NEEDED:

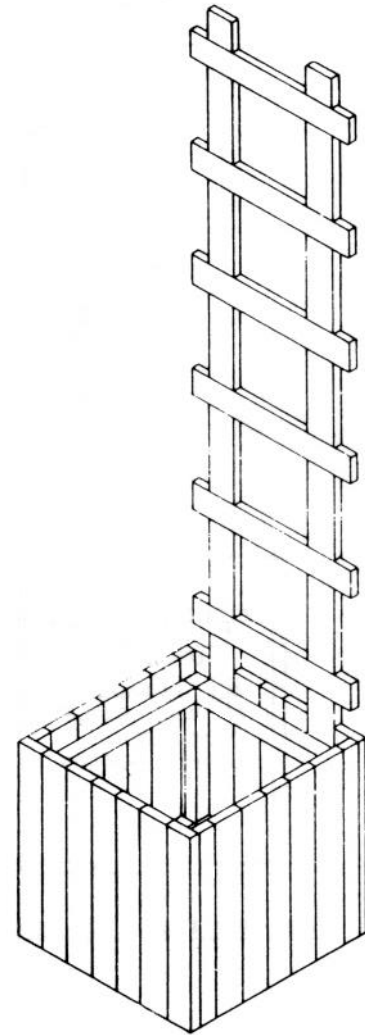
All pieces are redwood or cedar lumber except base.  
4 pieces wood 1 1/2" x 1 1/2" x 12" – corner braces  
8 pieces wood 1 1/2" x 1 1/2" x 13" – horizontal braces  
4 pieces wood 1 1/2" x 1 1/2" x 10" – base supports  
1 piece 5/8" exterior plywood, 16" x 16" – base  
22 pieces wood 3/4" x 2 1/2" x 17"  
4 pieces wood 3/4" x 2 1/2" ripped to 1 3/4" wide, 17" long  
2 pieces wood 3/4" x 2 1/2" x 74" – uprights  
6 pieces wood 3/4" x 2 1/2" x 16" – trellis cross pieces  
3/4" brads  
6d and 8d galvanized finishing nails  
Waterproof glue

#### TOOLS NEEDED:

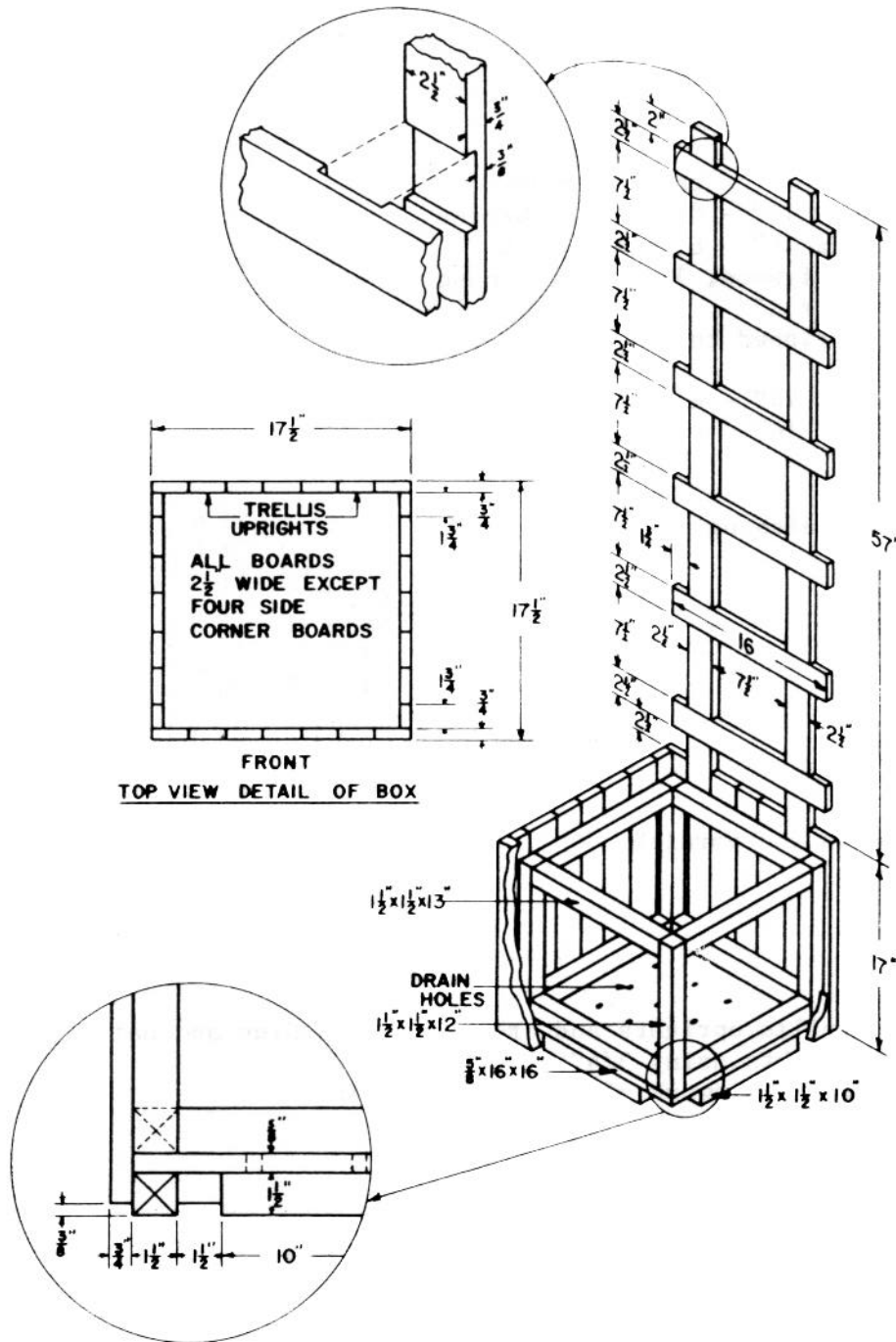
Saw  
Hammer  
Chisel  
Drill with 1/2" bit  
Sandpaper  
Exterior paint or stain and varnish  
Asphalt paint

#### INSTRUCTIONS:

1. Cut pieces to size.
2. Make notches in trellis uprights and cross pieces. Glue and nail cross pieces to uprights using 3/4" brads.
3. Glue and nail inside framework of 1 1/2 x 1 1/2's together.
4. Drill drain holes in base.
5. Glue and nail base to supports, using 6d nails.
6. Glue and nail framework to base with 8d nails through frame and base and into supports. Also put one nail up through the base into the corner 1 1/2 x 1 1/2's of the frame.
7. Glue and nail side pieces to frame. Glue front and back pieces along with trellis uprights to frame
8. Sand and paint inside of box with waterproof paint and finish outside of box and trellis as desired



# Ky 4-H Wood Science Plans - Level 3





## Ky 4-H Wood Science Plans - Level 3



### REDWOOD OCTAGON PLANTER WS316

#### MATERIALS NEEDED:

8 pieces wood 1 1/2" x 9 1/2" x 14" – sides  
8 pieces wood 1 1/2" x 1 1/2" x 6" – base supports  
1 piece 3/4" exterior plywood 22" x 22" – bottom  
48 – #10 x 2" galvanized flathead wood screws  
6d galvanized finishing nails  
8d galvanized finishing nails  
Waterproof glue

#### TOOLS NEEDED:

Table saw  
Drill with 1/2" bit, 1/8" bit and countersink bit  
Hammer  
Sandpaper  
Water resistant paint  
Exterior varnish



#### INSTRUCTIONS:

1. Cut pieces to size. Cut bevels on side pieces.
2. Glue sides together, drill 1/8" pilot holes, countersink and fasten together with #10 screws as shown.
3. Set octagon on bottom and mark around inside, cut out bottom. Glue and nail base supports to bottom. Drill 1/2" drain holes.
4. Glue and nail octagon to base with 8d galvanized nails.
5. Sand and paint inside with water resistant paint, outside with varnish or other finish.



# Ky 4-H Wood Science Plans - Level 3

