


PLANTER BENCH SHADE STRUCTURE

DIFFICULTY:
VERY COMPLEX

 12 VOLUNTEERS

 8 HOURS

MATERIALS

PREP

- (6) 2x6x10ft boards
- (16) 2x4x8ft boards
- (42) 4x4x8ft boards
- (6) 4x4x10ft boards
- (7) 2x6x12ft boards
- (8) pieces of 4x8ft lattice

BUILD

- (6) 4x4x10ft boards
- (12) 4x4x8ft boards
- (6) 2x6x10ft boards
- (7) 2x6x12ft boards
- (50) 4x4x24" pieces
- (50) 4x4x31" pieces
- (48) 2x4x31" pieces
- (1) 2'x8' lattice piece
- (1) 2'x4' lattice piece
- (8) 24"x92" lattice pieces
- (3) 4'x8' lattice pieces
- 1lb 3" deck screws
- 20lbs 60d 6" galvanized nails
- 2lbs 1" N8 galvanized nails
- 1lb 1" finishing nails
- (16) H2.5A galvanized rafter ties
- (8) .5"x8" galvanized carriage bolts
- (8) .5"x6" galvanized carriage bolts
- (24) .5"x6" galvanized lag screws
- (40) .5" galvanized washers
- (16) .5" galvanized nuts
- 7 cubic feet of fill material
- 6 cubic feet potting soil
- Plants

PREP LIST


1. Sort materials into piles by like items to ensure you have materials needed to complete project.
2. Take all (16) 2x4x8ft boards. Cut each into (3) 31" pieces, for a total of (48) 2x4x31" pieces.
3. Take (17) of the 4x4x8ft boards. Cut each into (3) 31" pieces for a total of (51) 4x4x31" pieces. You will use 50 of them - the extra is scrap.
4. Take (13) of the remaining 4x4x8ft boards. Cut each into (4) 24" pieces for a total of (52) 4x4x24" pieces. You will use 50 of them - the extra 2 are scrap.
5. Take 1 of the 4x8' lattice pieces. Using the chalk line, mark out (1) 2'x8' section and (1) 2'x4' section. Cut these out using the circular saw. The other part of the lattice is scrap.
6. Take 4 of the remaining lattice pieces. Cut each into (2) 24"x92" pieces, for a total of (8) 24"x92" lattice pieces.
7. Do NOT cut the following pieces of lumber: [6] 4x4x10ft boards ; (12) 4x4x8' ; (6) 2x6x10' boards ; (7) 2x6x12' boards ; (3) 4x8' pieces of lattice.

Tools listed on page 2

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TOOLS

PREP

Miter saw
Circular saw
Chalk line
Carpenter's square
Pencil
Tape measure
Safety glasses

BUILD

Tape measure
Hammer/mallet
Ladder
.5" long drill bit
Ratchet with .75" socket or .75" open wrench
Level
Safety glasses
Screwdriver bit
Sandpaper


BUILD LIST

1. Sort materials into piles by like items to ensure you have materials needed to complete project.
2. Planter Squares: create 22 planter squares using (2) 4x4x24" and (2) 4x4x31" for each square. Attach these 4x4s using 6" nails and a hammer. You will want to pre-drill the holes with the .25" drill bit to avoid bending the nails.
3. Planter Bases: using 12 squares, build 4 planter bases, each 3 levels (or squares) high. Attach one level at a time, rotating each level 90° so the 31" pieces always sit on top of 24" pieces. Use 6" nails to make two connections per level, one connection in the middle of each 31" piece.
4. Connect the Planters: connect each set of two planter bases with 4x4x10ft beams, sandwiching (1) 24" and (1) 31" piece between them. Place two sets of planter bases 65" apart - they will form two sides of the "U" shape that is created in Step 5. Make sure benches are in final space. They will be too heavy to move after next step!
5. Create "U" shape by using two remaining 4x4x-10ft pieces to create a third bench to connect the two back planters. Sandwich the 4x4x24" and 4x4x31" pieces between the two 4x4x10ft pieces, as shown below. **Note that the bench in the back will be one course higher than the benches on the sides.** Make sure the opening in bench is facing direction you want and all three sides are square (the opening into the structure should be 65in between the planter bases).
6. Continue building up all 4 planters until all are 7 levels high, including the seat level.
7. Using 2.5" screws, attach the 2x4x31" pieces to 10ft beams to create seats. Leave even-spaced gaps (about 5/8") between each seat slat and between end pieces and planters. There will be 16 slats on each bench.

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BUILD LIST

8. Attach 4x4x8ft Posts to Planter Benches with two .5"x 6" lag screws per post. Use one lag screw in each exposed face of posts (two screws should be perpendicular as they enter pole). **bottom of posts should be flush with bottom of planter base (the ground). 
9. Prepare inside headers: Sort (2) 2x6x10ft pieces of lumber. These will be structure's inside headers. Using 1" Simpson nails, attach galvanized rafter ties to headers. You'll be attaching seven rafter ties to each header. 
10. Attach outer side headers. Using two-three 3" screws, attach two 2x6x10ft pieces (headers) to 4x4 posts that run along each of the outside sides of the structure (one on each side). Align so top of 2x6x10ft is flush with top of 4x4 posts, and the ends of 2x6x10ft are flush with outside edges of 4x4 posts. Place screws closer to end of 2x6 rather than in line with 4x4 post center – the carriage bolts will go through the center. 
11. Attach the inside, side headers. Using 3" screws, attach (2) 2x6x10' headers prepped in Step 9 with rafter ties, to inside of the 4x4 posts which now have the outside headers. Use the .5"x 8" carriage bolts to secure headers by piloting a hole with the .5" drill bit and drilling through the two headers and the 4x4 post. There should be one carriage bolt in each connection between headers and 4x4 posts. **Note: place carriage bolts nearer to top or bottom of 2x6x10 rather than centered. You will later be adding another carriage bolt through 4x4 post perpendicular to these and want to allow sufficient space. 
12. Connect rafters: connect the rafters to rafter ties using 1" Simpson nails. Rafters will overhang the outside of the outer headers by 10.5" on each side. Continue until all rafters are connected to the rafter ties. 

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13. Attach the front and back headers. Sort (2) 2x6x10' headers and attach one to the front and one to the back of the structure, on the outside of the 4x4 posts. Use .5"x 6" carriage bolts to secure last two headers. You will pilot holes and add carriage bolts just like in Step 11, but through each connection of single header and 4x4 posts.



14. Arrange the lattice. Arrange the lattice pieces, and attach them to the tops of the rafters.



15. Arrange the lattice on the sides. Using finishing nails, attach the 24"x92" pieces of lattice to the 4x4 posts.



16. Fill the first 3/4 of each planter box with dirt, rocks, or other fill material. Fill the remainder of each box with potting soil and plants.

