

# Hollow Skull Column Make and Take Instructions

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## ITEMS TO BRING

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### TOOLS IF YOU HAVE THESE

DO NOT purchase items except the **REQUIRED** if you don't have them.

- drill bits (3/32", 1/4", 5/16") & a counter sink **REQUIRED**
- 7/16" nut driver bit, or 7/16" socket with socket adapt bit, or 7/16" socket and ratchet wrench
- cordless or corded drill (having 3 to 4 drills will speed up the process) **REQUIRED**
- Phillips bit **REQUIRED**
- Center punch
- DeWalt Steel Drill Drive Set (flip drive) 5/16 in. Hex Shank 12 pc
- scissors
- 36" yard stick or straight edge
- tape measure **REQUIRED**
- caulk gun
- square such as a carpenter's square
- 4+ bar clamps, gear clamps, or C clamps that can open to at least 2 inches
- jig saw, scroll saw or reciprocating saw
- small yogurt containers, frozen dinner containers or cup cake pan for organizing hardware
- medium and coarse sandpaper and sanding blocks
- box cutter/utility knife
- coarse file
- center punch
- safety glasses **REQUIRED**

### PARTS

- vacuformed skull from the January M&T (we will have extras)
- a light to put below or behind the skull (can be purchased later)

### SUPPLIES

- blue masking tape **REQUIRED**
- sharpened pencil **REQUIRED**
- sharpie that will work on black e.x. gold or silver
- black sharpie
- paper towels **REQUIRED**
- disposable gloves **REQUIRED**
- two scrap 2x4's about 14" long or smaller pieces
- scrap piece of plywood ideally 12 x 12 or larger
- dust mask **REQUIRED**

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## OTHER ITEMS TO BE PROVIDED

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### TOOLS

- large tarps and cardboard for spray painting
- sawed off 6mm Allen wrench hex bits

### PARTS

- hardware (see parts list)
- 4' x 8' brick paneling (see parts list)
- .45" sanded plywood (see parts list)
- square wood edging 1 3/8" x 1 3/8" (see parts list)
- 3D printed, primed, and painted frame

### SUPPLIES

- exterior wood glue
- construction adhesive
- black spray paint for skull
- other spray paints as options for color of frame
- aluminum foil
- wood stir sticks
- gorilla tape
- brown paper for the tables
- aluminum foil

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## PARTS LIST

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### BRICK PANEL PIECES

1. (2) 47 1/2" x 17 7/8" – Bottom Front and Back
2. (2) 47 1/2" x 15" – Bottom Sides
3. (2) 23 3/4" x 15" – Top Front and Back
4. (2) 23 3/4" x 12" – Top Sides

### SANDED PLYWOOD PIECES

1. (1) 21 1/8" x 18" – Top
2. (1) 21 1/8" x 18 5/8" – Middle
3. (1) 24" x 21 5/8" – Bottom

### SQUARE WOOD PIECES

1. (4) 47 1/2" – Bottom vertical supports
2. (4) 23 3/4" – Top vertical supports
3. (4) 21 1/8" – Front/back of bottom plywood's top, and front/back of middle plywood's bottom
4. (4) 18 1/8" – Sides of bottom plywood's top, and sides of middle plywood's bottom
5. (4) 15 5/8" – Front/back of middle plywood's top, and front/back of top plywood's bottom
6. (4) 12 5/8" – Sides of middle plywood's top, and sides of top plywood's bottom

### HARDWARE

1. (92) #6 Philips wood deck screws 1 1/4" long (28 will be left over when you are done)
2. (32) #6 Philips wood deck screws 2" long
3. (28) 1/4-20 stainless steel fender washer 1/2" diameter
4. (28) 1/4-20 Flush hex thread insert die cast zinc alloy 1/2" long
5. (28) 1/4-20 Stainless steel hex head bolt 1" long

### OTHER

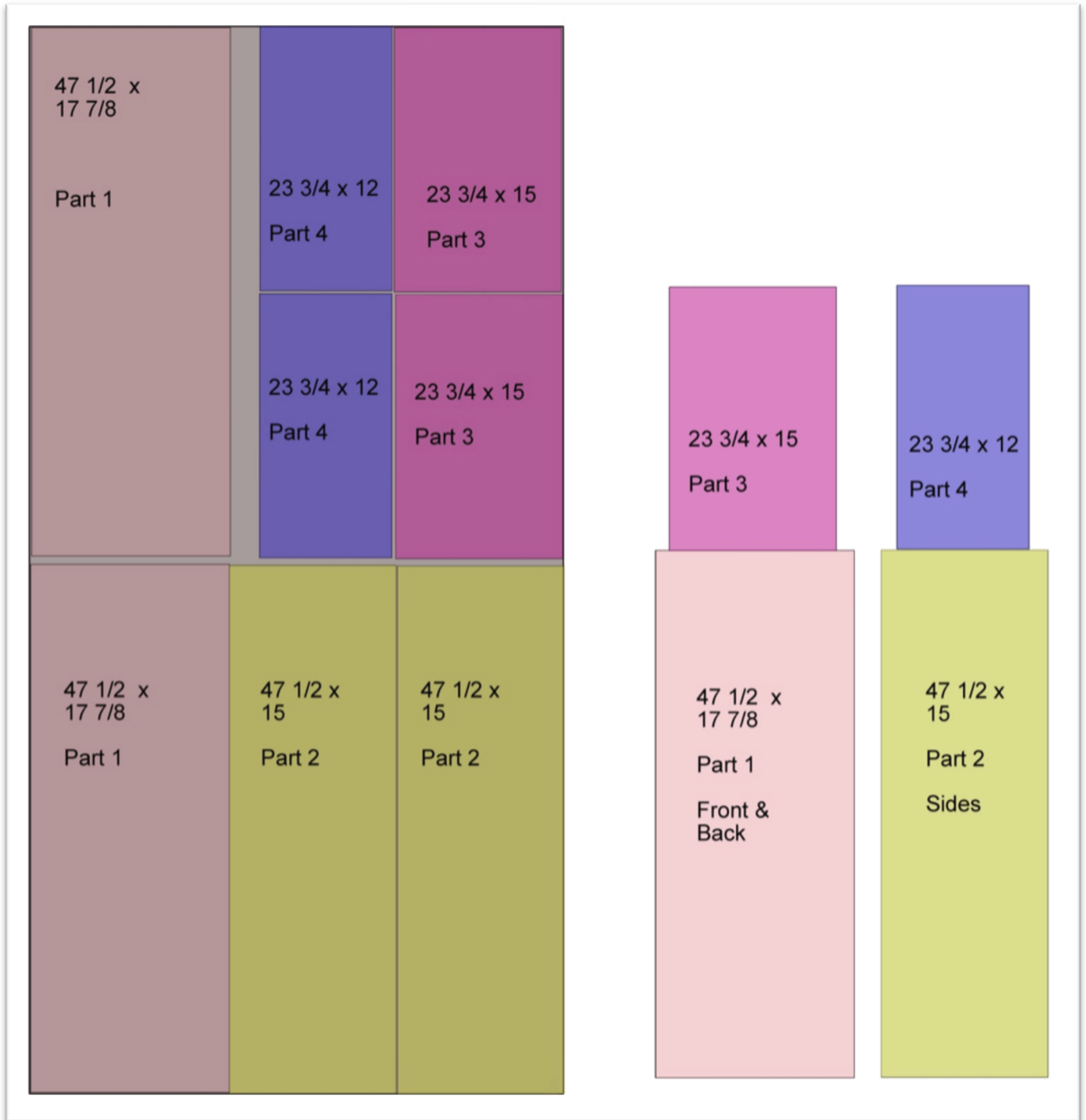
1. (1) Primed frame
2. (1) Vacuumformed skull

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### CUTTING PLAN FOR 4' X 8' BRICK PANEL

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# Hollow Skull Column Make and Take Instructions

## INSTRUCTIONS

### GENERAL

- As needed, sand wood to remove splinters left over from sawing
- Screw into brick paneling in the brick part not the mortar
- Mark flat (concave) side of skull as **front** and curvy (convex) side as **back**
- All pilot holes are drilled with 3/32" drill bit

### PAINT FRAME IF DESIRED

1. If you want the frame to be another color than provided, spray paint with desired color. Leave to dry.

### PAINT THE INSIDE VISIBLE PART SURROUNDING SKULL BLACK

2. With the front of the skull up, apply blue masking tape all along the edge of the skull where you want it to remain white.
3. Lightly scrunch a piece of aluminum foil, push it into the skull and tape it down to keep spray paint off of the skull.

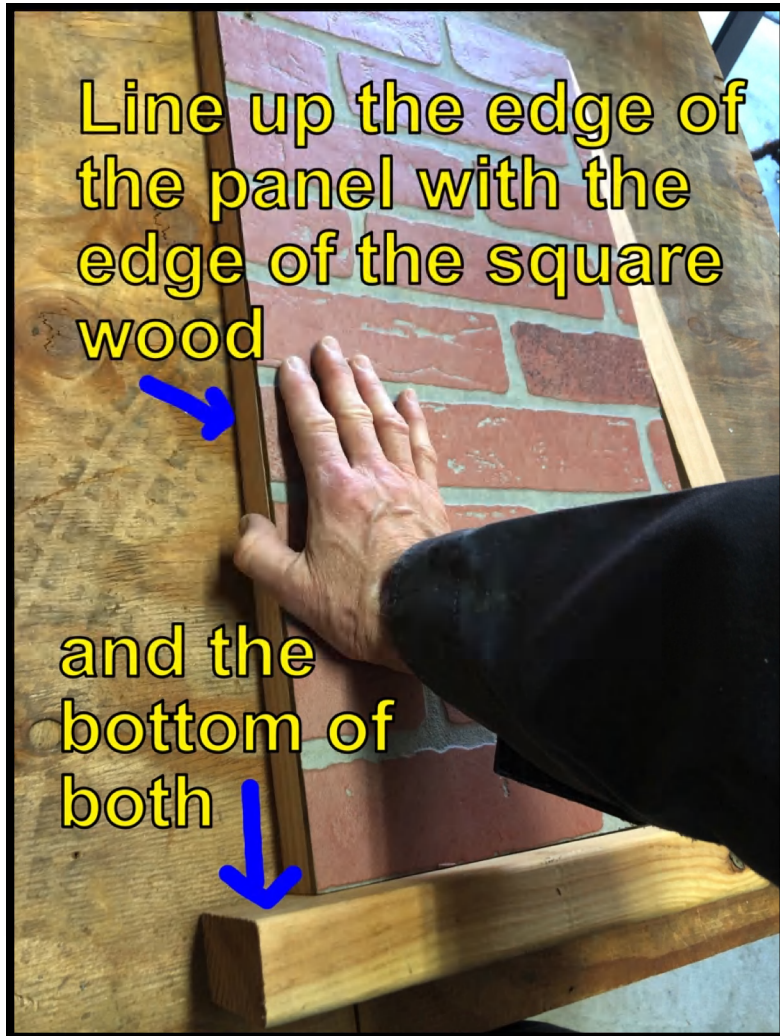


4. Spray paint the flashing on the front with black spray paint. Leave to dry.

## Hollow Skull Column Make and Take Instructions

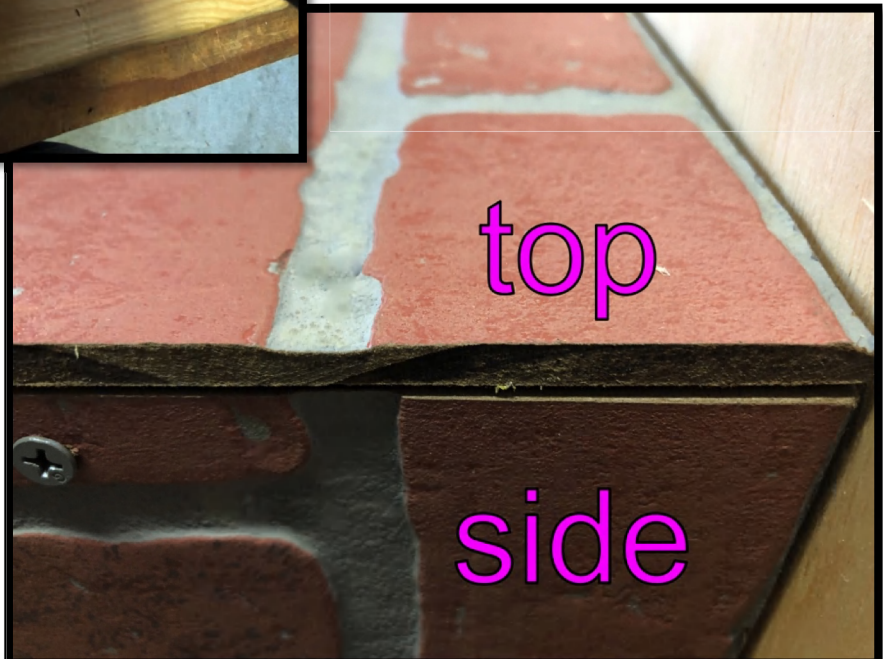
### CREATE THE TOP BRICK PIECE

5. Layout the 4 brick panel pieces for the top #4, #3, #4, #3. See how they best line up in terms of matching up the brick and mortar. Mark the back of the #4 panels to indicate which is the front and back and which end is the top. Mark the #3 panels to indicate which is left and right and which end is the top.



6. Drill  $\frac{3}{32}$ " pilot holes and then screw in (temporarily) the top vertical supports (square wood pieces #2) onto the top side panels (brick paneling #4) using (2)  $1\frac{1}{4}$ " deck screws for each. These screws should each be put in at about  $3\frac{1}{2}$ " from the top and  $3\frac{1}{2}$ " from the bottom and  $\frac{3}{4}$ " in from the side edges of the brick panel. **It is important that the vertical pieces line up with the side edge and bottom edge of the paneling.**

7. Drill  $\frac{3}{32}$ " pilot holes and then screw in (temporarily) the front and back brick panels (#3) to the vertical supports using (2)  $1\frac{1}{4}$ " deck screws for each. These screws should be positioned at about  $\frac{3}{4}$ " from the top and bottom and 1" in from the side edges. **The front and back paneling overlaps the side paneling.**



## Hollow Skull Column Make and Take Instructions

8. Remove the screws put in to hold the front, back and sides to the vertical supports in the two steps above. Hang onto the screws!
9. Enlarge the holes in the side paneling to  $\frac{1}{4}$ ".
10. Make a visual stop on the drill bit by wrapping masking tape at 1" from the tip of the  $\frac{5}{16}$ " drill bit. Enlarge holes in the vertical posts (just for the sides) to  $\frac{5}{16}$ ". Lightly sand all enlarged holes with a sanding block.



11. Drive threaded inserts into wood uprights with 6mm hex head screwdriver bit at least 1" deep. Make sure inserts do not stick out above the wood surface.



12. On the front and back pieces of paneling carefully countersink for the screws. Do not drill so far that you enlarge the holes on the inside surface of the paneling.
13. Organize the work surface: wood glue, 1  $\frac{1}{4}$ " wood screws, paper towels, hex bolts, and washers, electric drill with Phillips bit and the electric drill with the hex bit. Make sure you will have enough open work space for attaching the verticals to the side pieces and then putting the upper brick paneled column together as you will need to do all of this quickly.
14. Apply a **small** amount of exterior wood glue to the uprights (avoiding the sides where the threaded inserts are) and glue and screw to the front and back. Wipe off any excess glue very well with paper towels. Immediately install the hex bolts (with a washer between the hex bolt head and the paneling) to ensure everything lines up as it dries. Hex bolts can be installed either with a  $\frac{7}{16}$ " nut drive or a  $\frac{7}{16}$ " socket with a socket adapter bit in a cordless drill or manually with a  $\frac{7}{16}$ " socket and ratchet wrench (though the manual method is slower).
15. Drill, countersink and drive in additional screws about  $\frac{1}{2}$  way up and 1" in from the sides on the front and back panel pieces to assure the paneling does not separate from the vertical pieces. (at a later time, these can be concealed with a bit of epoxy putty so they will not show).

## Hollow Skull Column Make and Take Instructions

### PREP SKULL AND FRAME FOR THE TOP

16. Tape oval frame on curved side of the vacuumformed skull (part without the black paint). Loosely trace inside and outside of frame.
17. Use scissors to cut the flashing slightly outside the outer frame traced above. Cut off the flowery pieces of the frame shown in the outline (just cut an oval).
18. Drill some 1/4" holes in the remaining skull flashing so the edges of the holes are slightly within the outer trace line.
19. Use coarse sandpaper to roughen the plastic on front of the skull (black side) but only from the edge to just past the line of holes. The holes and sanding will improve adhesion of the column, skull and frame pieces. You don't want to take the black paint off the front parts that will be visible.
20. Use a coarse file and or a box cutter to roughen up and/or score the back side of the of the printed frame. If you scrap off some paint in the process you are doing it right.
21. Remove tape and foil from the skull.
22. Take the top brick column piece and lay it down so the top face is up. Determine the desired location of the frame and attach as best as you can with blue tape to avoid it moving. Trace around the inside of the frame. Create a smoother curve slightly larger than the oval just created.
23. Drill some 5/16" holes along the smooth curve line just created to allow you to plunge the saw blade into the brick panel. Either with the column vertical or horizontal, cut out a smooth oval shape with a jig saw, scroll saw or reciprocating saw.

### ADHERING THE SKULL AND FRAME TO THE FRONT TOP PANEL

#### *Skip for now if you are going to paint paneling*

24. Take the front brick piece (with the hole in it) off the other brick pieces. Lay it down flat with the inside side up. Mark on the paneling where the skull will fit (black side down) so that you can easily place it once you apply glue.
25. Apply a zig zag bead of construction adhesive to the skull flashing between the outside edge of the flashing and the line of holes. Use a stir stick to get some of the glue slightly on the inside line of the holes.
26. Set the skull on top of the hole, carefully centering it. Remove excess glue on this side with a wet paper towel.
27. Tape down with gorilla tape to secure the skull while the glue sets. Immediately turn over and clean any excess glue with a paper towel.
28. Carefully install the front piece back in the small top brick column. Lay front face down to dry for awhile.
29. Later, test that no light gets through around the edges of the flashing. Seal with more tape if it does. Turn the small top brick column so the top is face up. Apply a zig zag bead of construction adhesive along the back side of the oval frame. Carefully place around the skull. Remove any excess glue with a wet paper towel before it dries. Allow to dry before moving.



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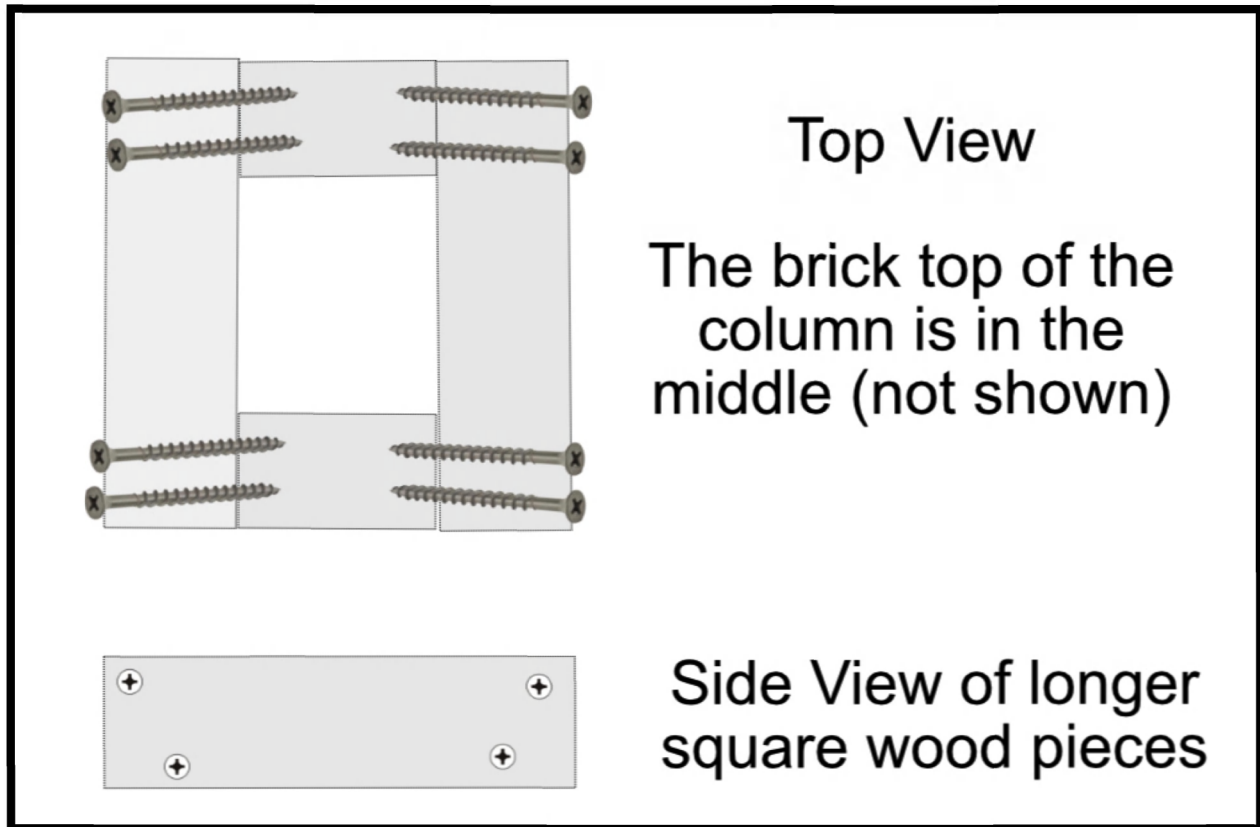
### CREATE THE BOTTOM BRICK PIECE

30. Repeat the steps for addition supports to the top except this time for the bottom pieces as follows, with the items underlined being slightly different than for the top pieces.
31. Layout the 4 brick panel pieces for the bottom #2, #1, #2, #1. See how they best line up in terms of matching up the brick and mortar. Mark the back of the #2 panels to indicate which is the front and back and which end is the top. Mark the #1 panels to indicate which is left and right and which end is the top.
32. Drill 3/32" pilot holes and then screw in (temporarily) the top vertical supports (square wood pieces #4) onto the top side panels (brick paneling #4) using (5) 1 ¼ deck screws for each. These screws should each be put in at about 3 ½", 12", 24" and 36" from the top and 3 ½" from the bottom. They should be ¾" in from the side edges of the brick panel. **It is important that the vertical pieces line up with the side edge and bottom edge of the paneling.**
33. Drill 3/32" pilot holes and then screw in (temporarily) the front and back brick panels (#3) to the vertical supports using (3) 1 ¼" deck screws for each. These screws should be positioned at about ¾" from the top, 22" from the top and ¾" from the bottom and 1" in from the side edges. **The front and back paneling overlaps the side paneling.**
34. Remove the screws put in to hold the front, back and sides to the vertical supports in the above two steps. Hang onto the screws!
35. Enlarge the holes in the side paneling to ¼".
36. Make a visual stop on the drill bit by wrapping masking tape at 1" from the tip of the 5/16" drill bit. Enlarge holes in the vertical posts (just for the sides) to 5/16". Lightly sand all enlarged holes with a sanding block.
37. Drive threaded inserts into wood uprights with 6mm hex head screwdriver bit at least 1" deep. Make sure inserts do not stick out above the wood surface.
38. On the front and back pieces of paneling carefully countersink for the screws. Do not drill so far that you enlarge the holes on the inside surface of the paneling.
39. Apply a **small** amount of exterior wood glue to the uprights (avoiding the sides where the threaded inserts are) and glue and screw to the front and back. Wipe off any excess glue very well with paper towels. Immediately install the hex bolts (with a washer between the hex bolt head and the paneling) to ensure everything lines up as it dries. Hex bolts can be installed either with a 7/16" nut drive or a 7/16" socket with a socket adapter bit in a cordless drill or manually with a 7/16" socket and ratchet wrench (though the manual method is slower).
40. Drill, countersink and drive in additional screws at about 10" from the top and 14" from the bottom, and 1" in from the sides on the front and back panel pieces to assure the paneling does not separate from the vertical pieces. (at a later time, these can be concealed with a bit on epoxy putty so they will not show).

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### MAKE SQUARE WOOD RECTANGLES

41. Set the top brick piece down on work table. Place square wood pieces #4 and #6 at right angles around the top brick piece.
42. Line up so things fit at right angles, if possible. Clamp down.
43. Use a 3/32" drill bit to drill 2 pilot holes at each corner. Use countersink bit to prepare holes for



screwing.

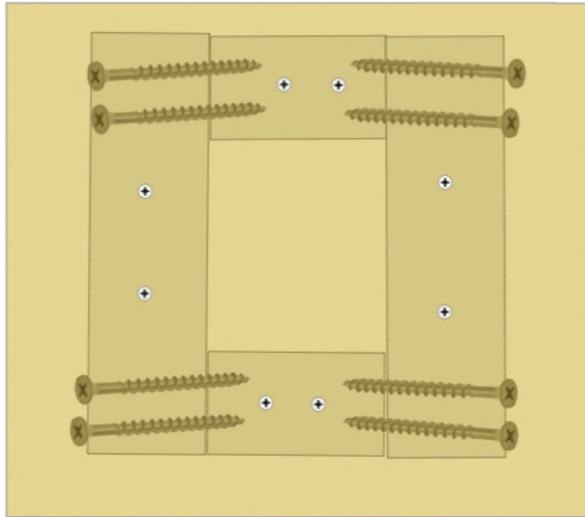
44. Unclamp one of the longer pieces of wood. Apply wood glue at the areas that will join. Screw together with Phillips bit using the 2" deck screws with two at each corner of the longer piece. See side view. Repeat with the other long piece. Unclamp. Mark the back of the rectangular piece.
45. Repeat. You should have 2 identical rectangles made from square wood pieces that fit around the top brick column. Each should have the back marked.
46. Now switch to the bottom brick piece. Assemble the 2 larger wood rectangles from #3 and #5 square wood pieces. Remember to mark the back on each one.
47. You should now have two large square wood rectangles and two smaller square wood rectangles.

### ATTACH WOOD RECTANGLES TO PLYWOOD TOP, MIDDLE AND BOTTOM

48. On all 3 plywood pieces mark the best side as the top. Mark one long side as the back. Use a straight edge and pencil to draw a line diagonally from one corner to the other diagonal corner. Draw another line between the other two corners so you now have a large X on the plywood. Repeat both sides of each piece of plywood.

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49. Using those lines place one of the larger square wood rectangles on the largest piece of plywood (#3) so it is centered on the plywood with the back of the square wood rectangle facing the back as indicated on the plywood. Trace around the square wood rectangle inside and out. Flip over the plywood and repeat.



Plywood with glued rectangle on the back (taped to plywood)

Plywood is shown as transparent but isn't!

Use outline you made of rectangle on this side of plywood to help determine placement of screws

50. Apply glue to the square wood rectangle and apply to the top side of the plywood. You can use more glue than was used on the vertical uprights. Carefully wipe up excess glue with paper towels, assuring that the square rectangle still ends up in the correct place.
51. Tape square rectangle to the plywood so it will stay in place as the glue is still wet. Flip over.
52. Drill pilot holes, countersink, and screw together using 1 1/4" deck screws using the tracings to help with placement. This is the bottom of the tower.
53. Turn over, remove blue tape and clean up any glue drops with paper towels. Verify that the large bottom panel column will fit inside.
54. Repeat with smallest plywood rectangle on the smallest plywood piece #1. This is the top of the tower. Verify that it fits on top of the small top panel column.
55. For the middle piece of the tower use the remaining plywood piece (#2) and attach remaining smaller wood rectangle on the top (better side of the plywood).
56. Attach the largest square wood rectangle on the bottom (worse side of plywood). Since this piece will be nearly the same size as the plywood piece it can be eyeballed to get it in the correct place without doing all the tracing.
57. Place the bottom plywood piece on the ground, and place the bottom brick piece inside it. Top with the center plywood piece and place the smaller top brick piece inside it. Place the top plywood piece on top!

### INSTALL LIGHT

58. Make holes as needed for the power cord.
59. If attaching below the skull attach bracket to the top of the middle plywood.
60. If attaching behind the skull then the paneling in the back will likely need to be reinforced with plywood.