

CLAMSHELL BOX

TOOLS:

These are the following tools featured in this handout.

- Bone Folder
- Cutting Mat
- Glue Brush
- Olfa Knife
- Pencil
- PVA
- Ruler
- Scissors
- Waste Paper

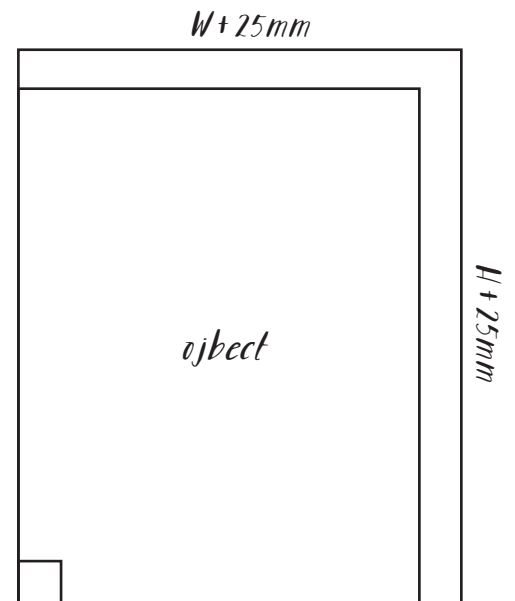
HOW TO MEASURE YOUR OWN BOX:

BASE BOARD:

Begin by cutting four oversized pieces of board. Measure the object going into the box and add 25mm to the height and width. Mark one board as A, one board as B and two boards as C. Mark the bottom left hand corner as square on all four boards.

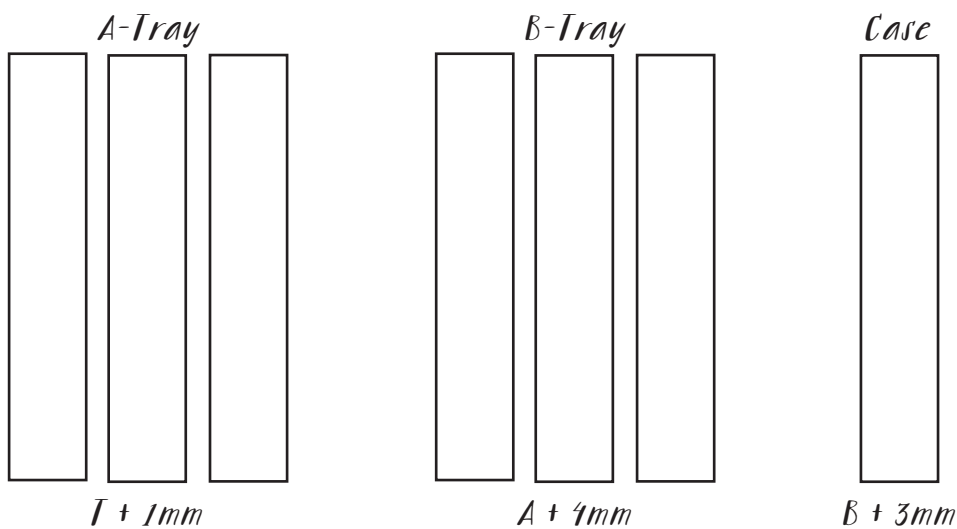
For the walls, cut one board to the same height as the four oversized boards. For the width of this board, measure the thickness of the object then multiply this number by 7 and add 50mm.

Cut two additional pieces of board and six pieces of cloth to 75 x 75mm. These will be used in the next step to help find the exact size of all the final pieces for the clamshell.



WALLS:

Measure and cut down all of the walls to the final thickness. Use the diagrams below as a guide for measuring each set of walls.

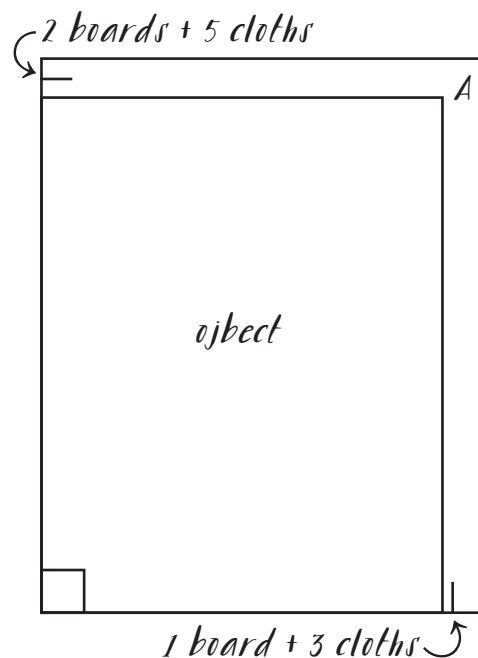


A-TRAY:

Place the object on the board labeled A, aligned with the square corner marked earlier. Using the jigs cut earlier, mark the final dimensions of the A-tray base. Place 2 boards + 5 cloths at the head of the object and mark on the other side of the bundle. Place 1 board + 3 cloths at the fore edge of the object and mark on the other side of the bundle.

Place the A board in the board shear and align with the mark at the fore edge. Set the gauge to the final width and cut the A board. Before moving the gauge, butt one of the A walls against the gauge to reduce the thickness by 1 board. Cut the other two A walls to this width.

Cut the height of the A board to the mark made earlier. Set the gauge to this final height. Before moving the gauge, cut the third A wall to this same height. The pieces for the A-tray are now ready for assembly.

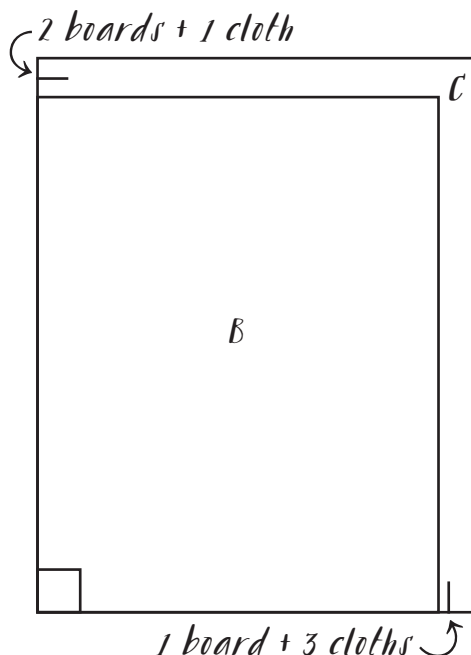
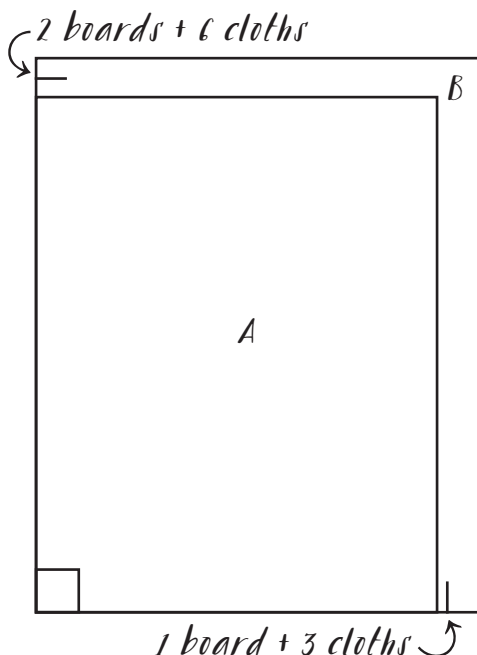


B-TRAY:

To measure the B-tray, place the A board on top of the board labeled B, aligned with the square corner marked earlier. Use the jigs again to find the final dimensions of the B-tray base. Place 2 boards + 6 cloths at the head and mark on the other side of the bundle. Place 1 board + 3 cloths at the fore edge of the A board and mark on the other side of the bundle. (See diagram on next page)

Place the B board in the board shear and align with the mark at the fore edge. Set the gauge to the final width and cut the B board. Before moving the gauge, butt one of the B walls against the gauge to reduce the thickness by 1 board. Cut the other two A walls to this width

Cut the height of the B board to the mark made earlier. Set the gauge to this final height. Before moving the gauge, cut the third B wall to this same height. The pieces for the B-Tray are now ready for assembly.



CASE:

To measure the pieces for the case, place the B board on top of one of the boards labeled C, aligned with the square corner marked earlier. Use the jigs again to find the final dimensions of the case pieces (C). Place 2 boards + 1 cloth at the head and mark on the other side of the bundle. Place 1 board + 3 cloths at the fore edge of the B board and mark on the other side of the bundle. (See diagram above on the right).

Place the C board in the board shear and align with the mark at the fore edge. Set the gauge to the final width and cut both C boards to this width.

Cut the height of the C board to the mark made earlier. Set the gauge to this final height. Before moving the gauge, cut both C boards and the wall to this height. The C pieces are finished.

HOW TO MAKE IT:

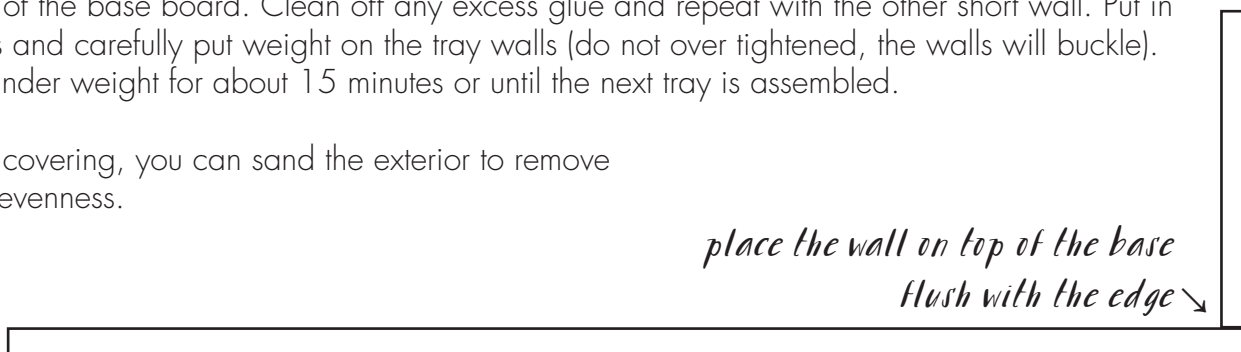
ASSEMBLE TRAYS:

Both trays are assembled the same way, so you can start with either. Run a bead of PVA along one edge of the long wall (or the wall that is the same height as the base). Place the wall on top of the base at the edge. Make sure both boards are aligned along the height and that the wall is flush to the edge of the base board. Clean off any excess glue.

Run a bead of PVA along two edges of the short wall. Butt up against the long wall and place on top of the base board. Clean off any excess glue and repeat with the other short wall. Put in a press and carefully put weight on the tray walls (do not over tightened, the walls will buckle). Keep under weight for about 15 minutes or until the next tray is assembled.

Before covering, you can sand the exterior to remove any unevenness.

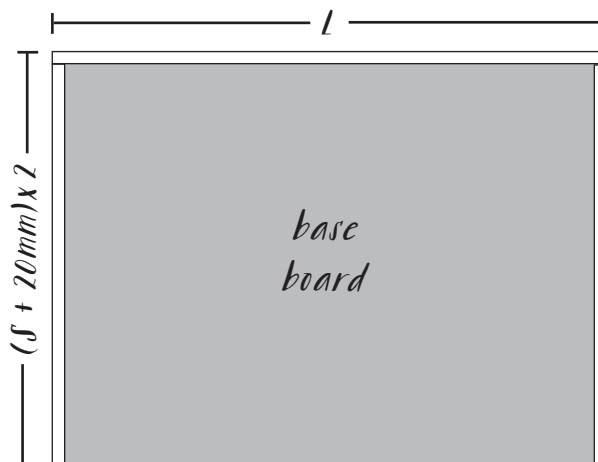
*place the wall on top of the base
flush with the edge*

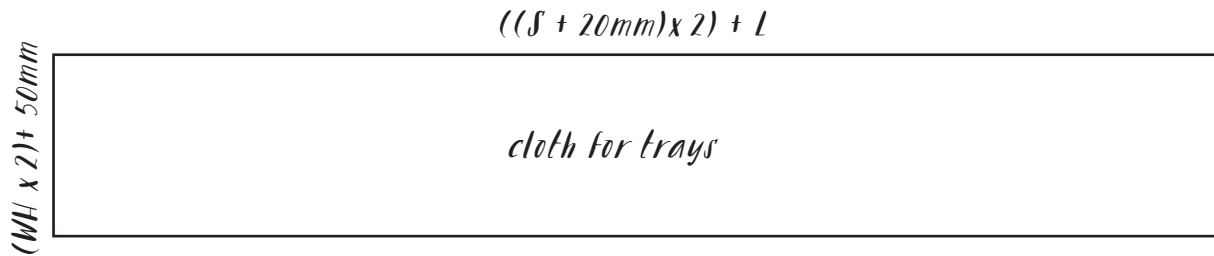


HOW TO MEASURE CLOTH:

After the trays are assembled, measure the B-tray to find the dimensions for the cloth that will cover the trays. Measure the short wall (S) and add 20mm, then multiply by 2. Add the length of the long wall (L) to this measurement, this is the final length of cloth you will need.

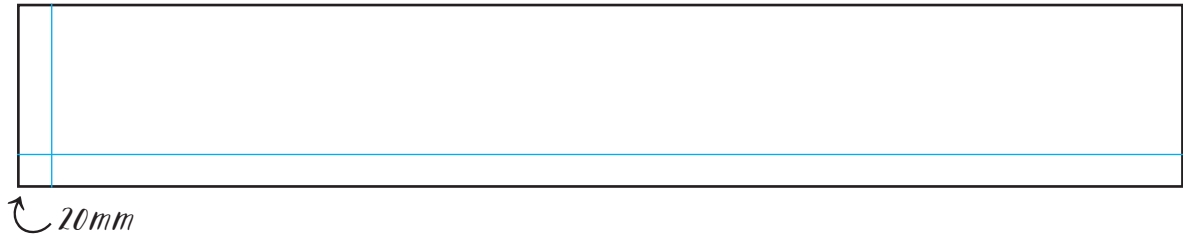
To find the height of the cloth, measure the height of the wall (WH) including the base board. Multiply this number by 2 and add 50mm. Cut two pieces of cloth to this final dimension.



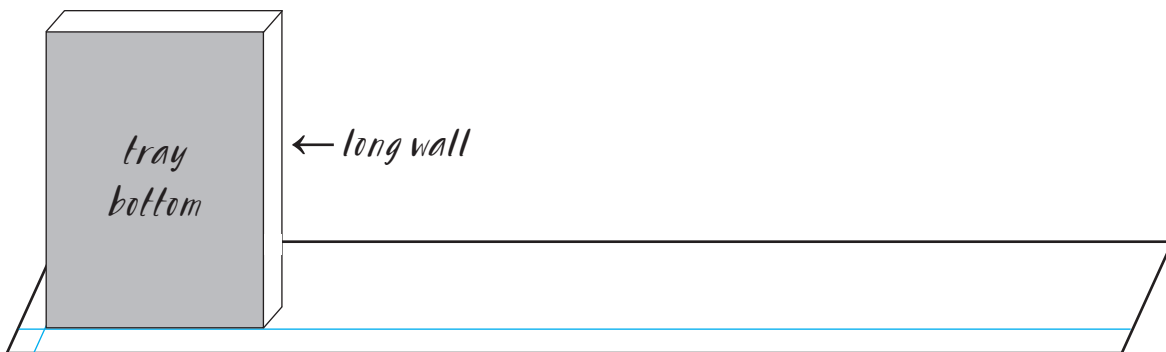


HOW TO COVER TRAYS:

Both trays will be covered the same way. Mark 20mm from the bottom and from the left hand side on the back side of the cloth.



Glue up one of the short walls on the exterior side of the tray. Place the wall into the corner marked on the back side of the cloth. The base of the tray should be facing the 20mm turn-in, while the interior side of the tray should be facing the larger turn-in and the 20mm turn-in on the left. The long wall should be facing the remaining portion of the cloth. Flip over and smooth down the cloth onto the board.



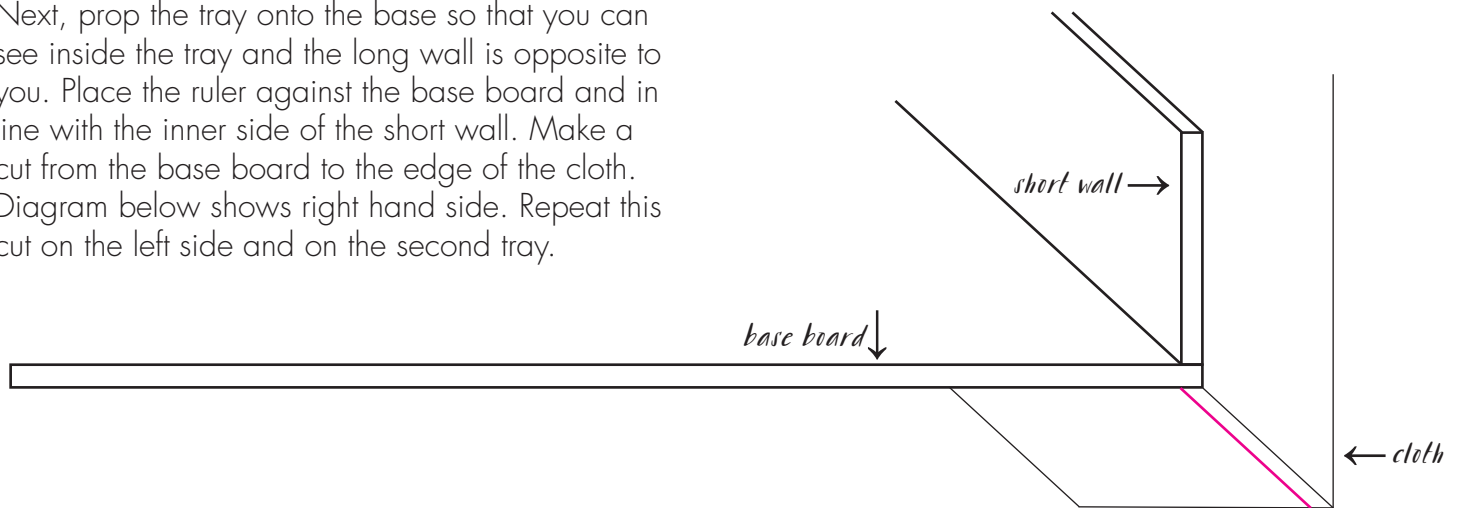
Glue the long wall and lay the tray down onto the cloth, keeping in line with the 20mm line. Flip over and smooth down the cloth onto the board. Continue with the final wall. You will end up with a slight overhang. If this is wider than 20mm, trim back to 20mm.

FIRST SET OF CUTS:

Flip the tray so that the bottom is facing up. At the two corners along the back wall, pinch both turn-ins together at a 45° from the corner. Trim off both layers with a pair of scissors. (See image on the right)



Next, prop the tray onto the base so that you can see inside the tray and the long wall is opposite to you. Place the ruler against the base board and in line with the inner side of the short wall. Make a cut from the base board to the edge of the cloth. Diagram below shows right hand side. Repeat this cut on the left side and on the second tray.

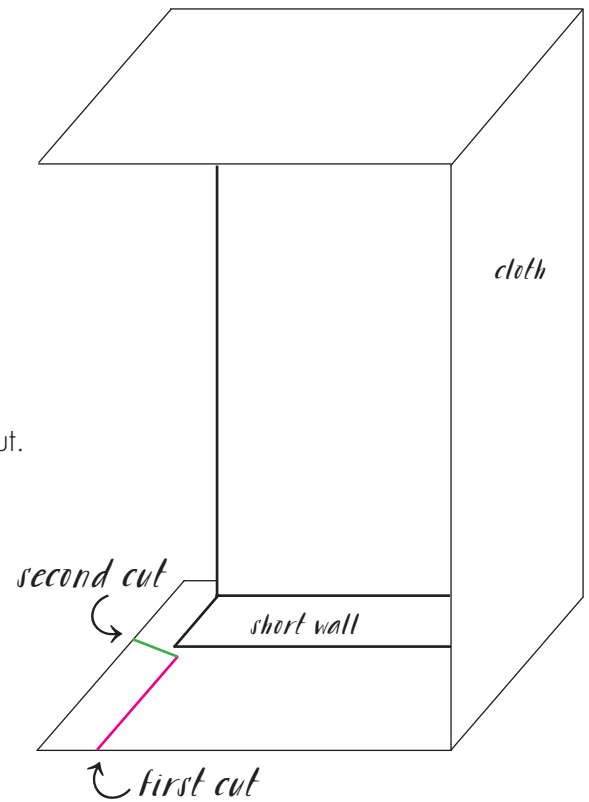
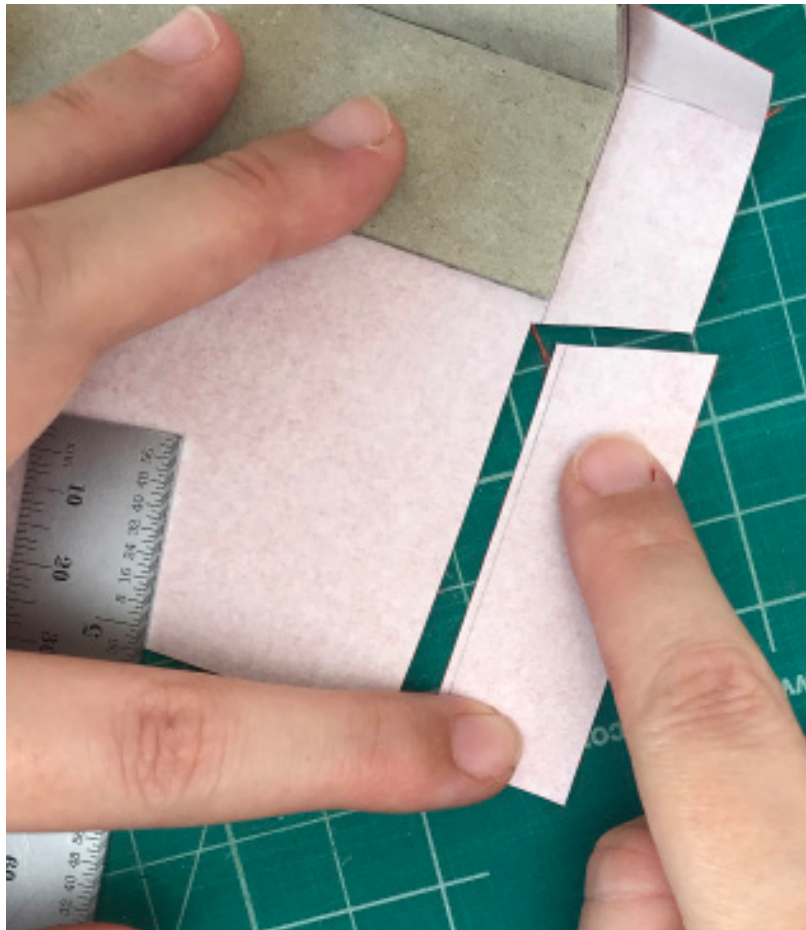


This cut starts at the base board and goes to the edge of the cloth. It should be line with the inner side of the short wall.

Prop the tray onto one of the short walls. Place a ruler against the top of the short wall and about 1 mm in from the edge. Make a cut about 1 board thickness from the top edge to the edge of the cloth. (shown in magenta)

Make a second cut to remove a portion of the cloth. Start at the same point and make a slight angled cut down toward the base (shown in green). This will create a turn-in to cover the edge of the short wall and will get glued up first.

Repeat this set of cuts on the other side of the tray and on the second tray. See image below for another view point of this cut.



GLUE DOWN TURN-INS:

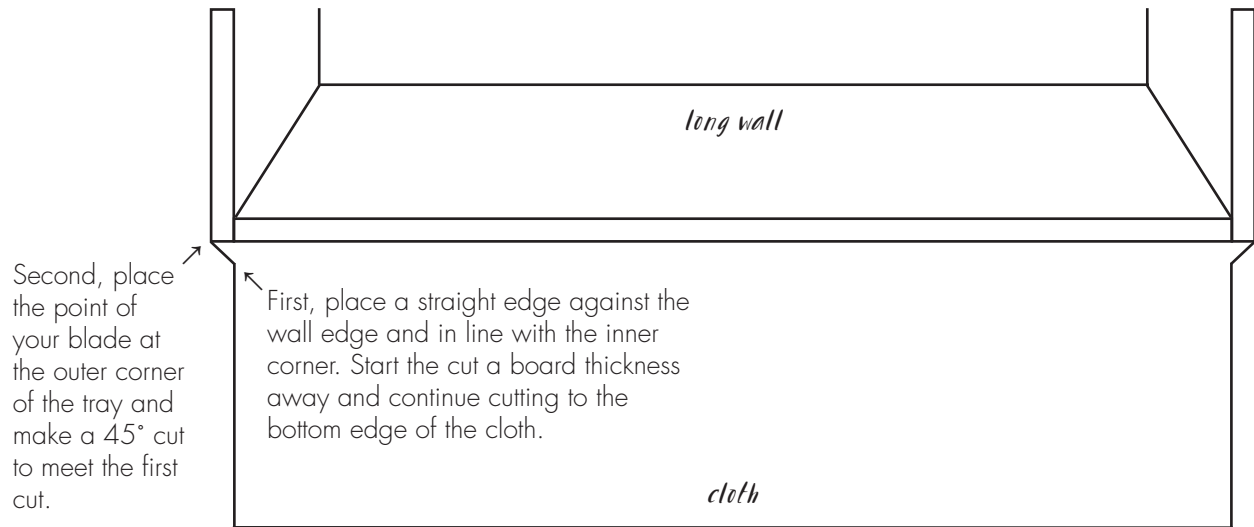
Start by gluing the turn-ins at the short wall edge. This turn-in will cover the edge and creep down onto the base board. At the top edge corner, use a bone folder to fold over a bit of cloth to cover the corner. Snip off any excess that might be sticking up.

Then glue the turn-ins at the bottom of the base. The turn-ins along the short walls will wrap around the edge of the base and cover the previous turn-in. Make sure this part doesn't creep up onto the short wall.

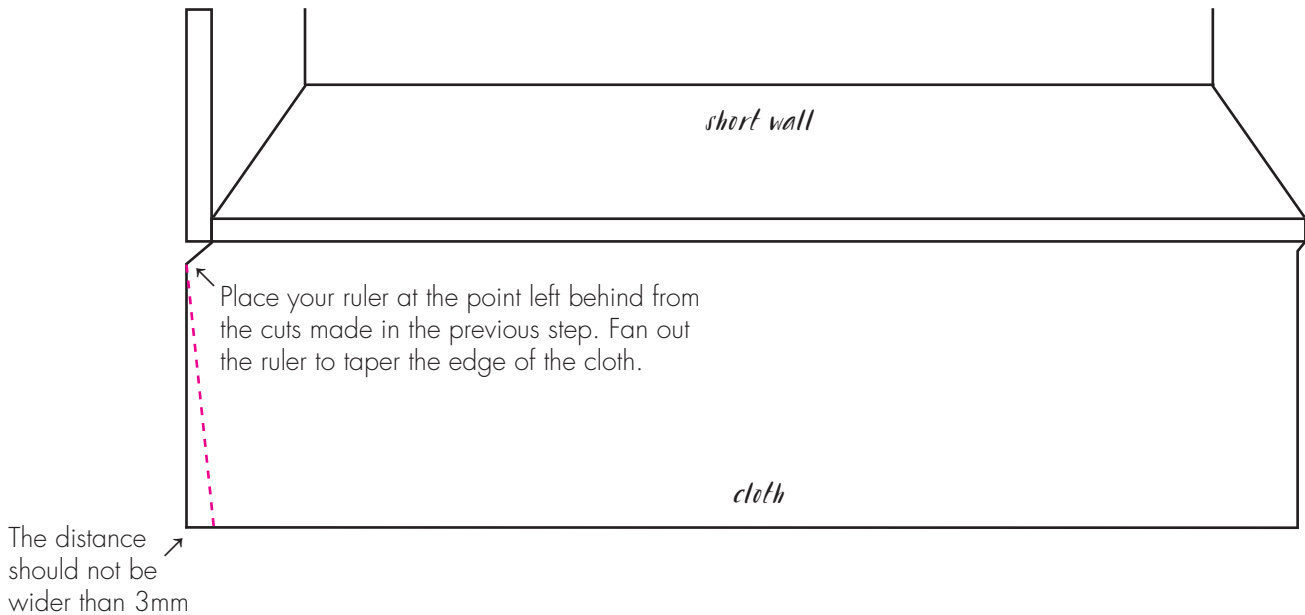
Repeat these steps for both trays.

SECOND SET OF CUTS:

Prop the tray onto the long wall and make two cuts at each of the corners. Repeat this step on the other short wall turn-in.



Prop the tray onto one of the short walls and make a single cut on either side. Repeat this step on the other long wall turn-in.



Glue up the short wall turn-ins first. As you lay down the cloth smooth down each plane one by one. For example, smooth the cloth on the top edge, then along the inner side of the wall, then into the corner and then finally onto the base of the tray.

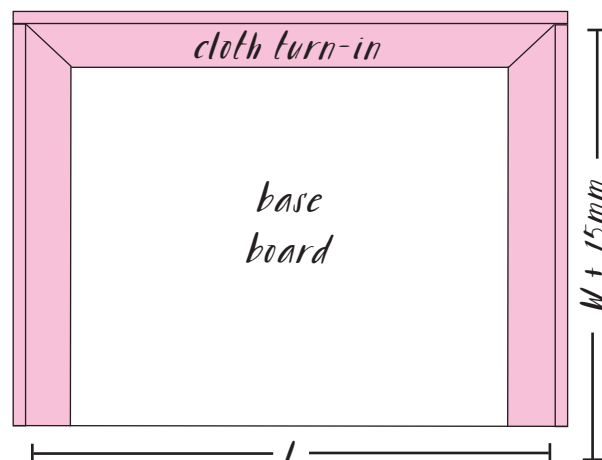
Before gluing up the long wall turn-in make one final cut. Without any glue on the turn-in, fold to the inside and place a 45° triangle in the corner. Starting a few millimeters from the corner, make a cut through both layers of the cloth. Do this on both corners. Pull back the turn-in and completely remove the corner from both layers. Glue up the turn-in and smooth down onto the wall and base. Push the cloth into the corner of the tray with a bone folder.

LINING:

The interior side of the tray can be lined with a variety of materials such as paper, suede or foam.

Each tray will need to be measured separately to determine the size of the lining. Measure the interior height of the tray and reduce this measurement for the lining to anticipate any expansion from the adhesive and to prevent the lining from creeping up the wall.

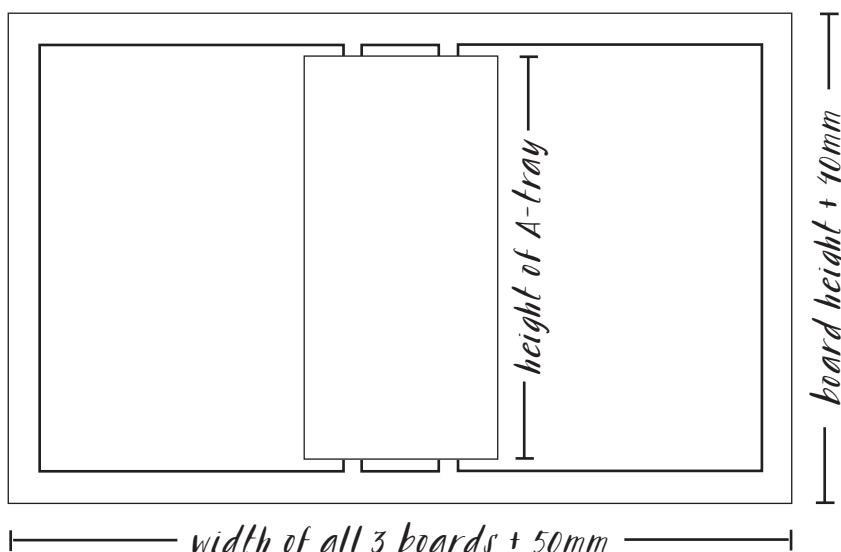
To find the width of the lining, measure from the back wall to the open side of the tray. Add 15mm for a turn-in. Cut each lining piece and glue up with PVA. Place evenly into the tray and wrap the turn-in around the open side of the base bottom.



HOW TO MAKE IT:

CONSTRUCT CASE:

In order to construct the case, cut a piece of bookcloth to cover the case and a second piece that will line the spine piece and joints on the inside.



To find the measurements for the cover, add 40mm to the height of the cover boards. Measure the width of all three boards and add 50mm. Cut the cloth to these dimensions. For the dimensions of the spine piece, the height will match the height of the A-tray and the width should be wide enough to span across the spine piece, joints and about 15mm onto each of the cover boards.

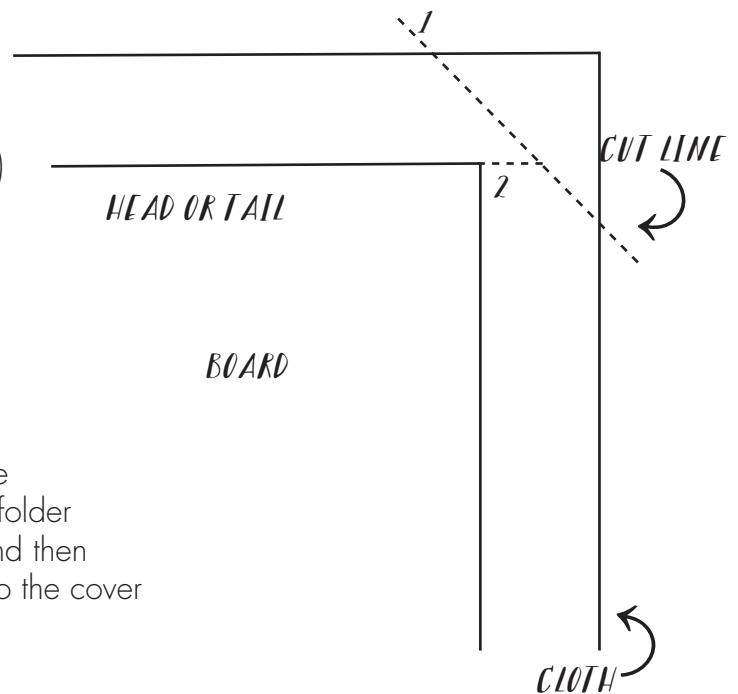
Mark the bottom and left hand side 20mm in from the edge just as you did earlier when covering the trays. Glue up a portion of the cloth and place one of the cover boards in the corner marked. Grab the jigs cut earlier and place 1 board + 6 cloths against the cover board to place the spine piece. Once the spine piece is placed, slightly wiggle the bundle to open up the joint space a bit more.

Place the bundle on the other side of the spine piece and place the second cover board. Wiggle the bundle to open up the joint. Flip over and smooth down the cloth onto the board.

TURN-INS:

Using scissors, cut off the corner of the bookcloth about a board and half thickness from the board corner. (1)
Make a second cut parallel to the edge of the board. (2)

Fold over the turn-in at the head and tail first, then wrap the flap made from the second cut around the corner of the board and onto the fore edge. Trim off any excess.
Finish by folding over the turn-ins along the fore edges.



CLOTH SPINE PIECE:

Glue up the spine piece with PVA and place on the spine board first. Push the bookcloth into the joint with a bone folder by running the tool along the edge of the spine board and then the cover board. Finish by smoothing the cloth down onto the cover board. Repeat on the other side of the spine board.

ATTACH TRAYS:

Glue up the bottom of the A-tray. Keep the brush parallel to the bottom of the tray. This will help keep the walls free of adhesive. Make sure the entire bottom is covered with glue before placing onto the case. The open edge of the A-tray will line up with the cover board edge and centered along the height, it should not extend into the joint. If possible, place a scrap board inside the tray along with press boards or blocks that sit taller than the walls. Place the clamshell into a press and apply pressure to the tray. If you don't have a press, fill the tray with weights until the glue dries.

Slide the B-tray onto the A-tray. Make sure both open ends of the trays are lined up. Glue up the B-tray in the same manner. Close the case onto the B-tray. Carefully open up the case and press the tray. Allow the trays to completely dry before placing the object inside the box.

