

# AS Level – Product Design

## Screen print development/ manufacture



For the design of my final screen print product I will combine these two designs. The wolf head will feature on a bag and will be screen printed in black. In order to print the wolf head I need to design this in techsoft 2D.

The wolf head was a bit fiddly to produce on techsoft but in the end it looked good. I traced around the edges of my design for the head and then enlarged the head to an appropriate size that would be suitable to go on a bag. I looked carefully at each of the lines and measured the gaps between the areas that would be filled. Some of the lines proved to be too close so I contoured around the design and made a duplicate 1 mm inside. This sound like a very minor tweak but it proved to almost completely solve the problem. The final amendment to the design was to remove just a couple of the smaller islands that would have no effect on the overall effect of the product but could have proved costly when I actually printed the design.



In order to be able to screen print I would need a stencil which I printed in vinyl from the design I had to the vinyl printer. One it was printed I carefully removed the parts of the vinyl that would need to let the ink through to form the shape.



Once the screen was ready I prepared the bag by putting a board inside and ironing the bag smooth. I was then ready to print, so I lined ink across the top of the screen and using a float firmly yet gently I pulled the ink across the screen whilst holding the screen onto the bag so that it couldn't move. Once it was done I peeled of the screen as if opening a book and then let the bag dry.

I then stuck the vinyl to the printing mesh. This was tricky because the vinyl was prone to rippling and making ridges, so I carefully used a credit card to push the vinyl onto the mesh as soon as it was unpeeled from the backing. In order to prevent ink from going around the outside as well as through the holes I needed to make a barrier. I used clear adhesive tape that was very wide and made sure all boundaries were covered except the holes I wanted it to go through.

## Initial ideas

Idea 1



**Materials:**

- The body of the calendar would be made from wood, potentially a soft wood such as pine.
- The shaded guards would be made from black acrylic. The wheel would also be made from acrylic, as it is easy to be engraved or to apply vinyl to.
- The blocks for the dates would also be made from wood but probably a man made board such as MDF because it would be painted.

**Manufacture:**

- The main box would be fixed together using mitre joints, and glued.
- The acrylic parts would be laser cut.
- The blocks would be formed from solid MDF and then engraved or cut in a CNC router.

**Bio:** This product would be marketed as an interactive calendar. There would be designs or pictures on each of the months on the wheel that reflect events and seasons in New Zealand.

Idea 2



**Materials:**

- The backing board for this idea would be made from a hardwood such as ash or beech.
- Each of the little parts that make up the map would be made from acrylic but would be cut in different colours.

**Manufacture:**

- The backing board would be cut from a length of timber, preferably by machine to prevent any mistakes or mishaps.
- The acrylic pieces would be cut in a laser cutter.
- The board would then be cut by a CNC router to create an inset to put the acrylic map into.
- The board would also be engraved with the locations of the major cities and attractions in New Zealand.

**Bio:** This product would be designed to hang on a wall. In a bedroom or living room. Each individual piece of the map could be taken out and removed to make the display interactive.

Idea 3



**Materials:**

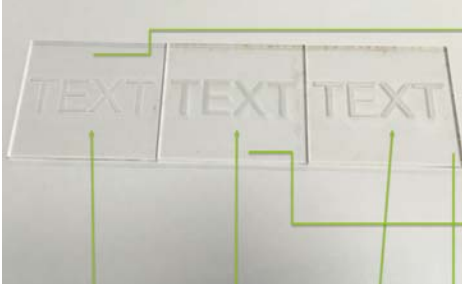
- The backing board for this idea would be made from a hardwood.
- The map however will be made from cork, which could be cut by a laser cutter.
- The tags would be made from card and laminated so that with a whiteboard pen you can erase them.

**Manufacture:**

- The backing board would be cut from a length of timber, preferably by machine to prevent any mistakes or mishaps.
- The cork would be cut in the laser cutter and kept as 1 entire piece.
- The tags could be cut by hand and laminated.

**Bio:** This idea is based on a cork notice board but has been influenced by the theme of New Zealand. You can pin almost anything to the board and keep it all in one place, while still looking stylish and functional.

## Engravings for acrylic layers



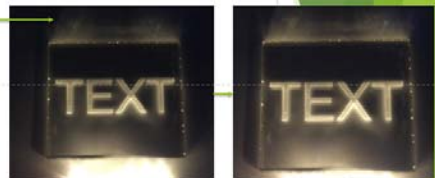
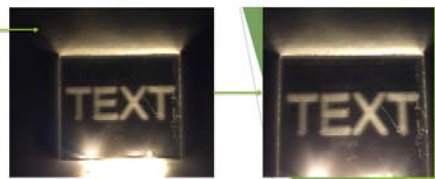
Shallowest depth Medium depth Deepest depth

I did some testing of clear acrylic with engravings on them. Because I plan on adding engravings to at least one of the layers I needed to test them. I tried 3 different depths of engravings to see which one would display the text the best.

**Shallowest depth** - this depth left very blurred text, which means that if the text was any smaller it would be very difficult to read.

**Deepest depth** - this was very close to going all the way through the acrylic which was not necessary. The edges of the text were not very clear and I fear that I will have the same problem with scalability of the text.

**Medium depth** - this depth worked best from my testing. It produced the sharpest edges and made the text the clearest of the three I tested. If I do include engravings I will use the setting of engraving.



## Framework and backboard

This was the second major section of my project after the acrylic layers. I needed to frame the acrylic in a way that would present them best but still keep the attributes necessary to be hung on a wall. As there are two different sections to the acrylic I needed to cater to both in the framework. I considered making something not too dissimilar to a photo frame but that would make it hard to mount LEDs and have any drawings or engravings.

I did a few drawings and came up with a solution that would make the frame for the acrylic whilst having a backboard that would mean I could have some designs on. I would need to have a backboard that had forward facing panels to support the acrylic. These side panels would be routed in three places; two so that the acrylic could slot into place and the other so that the side panels could sit on the edge of the backboard.

Because the frame and backboard was made from oak veneered MDF I needed a joint that would hide the edges and I chose mitre joints to do this job. Mitre joints are strong joints because there is a large area to place adhesive upon so I felt this would be perfectly sturdy. Also the fact that the side panels would be glued to the backboard via a rebutt joint meant that the whole frame would be perfectly sturdy. To make the mitre joints I used a mitre saw to cut the 45 deg angle. I did however cut it with a bit of material left over so that if I made a mistake whilst cutting I could sand the end down to make the perfect joint.

In order to cut a groove for the acrylic to slot into the framework would need to be routed. Unfortunately I was not permitted to use a table router but I was able to set it up and make sure all the H&S and QC checks were in place. Once I had set the router up using the bits of wood with it switched off, the wood was ready to be cut, this part was carried out by a technician.

I planned to use LEDs to shine up into the vario acrylic layer so I needed to leave a gap at the bottom so that I could fit the LEDs in place. The gap didn't need to be very bit so I made it 2 cm as this would give enough room to manoeuvre the LEDs if I needed to. This also meant that I didn't need to route a path all the way to the bottom of the frame and wouldn't need to route the bottom part.

