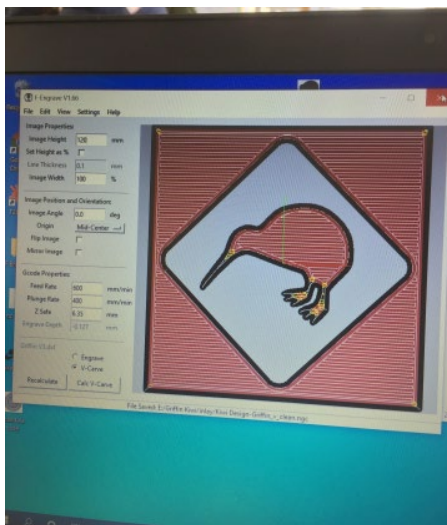


For this assessment I used the school's CNC router to create my cheeseboard. I decided to use a kiwi road sign design. **①** To find out which technique I wanted to use on my final design I did three different techniques on a smaller scale to see which one I preferred. I did resin fill, inlay, and laser.

After trying all 3 techniques on a smaller scale I decided that an inlay was the best design choice for my cheese board. **②**

I did one more practise of the inlay design on a smaller piece of wood, once that was done and I was happy with it I went straight to my final design, doing my inlay design first and then cutting out the circle cheese board.

③ I had realised from the practise that before starting the router to check that the stock was large enough to accommodate the work, and the work was going to be engraved in the centre. I also checked that all the settings were exactly how I wanted to avoid having to do it more than once. I checked the preview on the CNC router and looked at the amount of time it would take to finish. I made sure I had time to allow it to complete its task to avoid having to interrupt it mid-way, which could possibly ruin the work.



After drawing the design in Onshape and exporting it as a CNC compatible DXF file I opened it in an engraving and cutting programme to set the specifications of the engraving and cutting. The engraving programme allowed me to set the depth of cut (because the router uses a tapered bit that also controlled the width of the cut) and the feed rate.

I opened the CNC routers program (Mach 3) and loaded the file from the engraving and cutting programme (Mecsoft) which contained the design along with the feed rate, cut depth and other information the router needed.

③ I experimented with different feed rates and chose a feed rate of 900 m/second which would allow the machine to do a good job without struggling yet wouldn't take too long to complete the job.

③ I realised I had to be quite precise with centering because the stock was not much larger than the image to be engraved. I did a test which centered the bit of the router in the centre of the workpiece and worked out that the best way was finding the centre of the stock with a ruler and jogging the router bit over to the mark using the x and y axis buttons on the CNC program. Once I had the bit over the centre of the stock, I had to find the surface of the cheese board. To do this I placed a piece of paper on the surface of the work and used the z axis button to jog the bit downwards. I started off moving the bit large amounts, until it was close to the surface. I lowered it to the surface of the cheese board until it was just touching then zeroed the z axis and brought the bit up. The CNC program shows a small diagram of the workpiece, with a marker where it thinks the bit is. I had previously put the marker in the centre of the diagram, so when I

clicked 'reset zeros' the bit was now in the centre both physically and on the program. The router was now ready to run. I looked at the preview then started the operation. I made sure the machine was undisturbed the whole time it ran, and no one interfered with it.

Health and Safety: There are many places loose things could get caught in on a CNC router, including the fast moving cutting bit and the rotating shafts that move the cutter. To avoid accidents, loose clothes were tucked in. We programmed the machine to create 5 tabs. This allowed us to keep the board in shape when the last cut is being cut and keeps flying objects from not happening. A tripping hazard was presented by the power/data cables going into the machine. To prevent this the machine was placed near a power point, and to avoid excess cables (the router has two separate power leads) we placed a splitter board on the bench and ran the splitter boards lead to the wall. This meant there was only one lead on the floor to the power point. I also made sure that the USB data cable from the laptop to the machine was not dangling off the bench. As the machine cut it formed very small chips, these could have been flicked off the machine by the fast spinning cutter. However this was extremely unlikely due to the chips being too small to fly far enough to exit the machine, this meant safety glasses were necessary. The piece of wood that was being cut was secured with screws. This meant there was no way that the work could slip or be flung off the machine while operating

Checking against specifications: 4



I have inspected the piece and it appears to have been routed properly. There are no blemishes or imperfections, and the design is well defined. On the trial piece the inlay design had some glue residue left over, this was because I didn't run it under the belt sander enough. To make sure that this didn't happen again, I made sure to run it under the belt sander until there was no residue left.

When removing the finished cheese board from the rest of the pine I had to gently break the tabs that were holding it in place. I was careful to make sure that tabs broke in half and not off my cheese board so that there would be a chip in it.

The kiwi road sign inlay in the centre is the correct size and I think it looks great on my circle cheese board. To improve the design in the future I would make the square sign part of the kiwi design into a circle to fit better with the circle cheese board, but the final design is still very good

