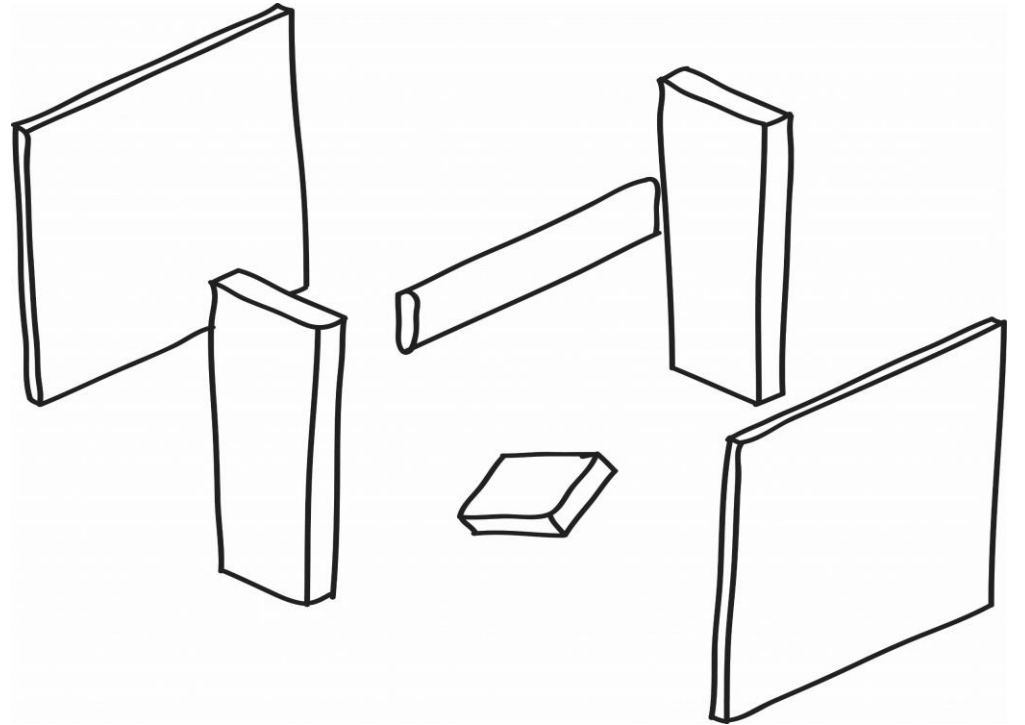


# Flat Mates

Aaron Clifford  
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## Flat Mates



### Design Brief

Laser cut flat materials offer huge potential for designers to explore, experiment and deliver objects that are simple, easy to use and functional. In collaboration with FABLAB Limerick you will exploit this potential using all of your creativity and design skills.

Choosing one of the locations; Kitchen | Bathroom | Living Room | Bedroom | Garden Shed, design a functional object and it's packaging. Minimal additional fixings may be used-but sparingly.

Explore the limits of material and technical possibilities on the Laser Cutting machine. Final solutions must use appropriate materials and be within an appropriate size envelope.

Your products should be simple to build and must be accompanied by a set of blueprints (illustrations only) for construction.

Packaging designed, should aim to be creative, appropriate and complimentary to your design. Packaging must be made from flat materials and have a consistent aesthetic language.

On the final day of the project each student will exhibit their work in the design studio.

### Project Objectives

- To learn about Laser Cutting manufacturing: materials and production methods.
- To understand the process of 'discovery' through EXPLORATION.
- To develop an ability to EXPLORE through sketching and prototyping.
- To experience the DEVELOPMENT of solutions through iteration (you will not get it right the first time!).

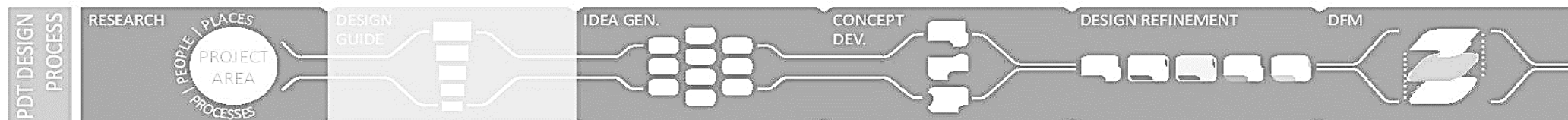
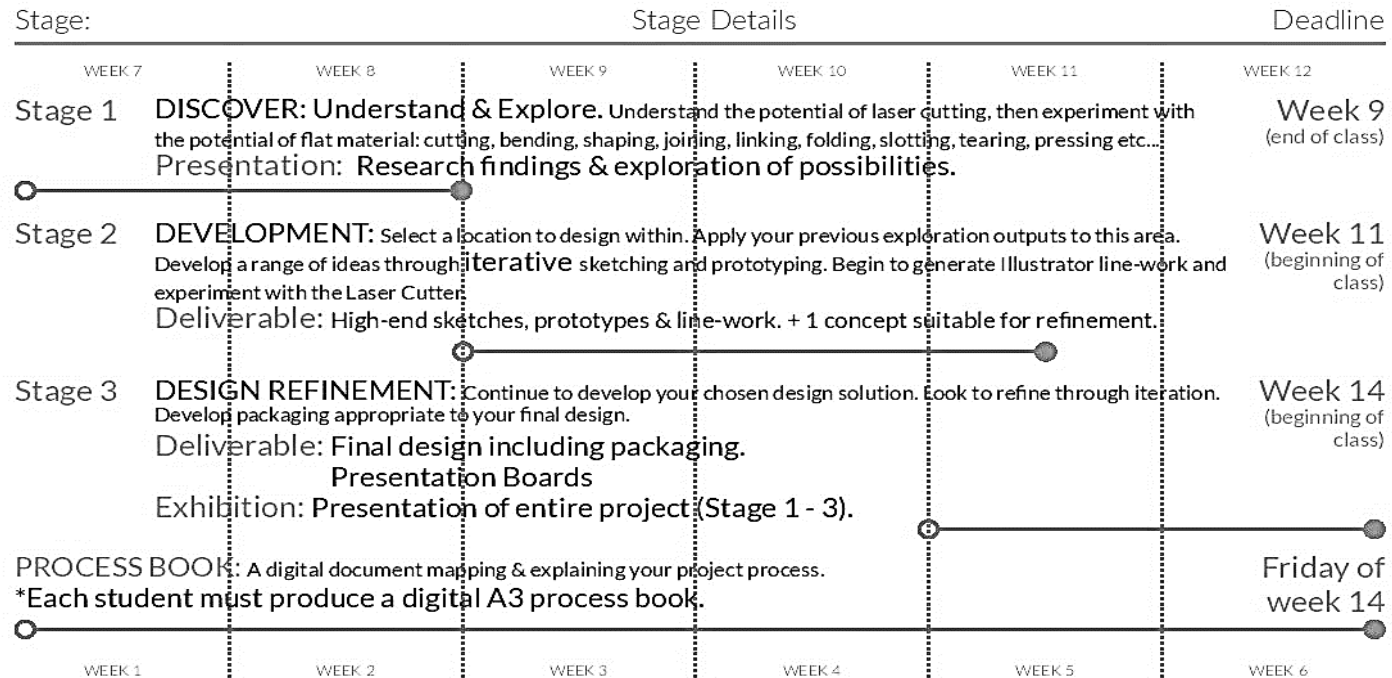
### Assessment Criteria

- EXPLORATION** (50%)
- Understanding of laser cutting capabilities.
  - Exploration of possibilities through sketching & prototyping.
- Quantity and variety of ideas (based on selected location).
- Quality of communication through sketching & prototyping.
- DEVELOPMENT** (50%)
- Appropriate selection and utilisation of design development tools (modelling, sketching, CAD...).
  - Resolution of design through **ITERATION**.
  - Quality of prototypes.

50%

of module

NOTE: All clutter must be removed from the studio 1 week after the project. Work that is not removed will not be awarded a grade.



# Laser Cutting

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Laser cutting is a technology that uses a laser to cut materials,. Laser cutting works by directing the output of a high-power laser most commonly through optics. The laser optics and CNC are used to direct the material or the laser beam generated.

The Trotec Speedy 400 is the laser cutter I used in this project. The Trotec Speedy 400 is a large, fast laser cutter that has the ability to do incredible detail. It will accept both vector and raster graphics. A range of materials can be cut or engraved including paper, card, plastics, wood, rubber, glass and textiles but the Trotec cannot cut Metals, PVC or Polycarbonate.

The Trotec is a commercial grade laser cutter with a bed size of 1000mm x 610mm. It has the power of an 80 Watt laser that gives it the ability to cut and engrave large sheets of material.





# Adobe Illustrator

**To use Adobe Illustrator to prepare the laser cutting drawings the following criteria had to be followed:**

- Artboard size: 1000 x 610mm
- Document colour mode: RGB
- Line weight: 0.001pt
- Raster Engrave: Fill, RGB Black
- Vector Engrave Stroke, RGB Red
- Vector Cut Stroke, RGB Magenta
- Switch Trotec on with the key. Switch computer on.
- Transfer your file onto the computer using a memory stick.
- Open the file in one of the available software's: Adobe Illustrator
- To send drawing to laser cutter click 'File', then 'Print'. This will open up a printing dialogue box. Pick 'setup' and then 'preferences'.

**A few options are available from here;**

- Minimize to job size: **Ticked:** only the drawing will be sent to the laser. **Unticked:** the entire page will be sent to laser.
- Pick your required material.
- Process mode:
- Resolution:
- Cut line:
- Halftone:
- To send, click JC, then print, then print again.
- The JC (job control software) will flash. Click on it to open it.

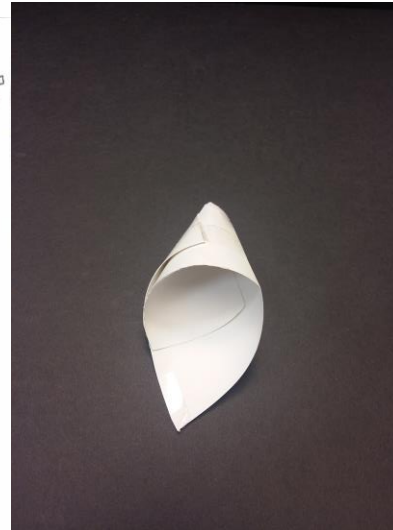
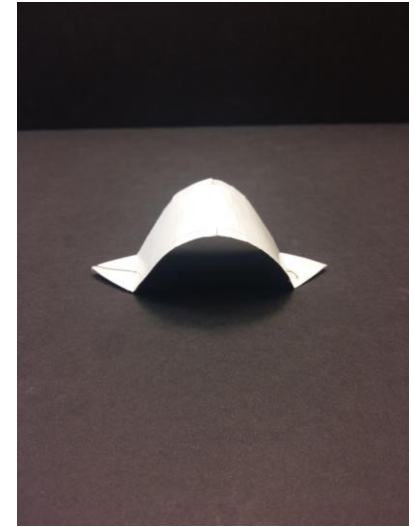
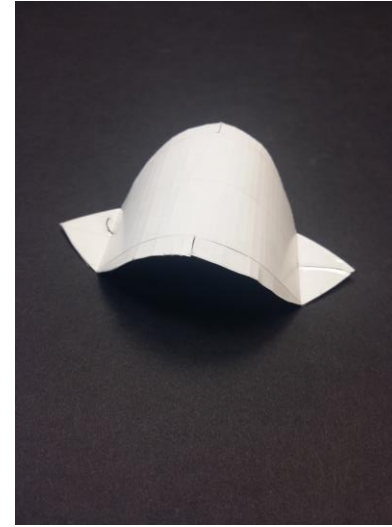
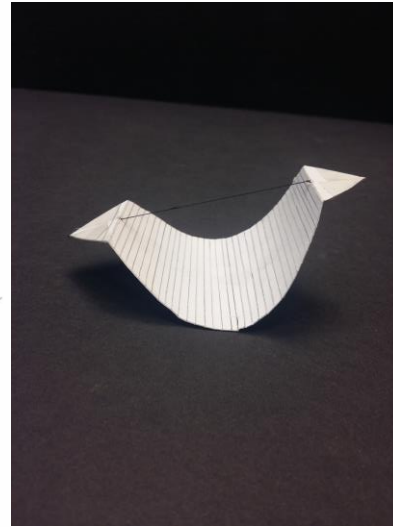
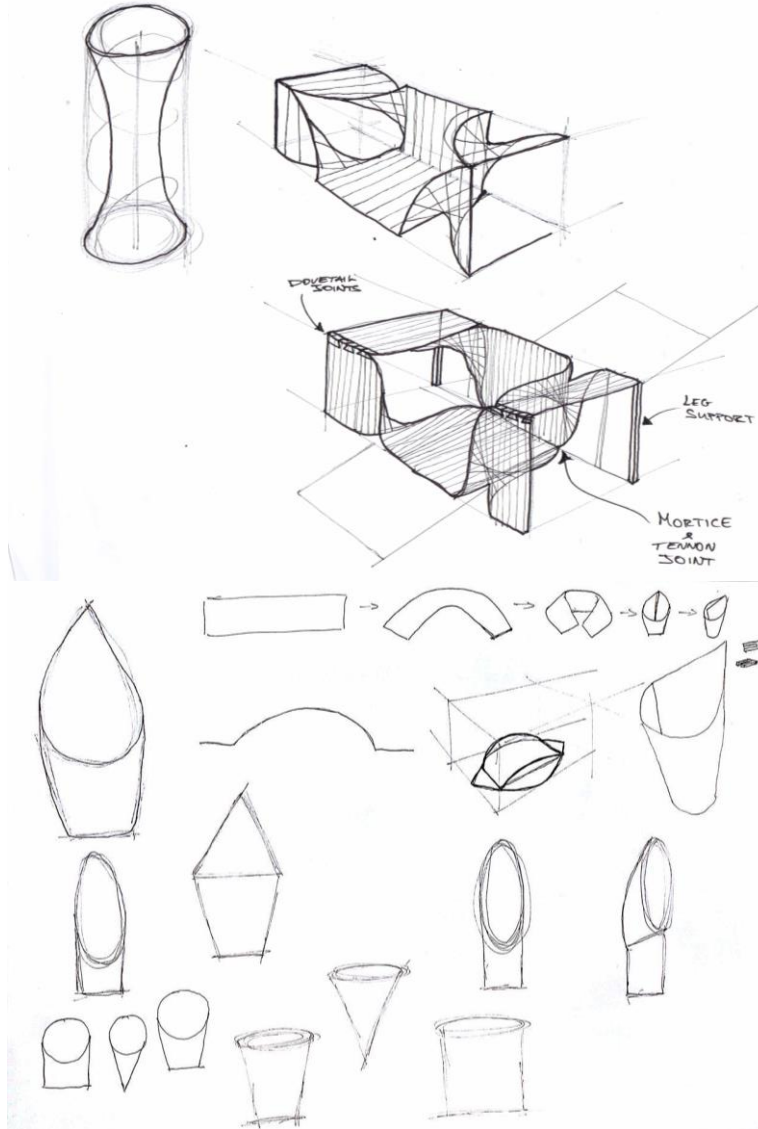
# Exploration



# Exploration

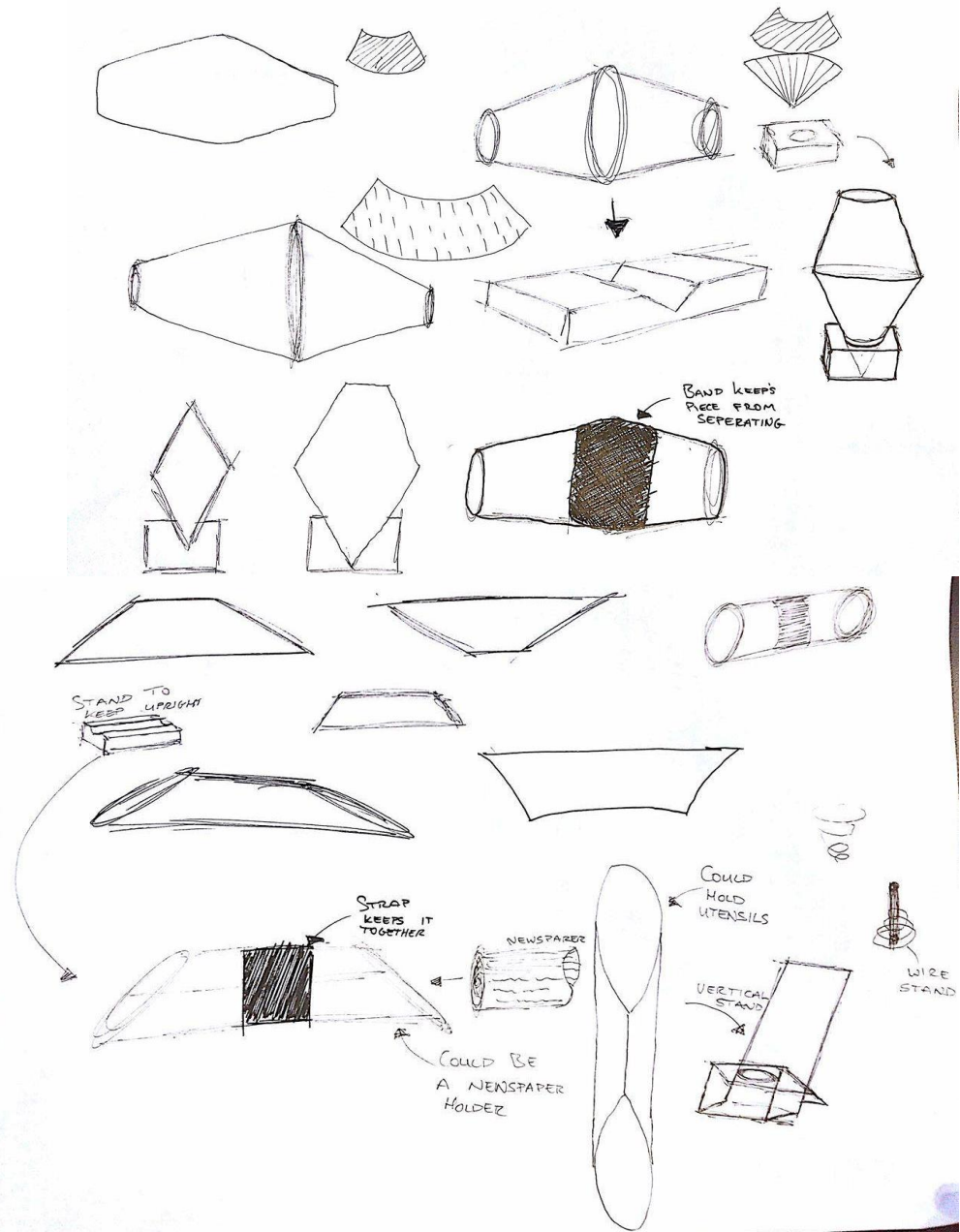
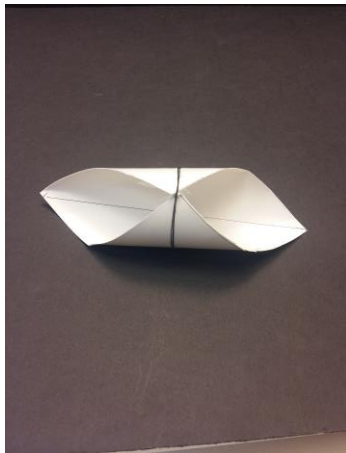
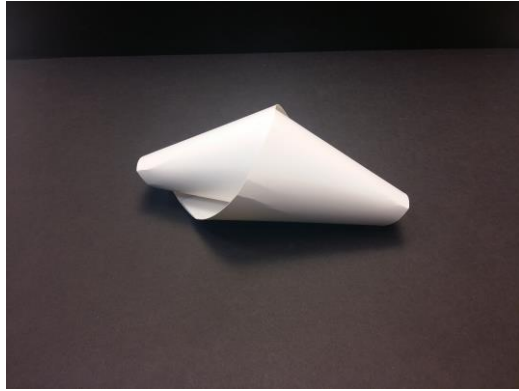
Aaron Clifford  
15122379

I looked at curves  
and incorporating  
them with  
geometric shapes.





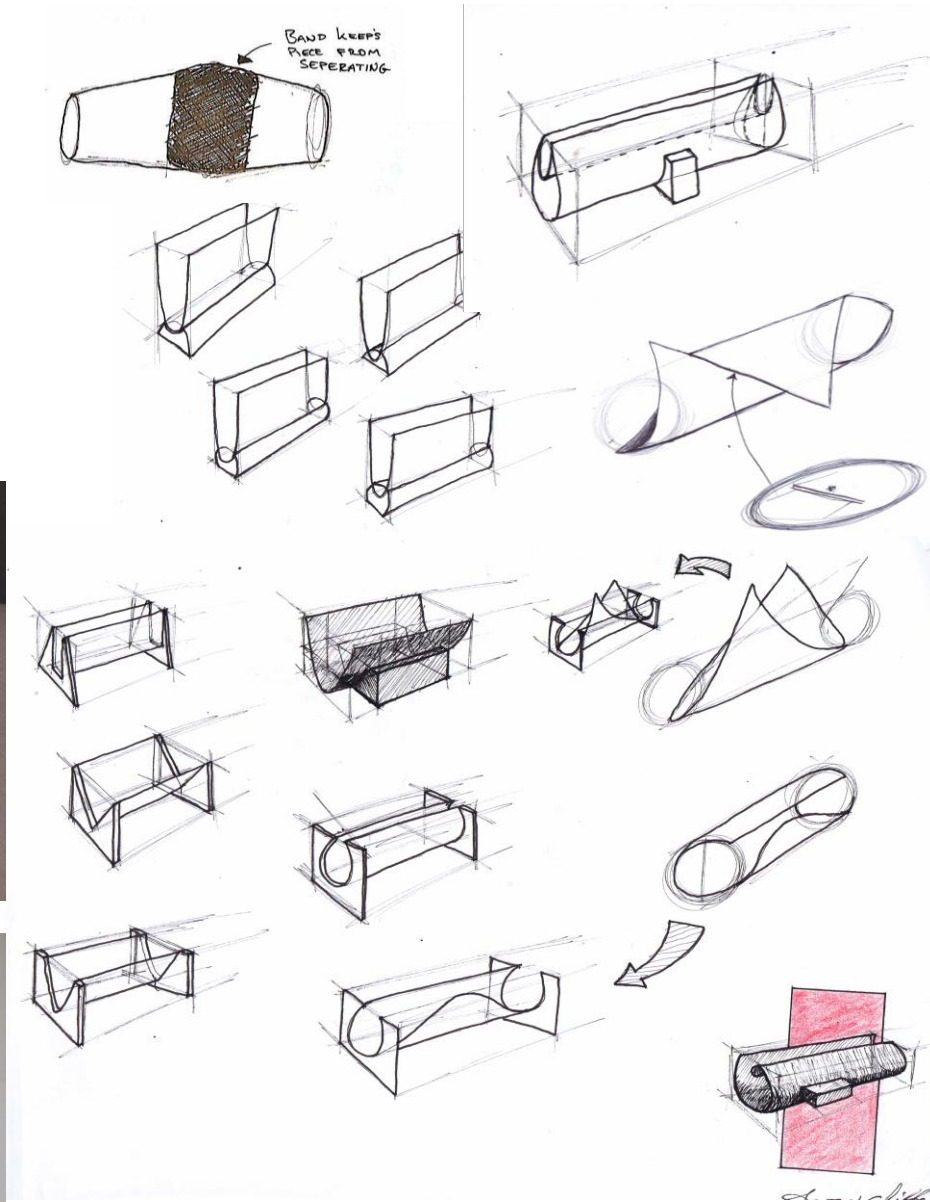
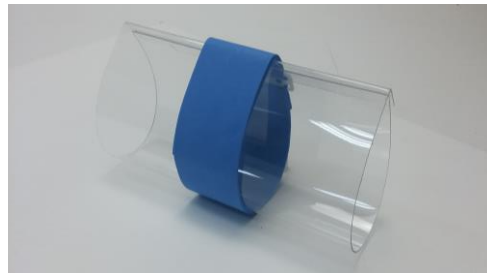
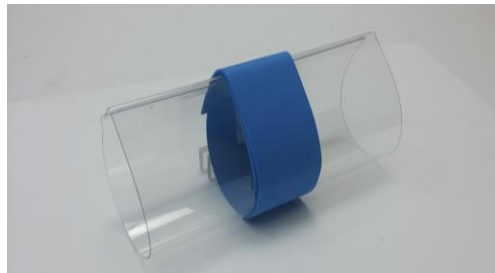
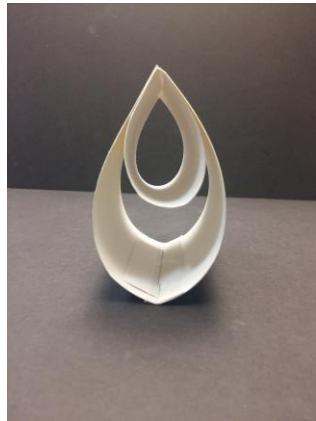
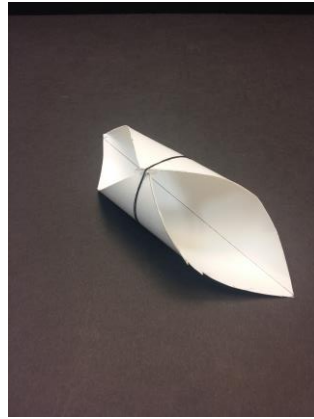
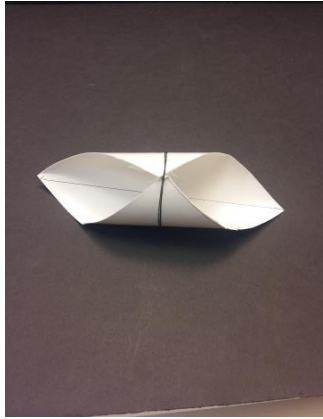
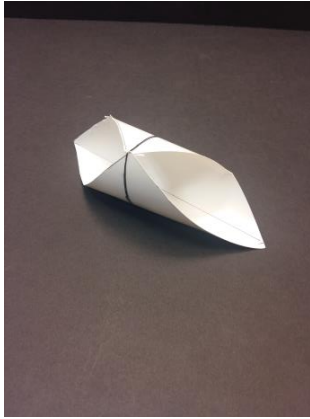
**Aaron Clifford**  
**15122379**





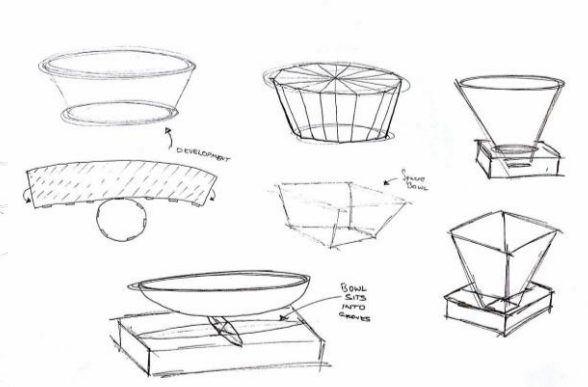
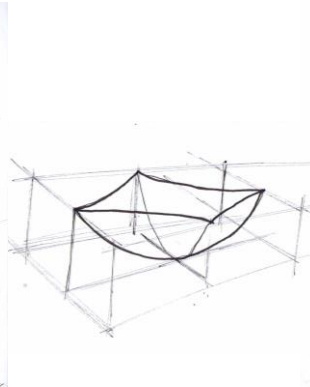
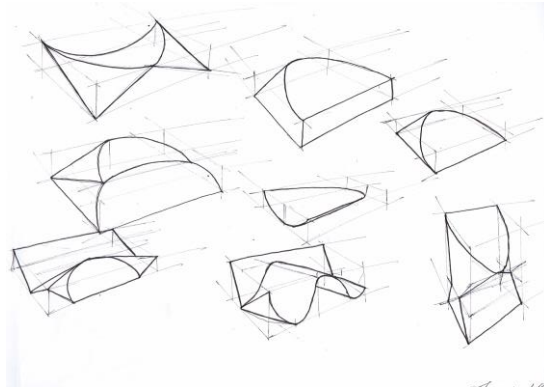
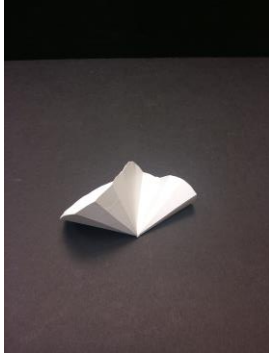
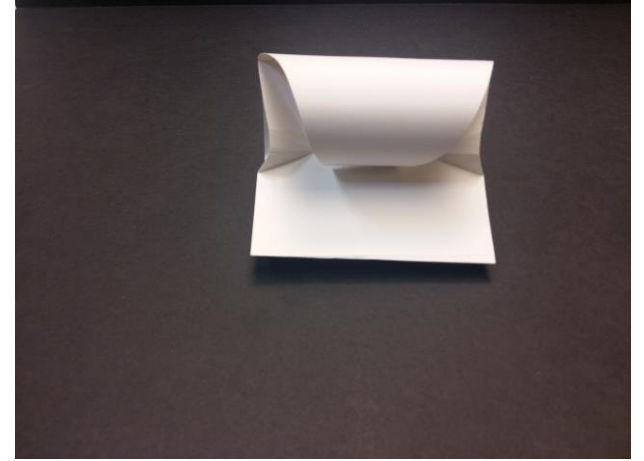
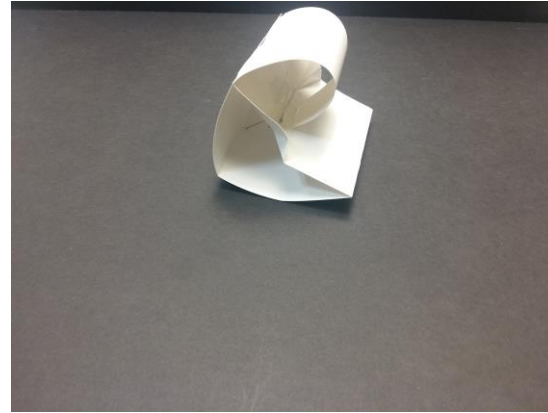
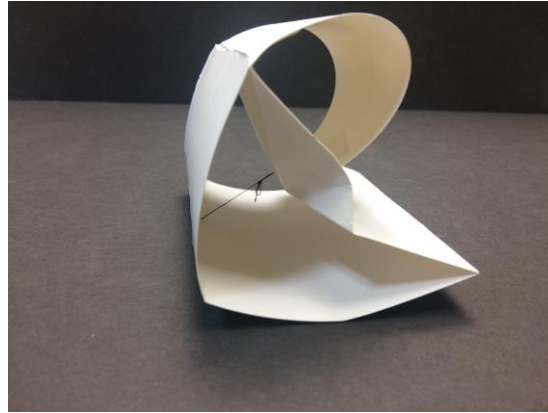
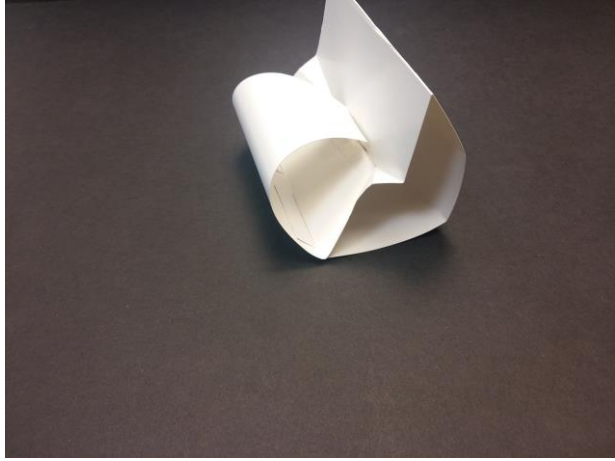
# Exploration

Aaron Clifford  
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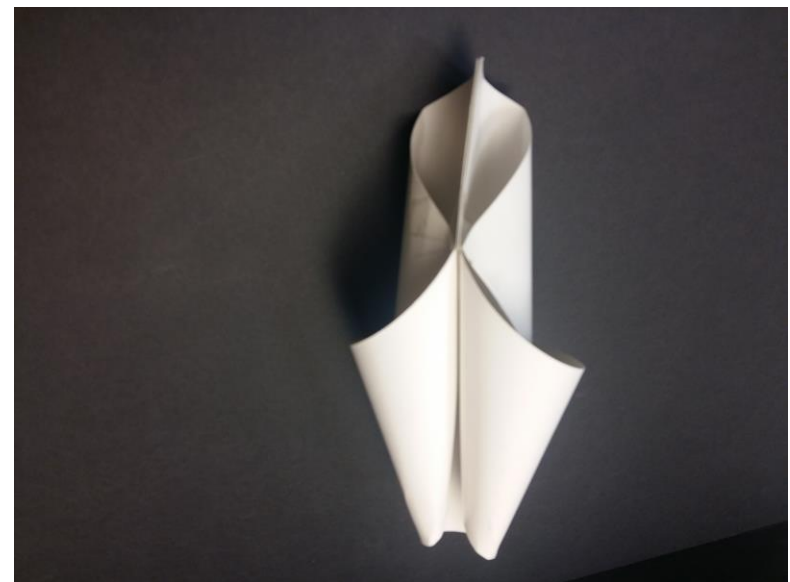
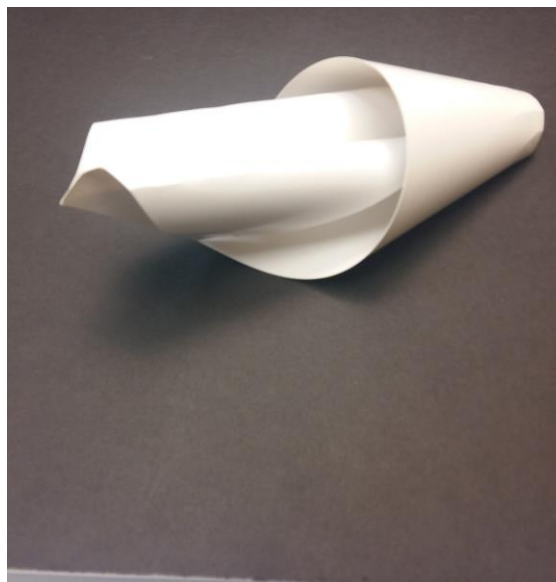
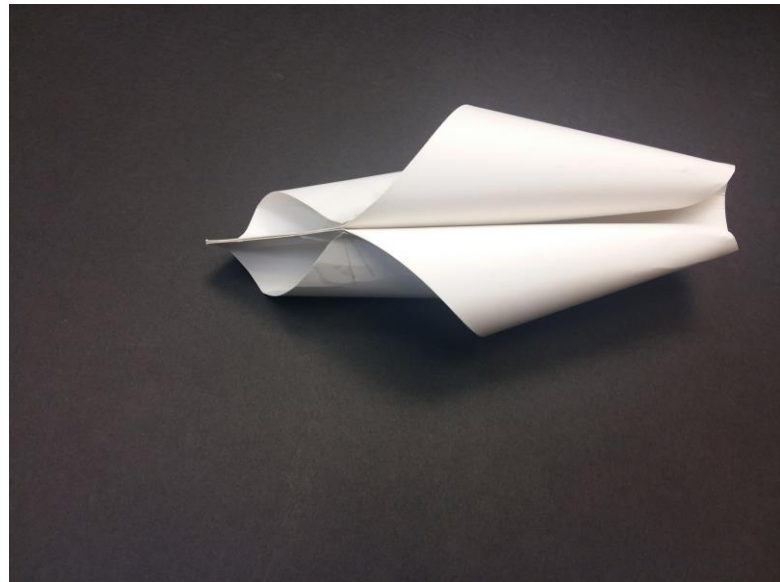
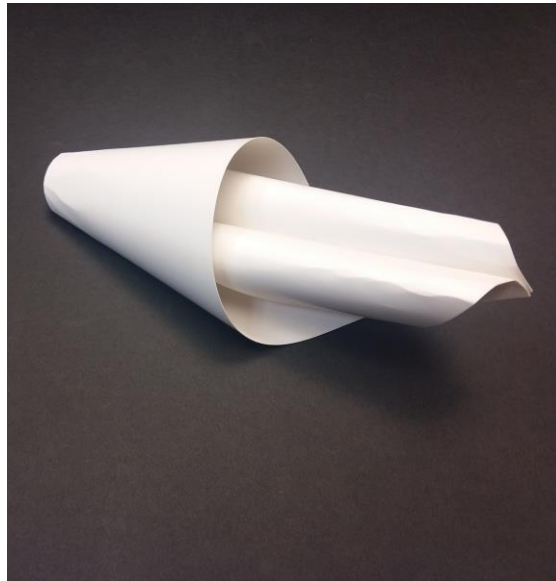
# Exploration

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# Exploration

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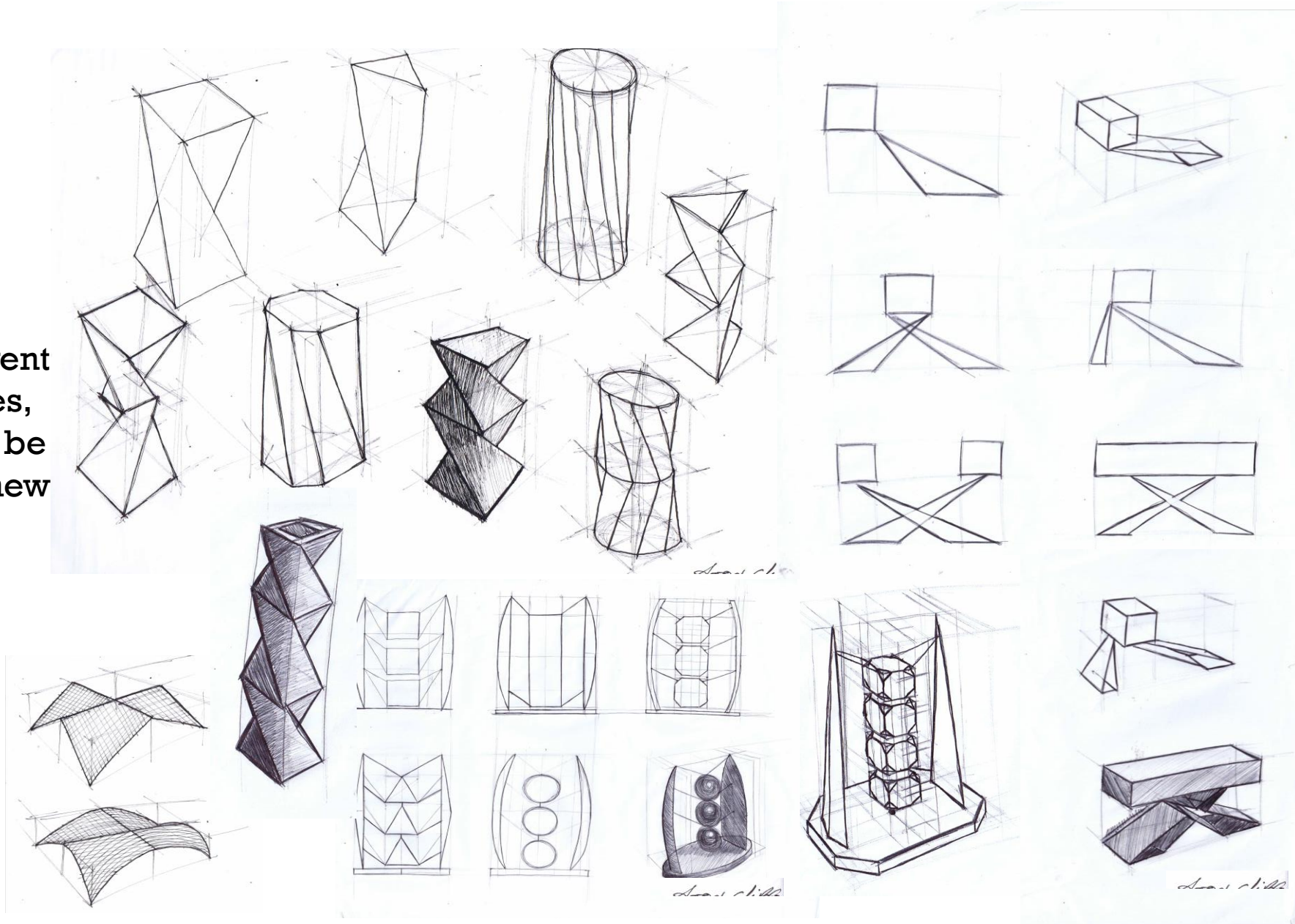




# Exploration

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I looked at different  
geometric shapes,  
and how the can be  
twisted to form new  
shapes.



# Exploration

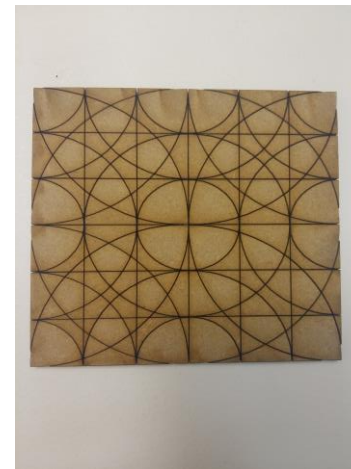
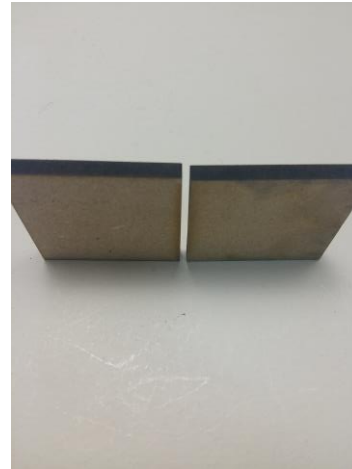
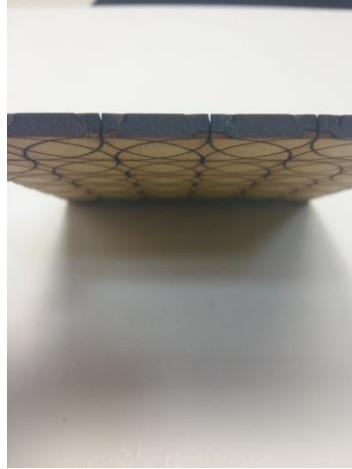
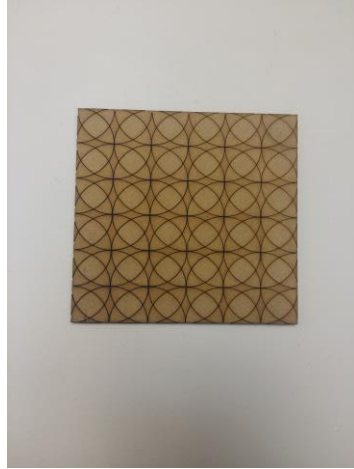
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15122379

I used the laser cutter to test out an idea where a line would be engraved on both sides of the material in an attempt to make the material more flexible.

I had to try several different settings on the laser cutter to try and find the optimal depth of engrave.

The pictures in the bottom left are ones of the most that the MDF would bend.

This process didn't work so I abandoned the idea.



# Exploration

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These are some of the materials that didn't work.



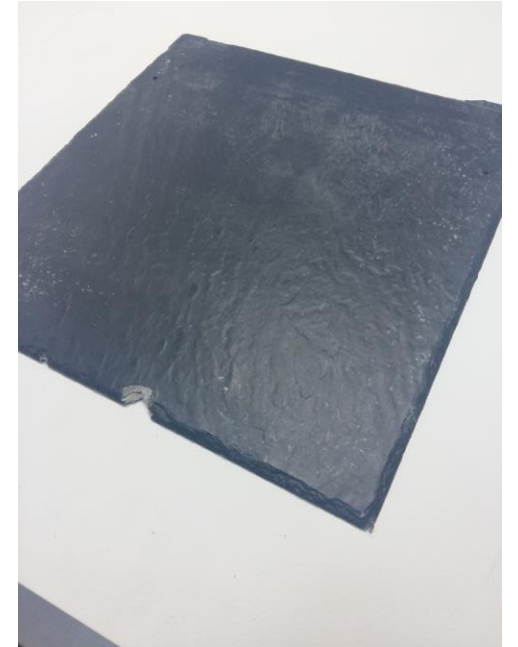
The Perspex didn't work at first as I used an engrave line which didn't make it anymore flexible but mad it brittle.



This is vulcanised rubber used for various animal bedding, but because it is coated in PVC it cant be used on the laser cutter.



This is an old Bauxite record. This is also unable to be used on the laser cutter because it would create harmful gasses when cutting.



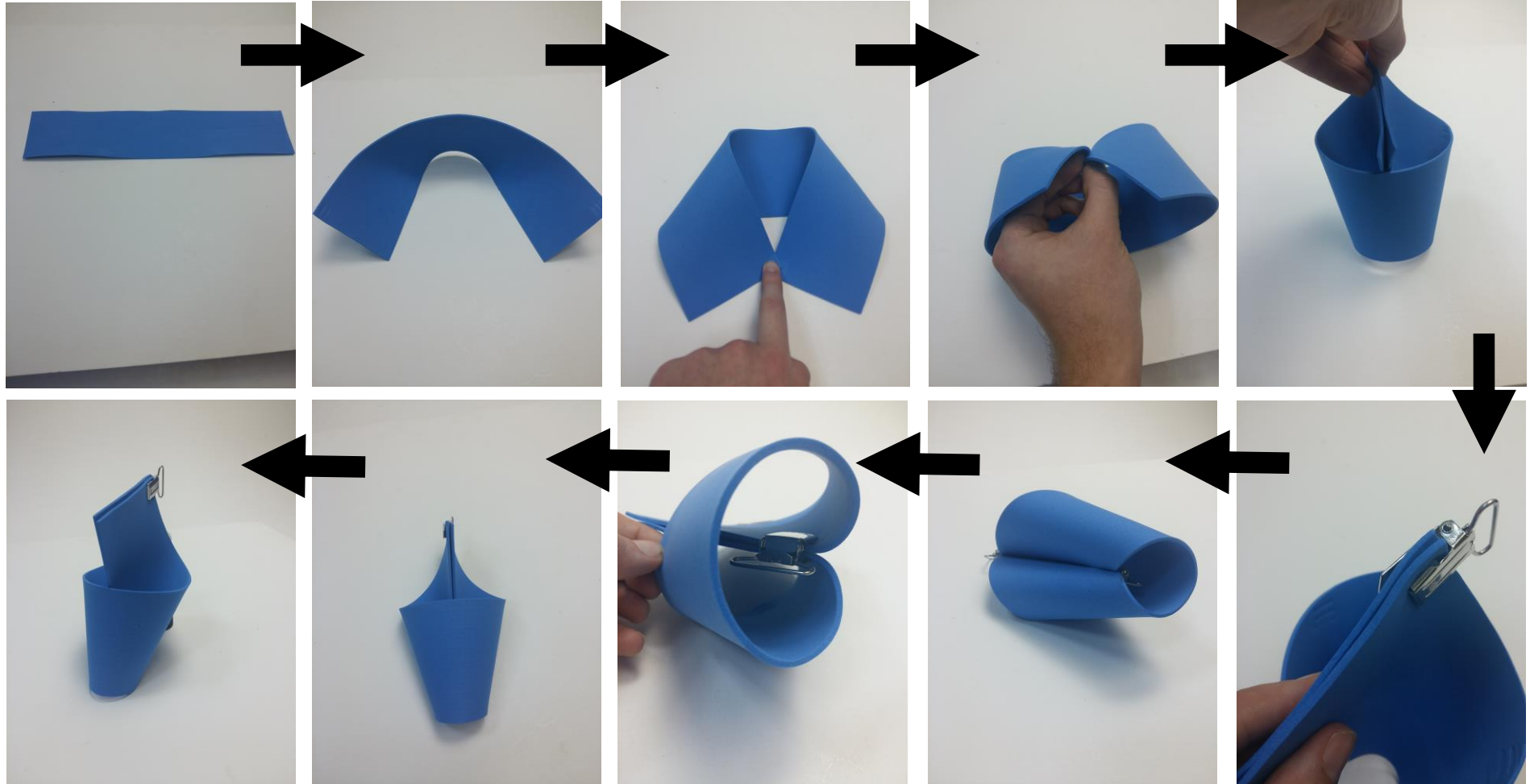
This is manufactured slate. This material can only be used for engraving with the laser cutter.



# Exploration

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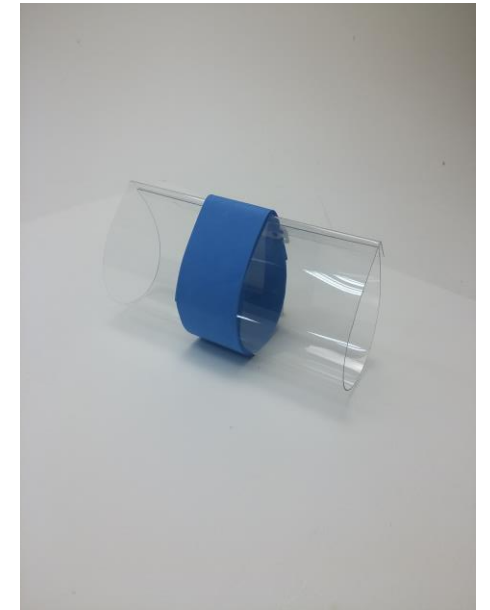
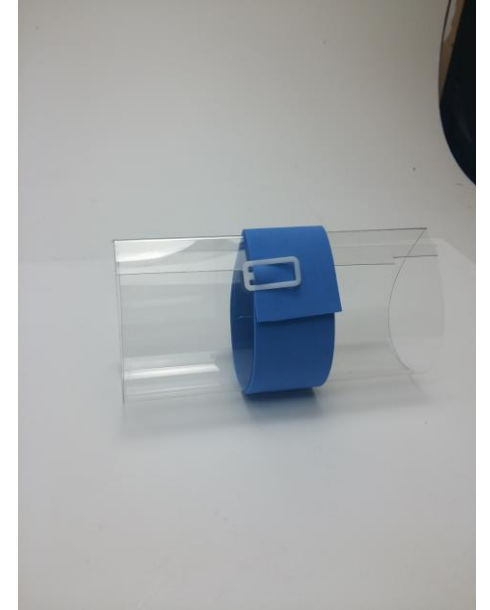
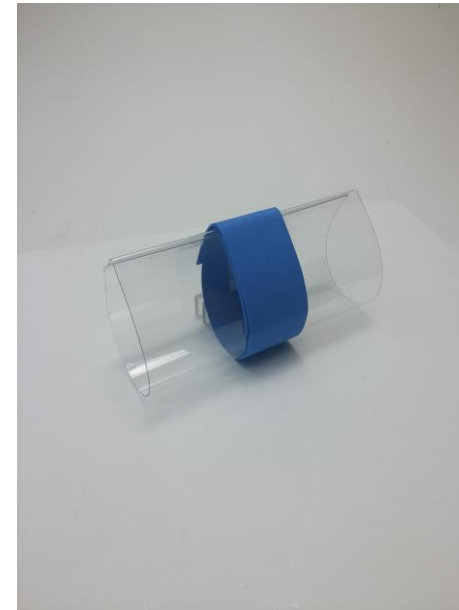
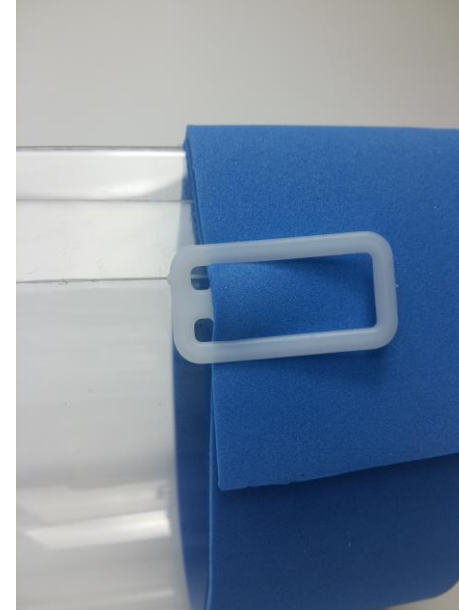
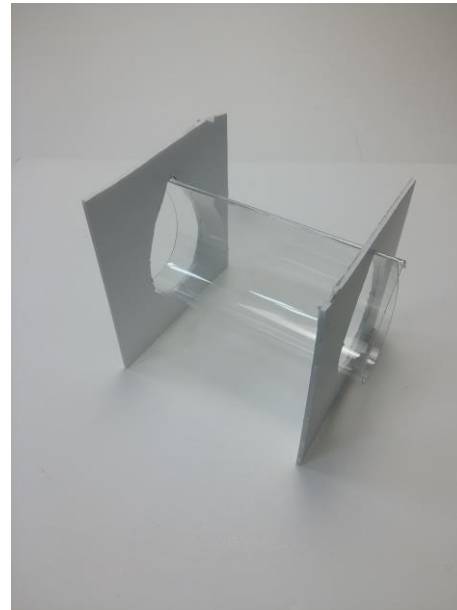
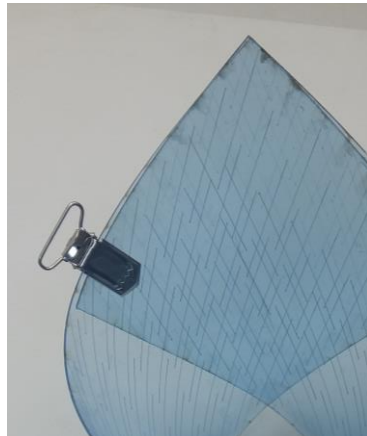
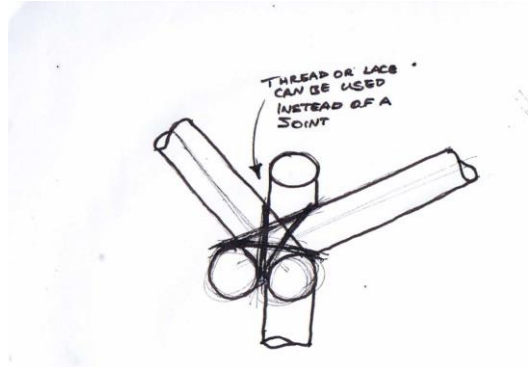
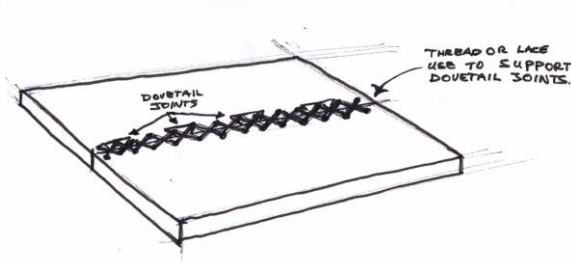
This is a foam material that I used to help understand the curving of flat materials.



# Exploration

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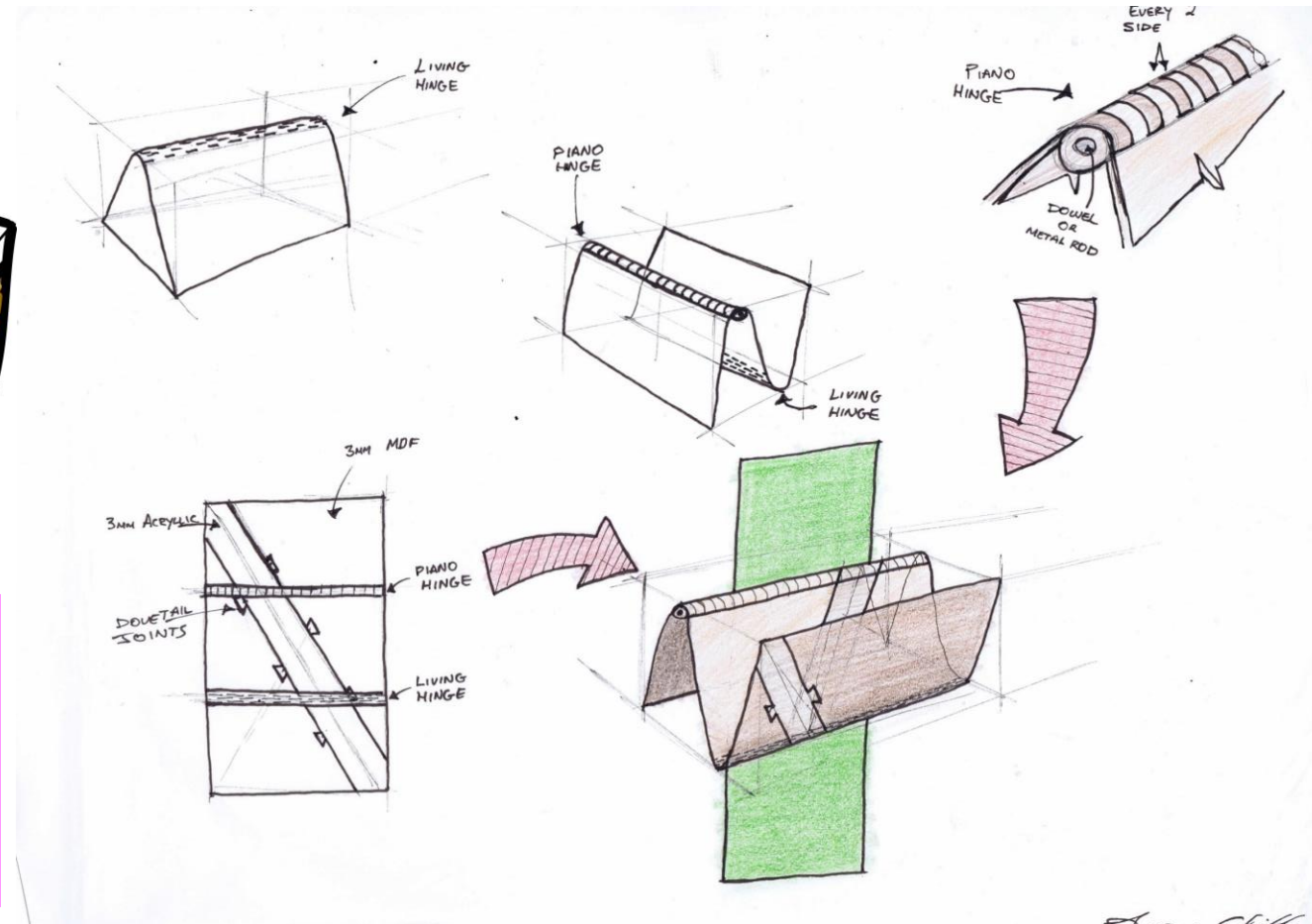
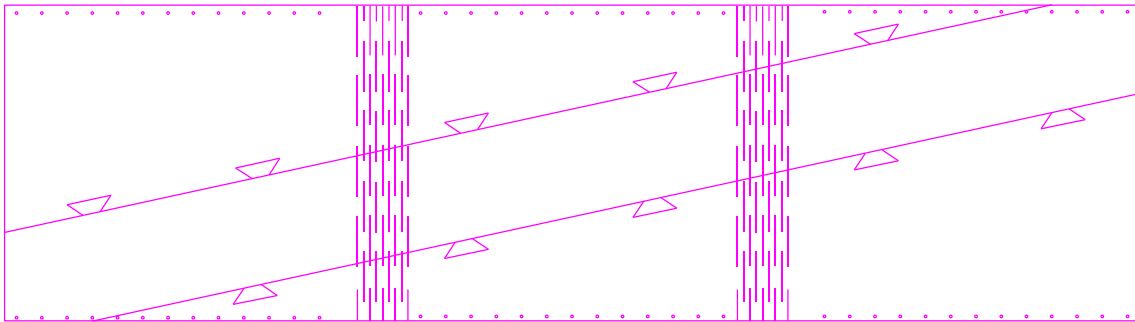
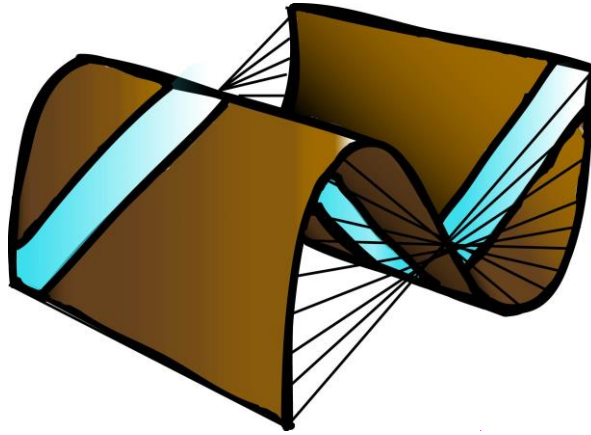
I looked at different ways of joining materials from using string to using a band around the object to keep it from unravelling and clips to hold material together.



# Exploration

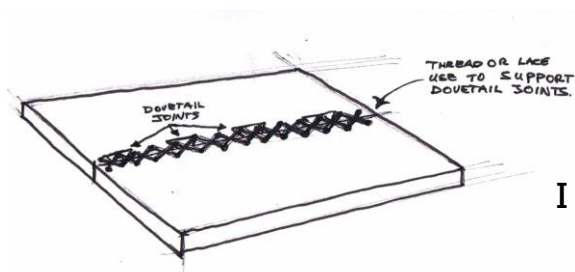
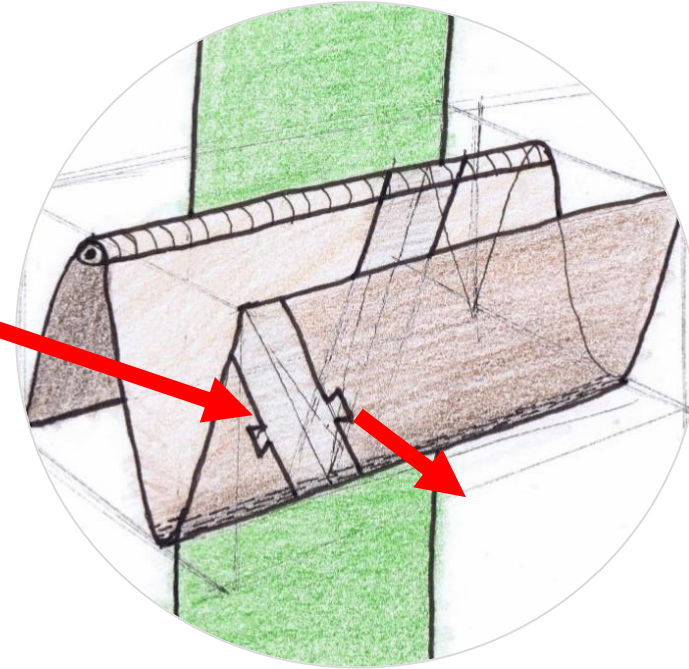
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This was one concept I designed which is a Magazine stand. It uses a mixture of Perspex and MDF.



The problem with the design was joining the two materials.

In my design I just used dovetail joints to keep them together. The problem with this was they only kept the materials together horizontally but they wouldn't keep it from vertically sliding out.



I could have used string to reinforce the joints but It wouldn't be strong enough.

# Development

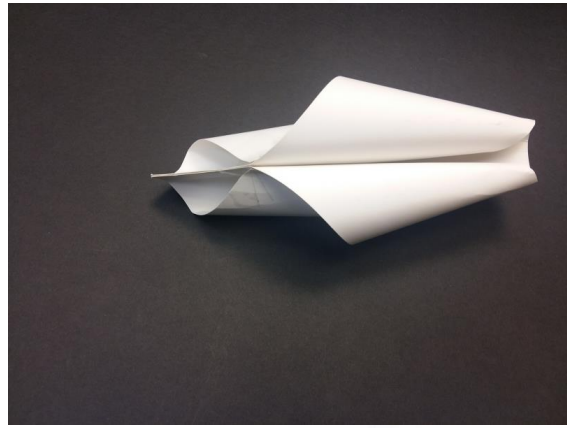
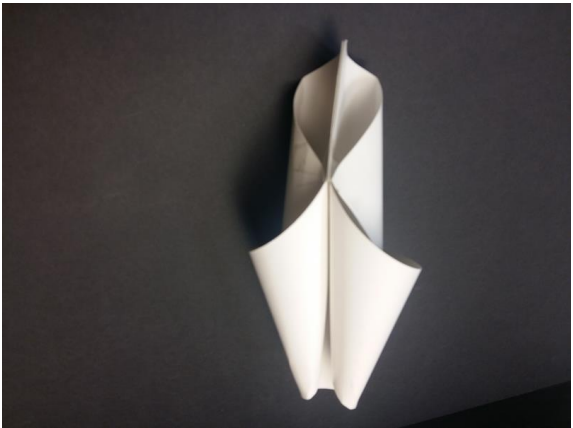
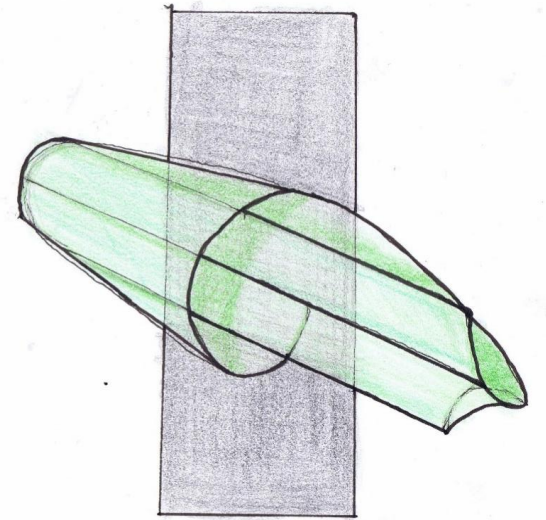
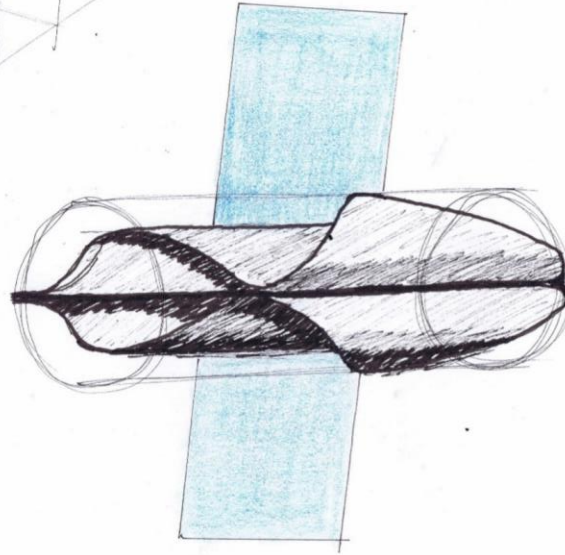
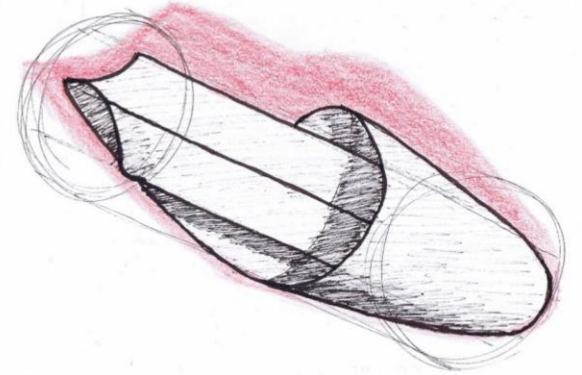
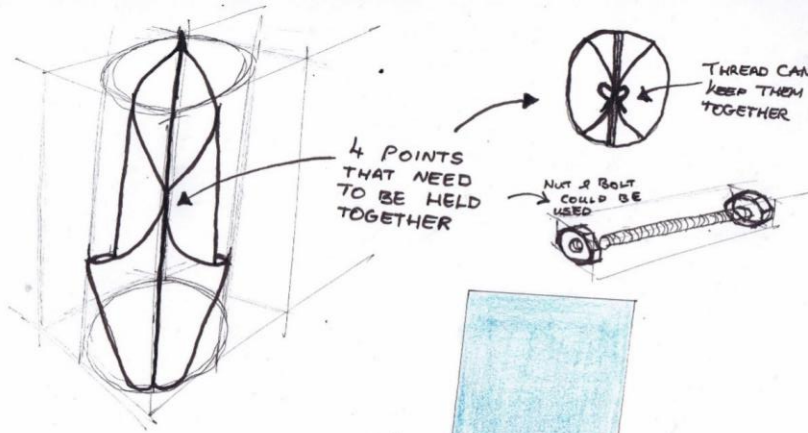




# Development

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From my exploration I found these designs very interesting so I decided to develop them further.

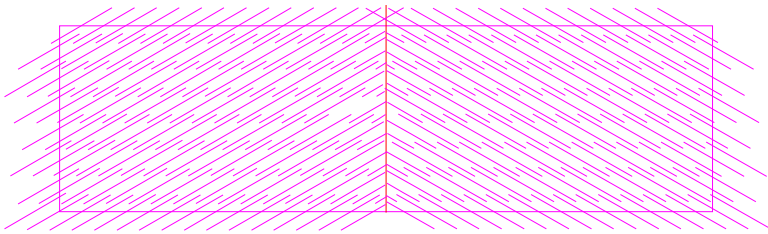
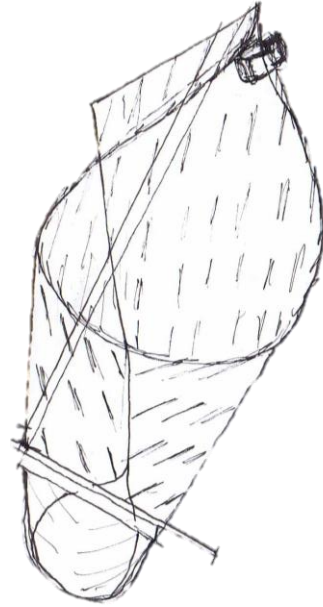




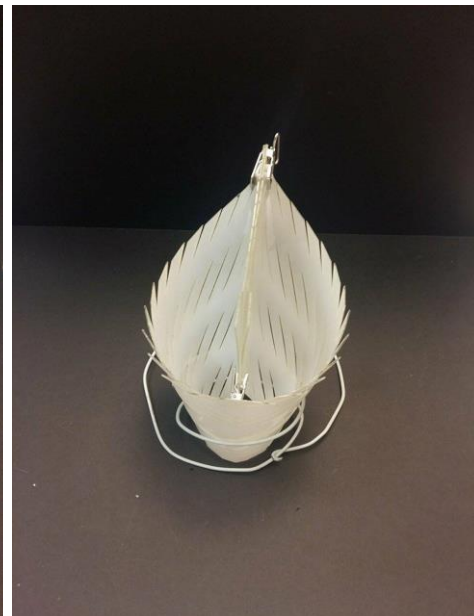
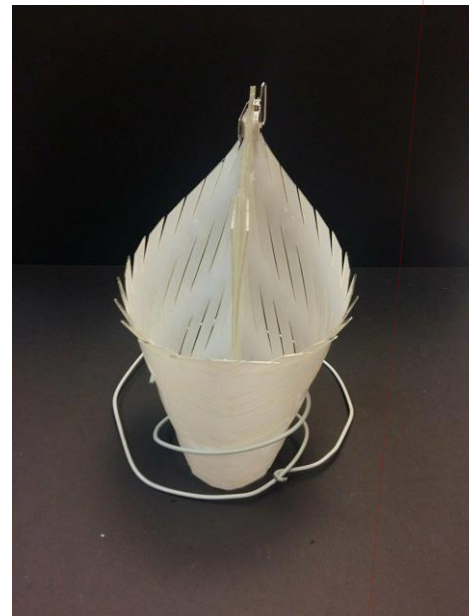
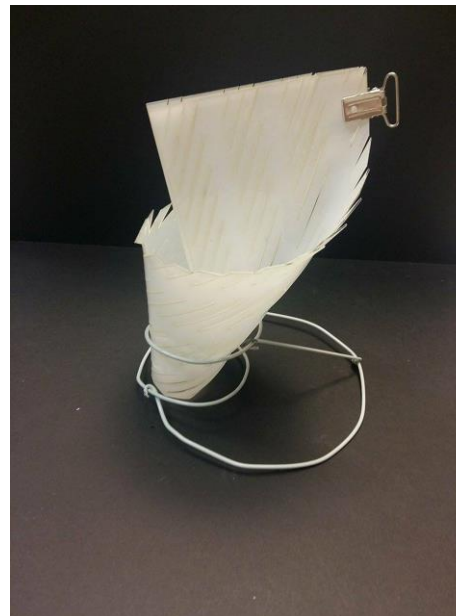
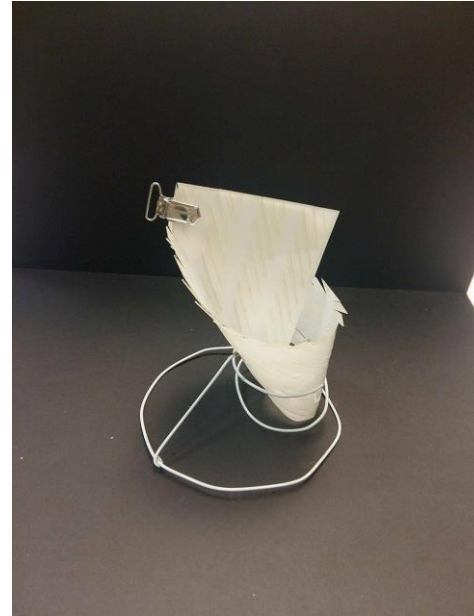
# Development

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15122379

I choose 0.8mm white Perspex for making this product because it had some flexibility in itself already.



The Illustrator line work was a series of diagonal cuts which would improve the flexibility of the Perspex.



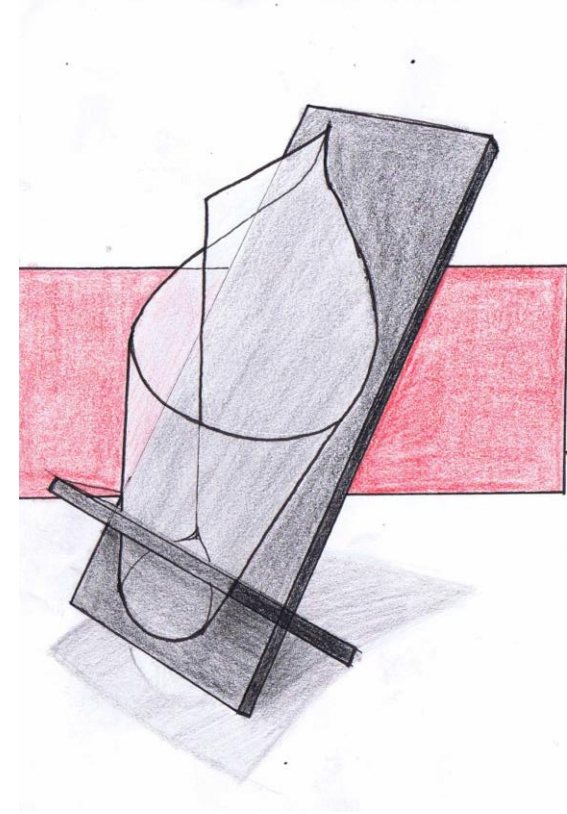
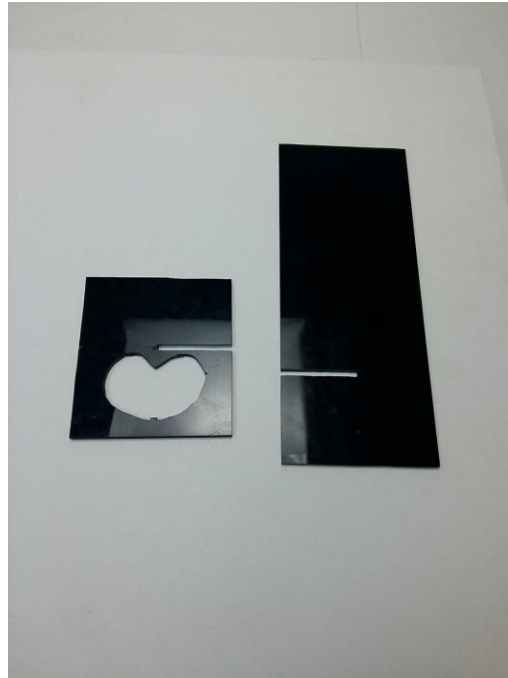
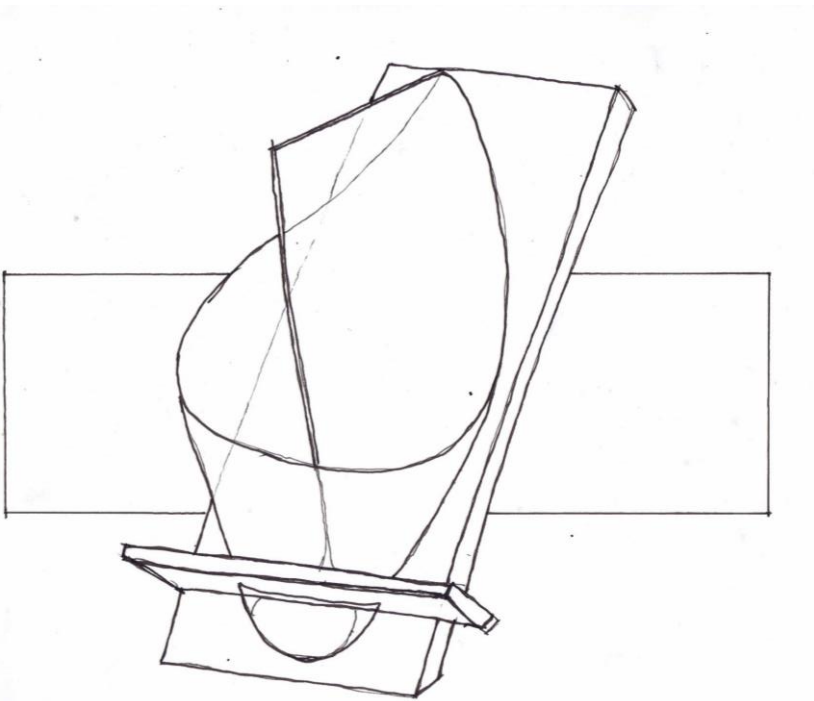
# Refinement



# Refinement

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For my final model, 'The Kitchen Kaddy', I chose to make a stand that it would slot into as the wire stand wasn't strong enough when objects were placed in.



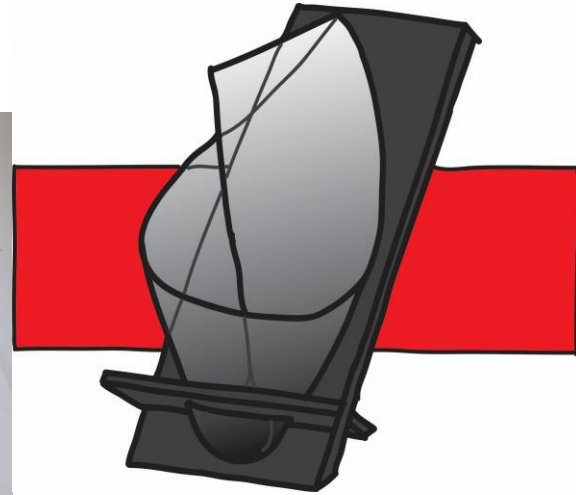
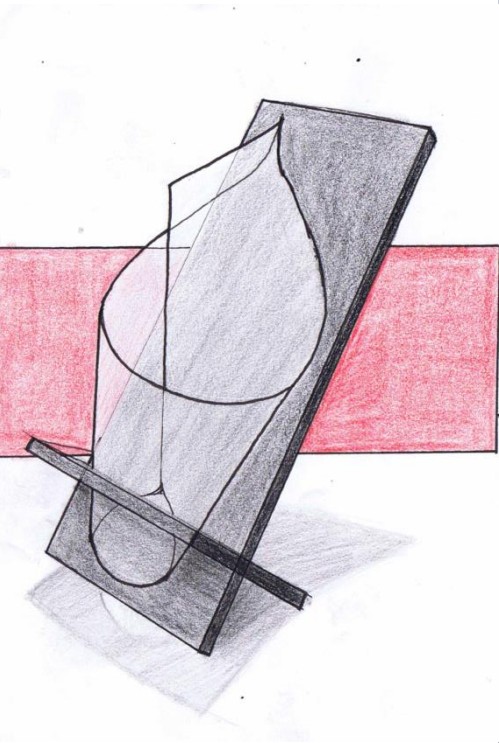
I made a mistake while cutting the stand on the laser cutter and didn't get the chance to fix it so I cut the stand with a band saw and scroll saw.



# Refinement

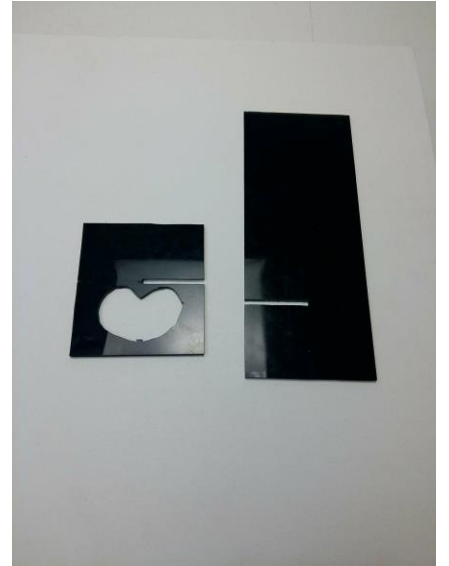
Aaron Clifford  
15122379

The Kitchen Kaddy is a stylish and elegant utensil holder which will modernise your countertop.



# Refinement

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# Refinement

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# Appendix

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