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**FLAT MATES**

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# DESIGN BRIEF

Pictured is the Design Brief For the Project.

PD4103: Louise Kiernan, Muireann McMahon: Weeks 7-13



## Flat Mates



### Background

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 themes below:

Travel Play Leisure Learn Work

Design a functional object and its packaging. The product suite must be made from flat materials and have a consistent aesthetic language throughout. There is no limit to what you can use as long as the machines can cope with it. Minimal additional fixings may be used- but sparingly and the product size must not exceed 50cm X 50cm X 50cm.

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

Classes will take place in FabLab unless otherwise stated. You are allowed to use the FabLab machines outside class time for free but please book via [www.fablabsau.ie](http://www.fablabsau.ie). DEMONSTRATION CLASSES & WORKSHOPS WILL TAKE PLACE THURSDAYS 12-2pm



## Project Objectives

- Research an open-ended theme.
- Explore materials and production methods.
- Plan, specify and produce finished products.
- Apply graphic design principles for effective visual communication.
- Application of high level design skills.



### Project Stage

#### Stage 1

15%

**DISCOVER:** Research & Understanding Experiment with the potential of flat material to be cut, bent, shaped, joined, linked, slotted, torn, cut, folded, pressed etc... Investigate then choose a project theme. **Presentation:** Research & Experimentation Pack

#### Stage 2

15%

**DEFINE:** Style Definition & Exploration Explore aesthetic features to develop a style language for your suite of products, apply the materials exploration to begin to generate initial ideas for designs. **Presentation:** Style Board & Sketches (2D &3D).

#### Stage 3

20%

**ITERATE:** Ideation, Exploration, Experimentation Develop, make, test & iterate as many ideas as possible. Experiment with function, form, materials & the capabilities of the machines. **Review:** Sketchbook, Evidence of building & exploration.

#### Stage 4

25%

**DEVELOP:** Development, Detailing, Modelling Select the most interesting, appropriate, innovative and exciting designs. Refine the technical details (through working prototypes & technical drawings) for production. **Hand-in:** Specifications, Technical Drawings, Models.

#### Stage 5

25%

**DELIVER:** Visual Communication Build your suite of products (full scale if possible). Prepare User Blueprints that visually explain the assembly & functioning of the product. **Exhibition of Final Products** (Public Exhibition in Fablab).

**PROCESS BOOK:** A digital document mapping & explaining your project process.

## Assessment Criteria

1. Evidence of thorough research.
2. Evidence of materials & processes exploration.
3. Demonstration of high quality design and build skills.
4. Innovativeness of ideas.
5. Appropriate response to brief.
6. Professionalism.
7. Attention to detail.

50%  
of module

## Deadline

Week 8  
class start

Week 9  
class start

Week 10  
class start

Week 11  
class start

Week 13  
class start

Week 14  
class start

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# DESIGN GUIDE

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The aim of the project was for each student to research, use and gain experience with flat materials. Students were allowed use a laser cutter to make models. I personally decided to make a wallet or a card holder. This idea was driven by the fact that most people carry a bulky wallet when there is no need for this.

I aimed to both decrease the footprint of the wallet while still keeping all the functionality and durability of the everyday wallet. This can be done by changing the materials and design of the wallet. This allows for users to have more room in their pockets.

### **The Theme**

For this brief we had to choose a theme from Work, Play, Leisure, Learn or Travel. I chose the theme work.

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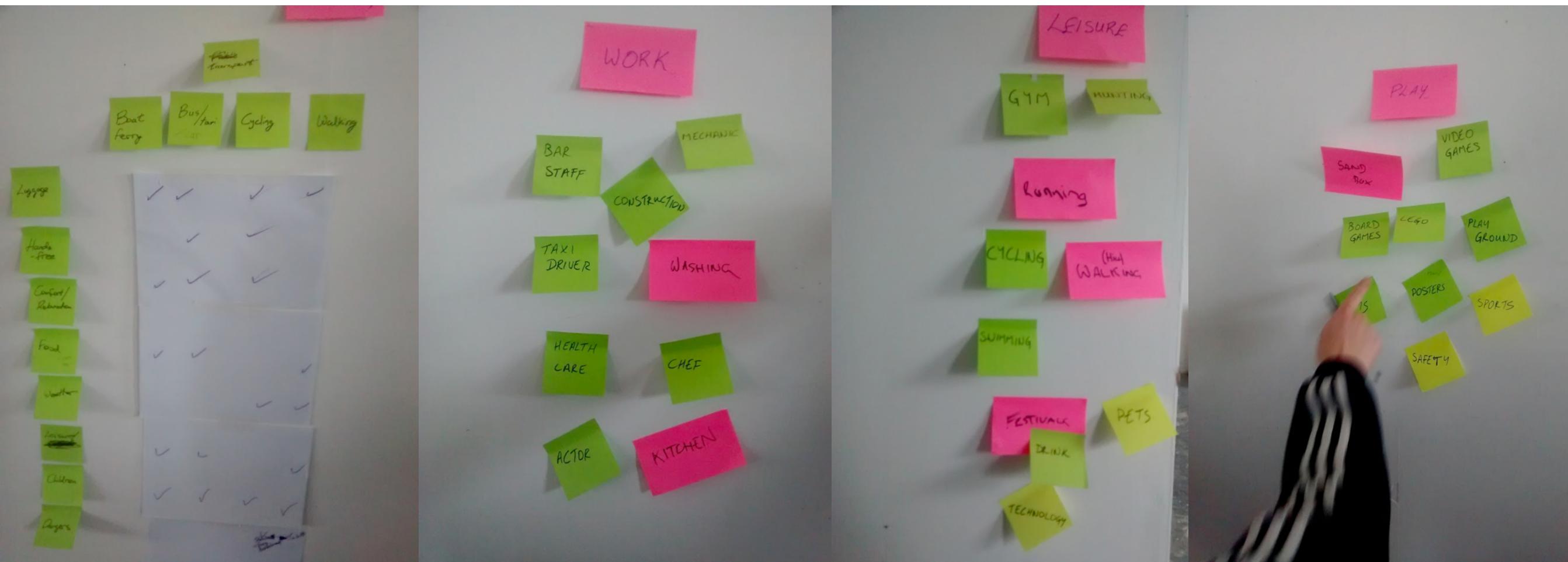
# RESEARCH

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## BRAIN STORM

A brainstorm was carried our after receiving the brief. This was done to generate the start of ideas for the project.

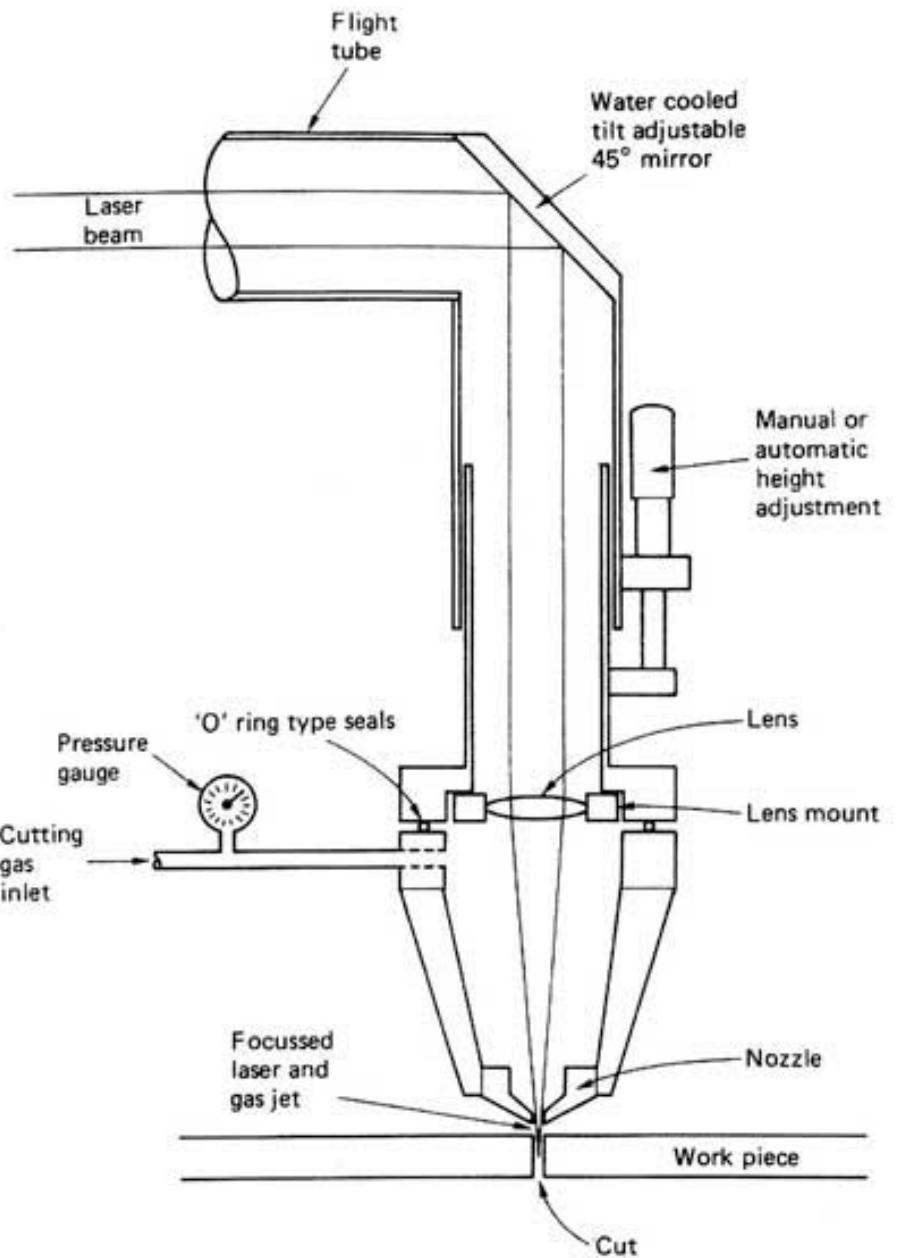


## LASER CUTTER

Laser cutting is a cutting process which uses a laser to cut materials.

The output of the laser cutter is a high powered laser. A typical laser will follow a CAD diagram drawn out.

It is generally used on flat-sheet material and structural and piping materials.

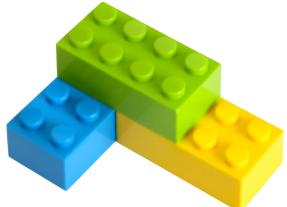


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## MATERIALS

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All these materials are suitable for laser cutting.



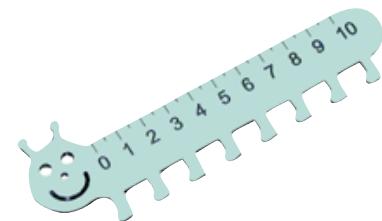
ABS or acrylonitrile butadiene styrene is a thermoplastic polymer. It is impact resistant and tough. Heating up gives off poisonous gases. It has a wide range of uses from Lego bricks to keyboard keycaps. Is not used very often for laser cutting.

Acrylic is a thermoplastic polymer. It is a stiff, fragile material comparable to glass. It retains laser cutting well and engraves well. Available in multiple colours. Cheapest plastic to laser cut



Leather is a durable, flexible material created by tanning animal hide. It can be tanned in a lot of different ways. These leave the leather with different properties. The most popular being chrome-tanned leather. It has a lot of different uses including shoes, hats, jackets, skirts, trousers and belts.

Laminate is when several layers of a material are joined together to form a typically stronger material and other properties. Laminate materials can be anything from wood to plastic. There are a lot of uses for laminate including car windshields, flooring and paper





A dovetail joint is resistant to being pulled apart. This joint predates written history being used as far back as in ancient Egypt. Does not require glue. A series of pins cut at angles intersect each.

A box joint is a joint where two sets of asymmetrical rectangular cuts interlocked and then glued to form a joint. This is the aesthetically pleasing joint used in tables, floor boards and door construction.



More complex joints like the wedge mortise and tenon joint can be used as well. The use of the wedge pushes the joint into an airtight fit and makes sure the joint cannot be removed. This can be used in place of glue and other adhesives.



The joint pictured on the left is an example of a joint that uses multiple planes. The joint is a simple finger joint with the leg of the table sliding on top making sure the joint does not slip out and makes sure the table is structurally sound.



The final joint requires all of the pieces to be placed together to be structurally sound. This joint allows for an interesting shape which can be used as a support or even as an ornament it self



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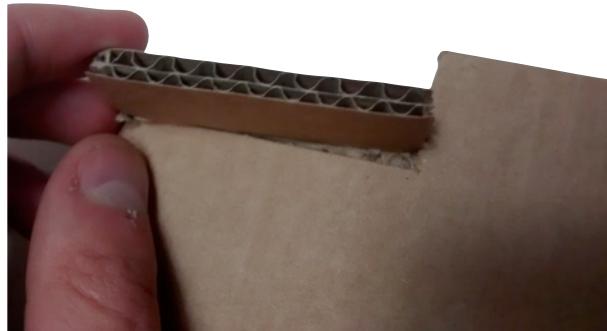
## FOLDS

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Folding along the supports allows for a clean fold.

Folding across the supports diagonally causes the joint to be unclean but still allows for a fold.

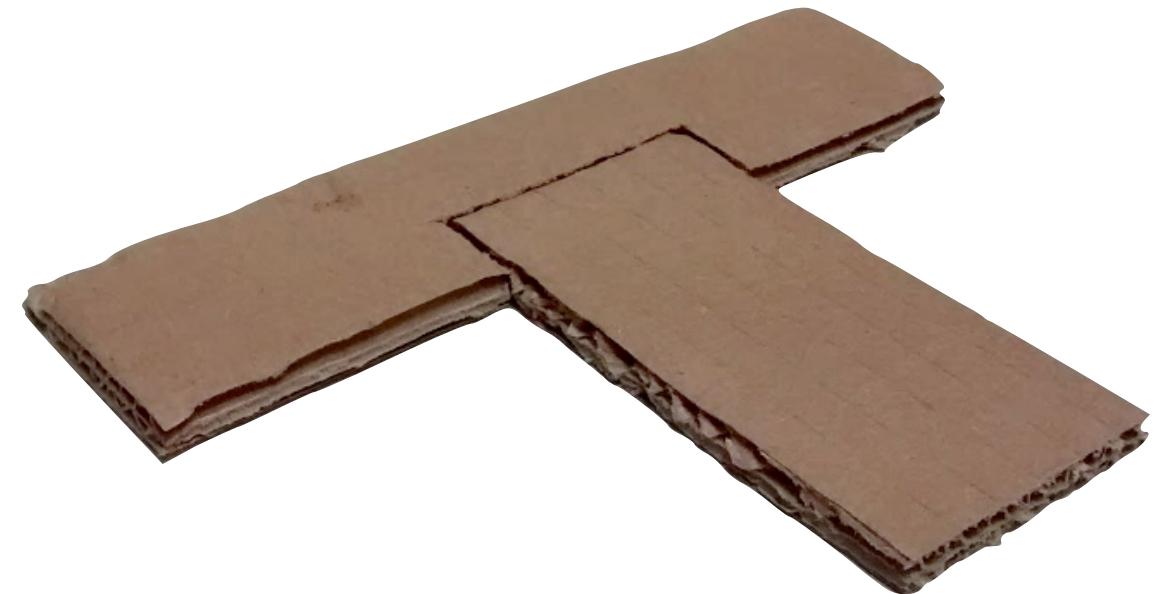


Folding perpendicular to the folds causes an awkward fold.

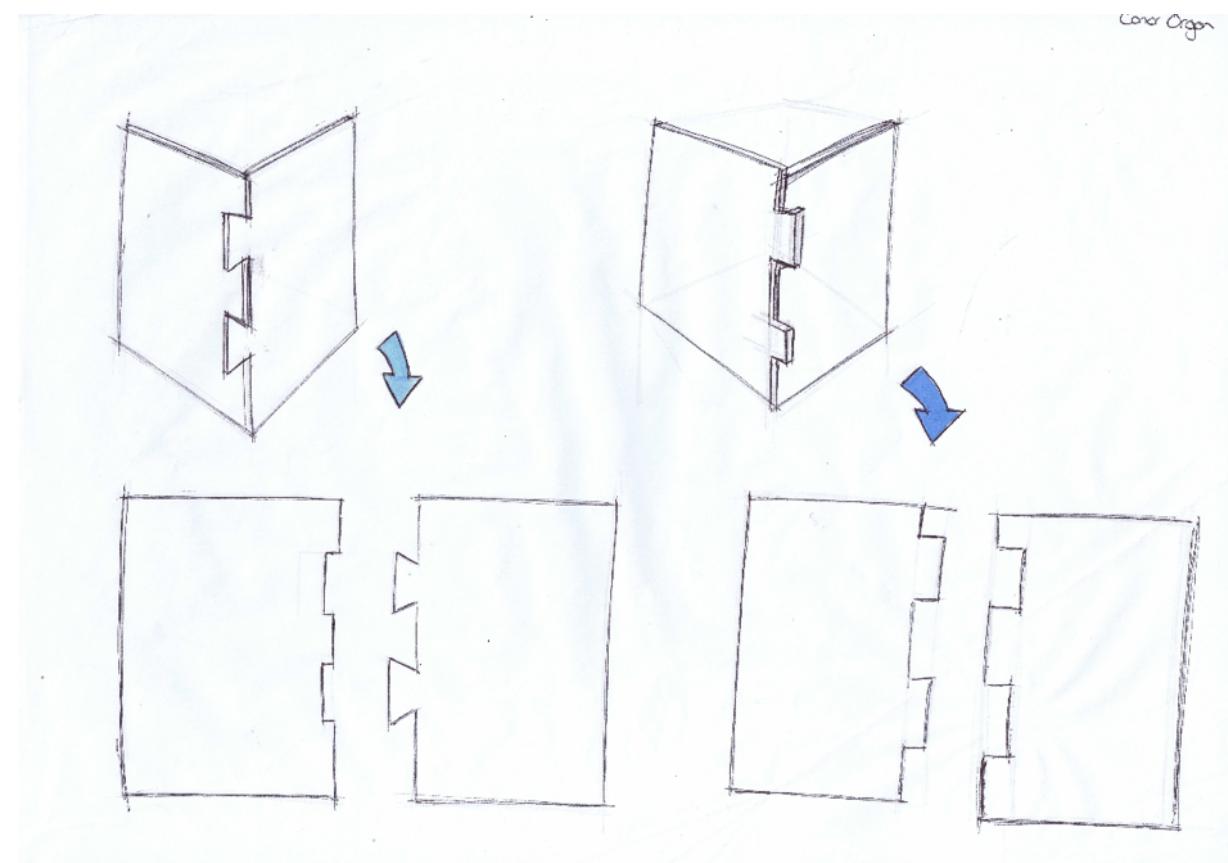
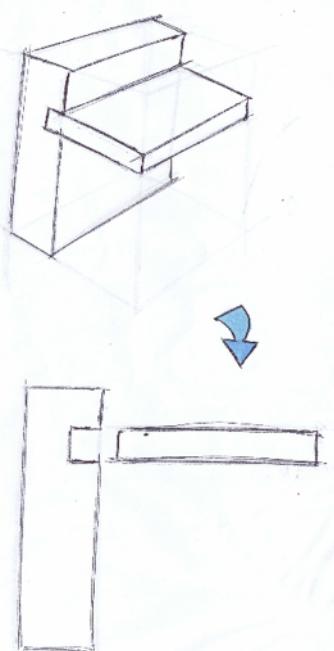
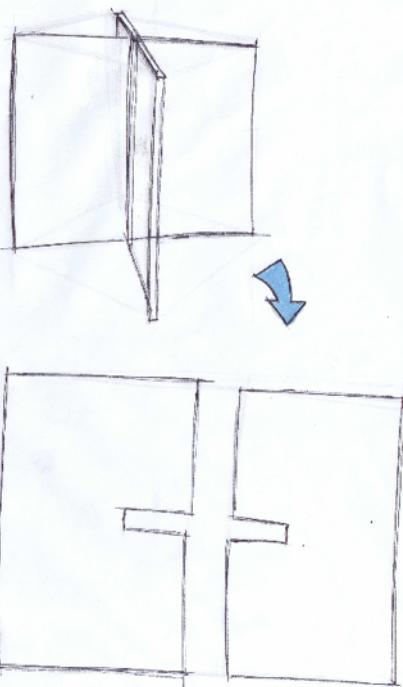
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PICTURES  
OF  
EXPERIMENTATION

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## SKETCHING OF JOINTS



## What makes a wallet a wallet?

The definition of a wallet is a pocket-sized folder for money and plastic cards. This can be done in multiple different materials from synthetic leather to real leather or wood and acrylic. This definition allows for a bit of play with the design of a wallet. The description of the wallet as a “folder” is a loose one. Wallets come in all different shapes and sizes.

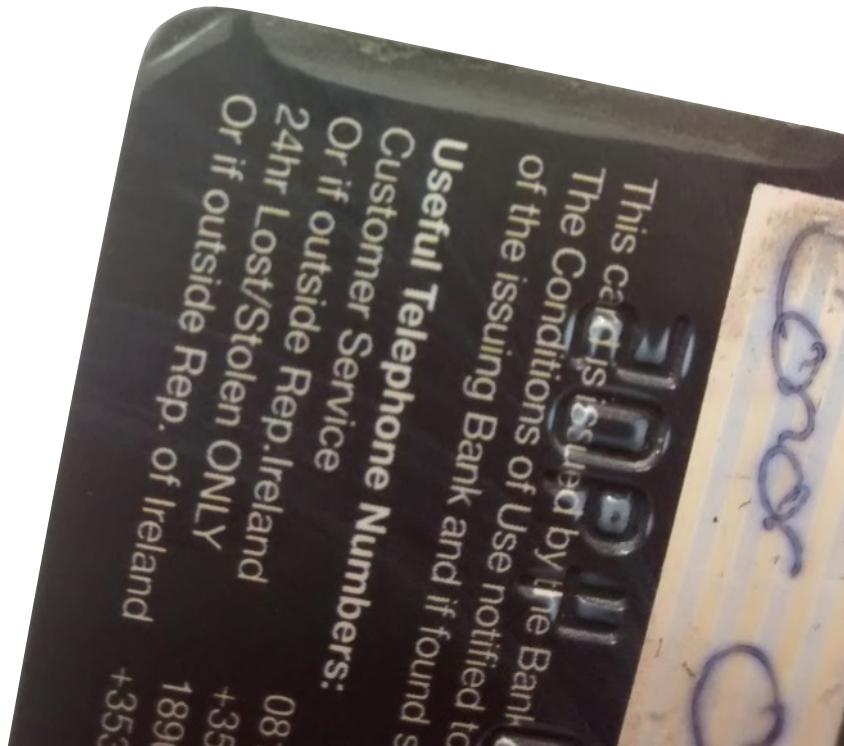
## What technologies are used in a wallet?

An important technology that is in current wallets is RFID blocking or Radio-Frequency Identification Blocking. RFID is the wireless use of electromagnetic fields to transfer data for the purpose of automatically identifying and tracking tags attached to objects. This is used in modern credit cards. Modern credit cards use this technology to charge a card when the card is placed on the right spot.

Wallets can block these signals so that hackers can not use their phones to steal data off these cards, passports and other important cards.

## How to avoid demagnetising credit cards?

Avoiding demagnetising is important when using anything with credit cards. This occurs when the black stripe on the back of the card becomes corrupted. This black stripe on the back of the cards is a magnetic strip. This strip is filled with data, which is arranged as Magnetic particles and the basic properties of a magnet mean these particles could get rearranged simply by being near a magnet



Multiple cards in my wallet have been damaged simply by taking the cards in and out of the wallet. This should not be happening for a simple everyday product.

This was an aim I aimed to address in the process of this project.



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# DEFINE

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After research mood boards and other inspiration methods were developed to help build a style guide and inspire Ideation and branding and packaging for the project. This is an important step in the project and is required for a successful project.

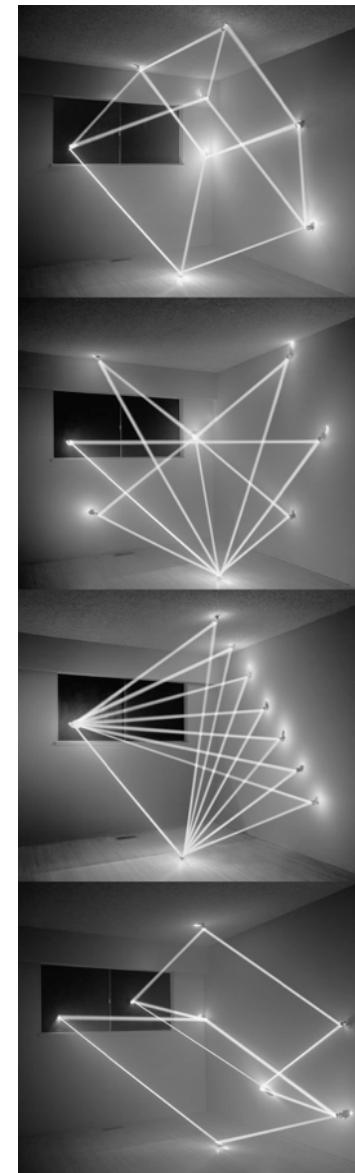
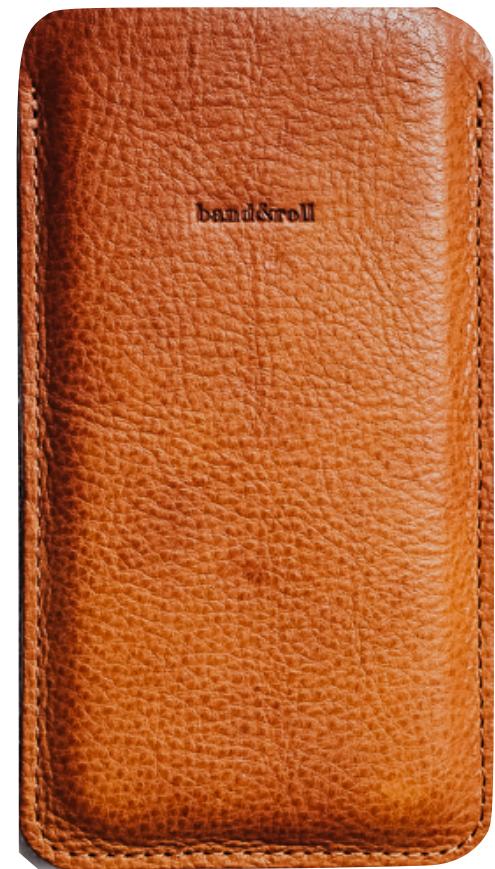
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MOOD  
BOARD

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The mixture of organic, non-synthetic materials with clear, clean stark synthetic materials is something that I wanted to look at during ideation

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## PACKAGING BOARD

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After looking at multiple packaging designs a couple stand out designs were taken and put together into a mood board. What these packages all have in common is simple and clean colours. These also have bold colours which make the product stand out. These colours are used sparingly to give the colours a bigger impact.

The mix of flat and large boxes allowed for a vary of different types of packaging to be explored.

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## LEATHER BOARD

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Leather has the benefit of being able to fold and looks good when mixed with other materials



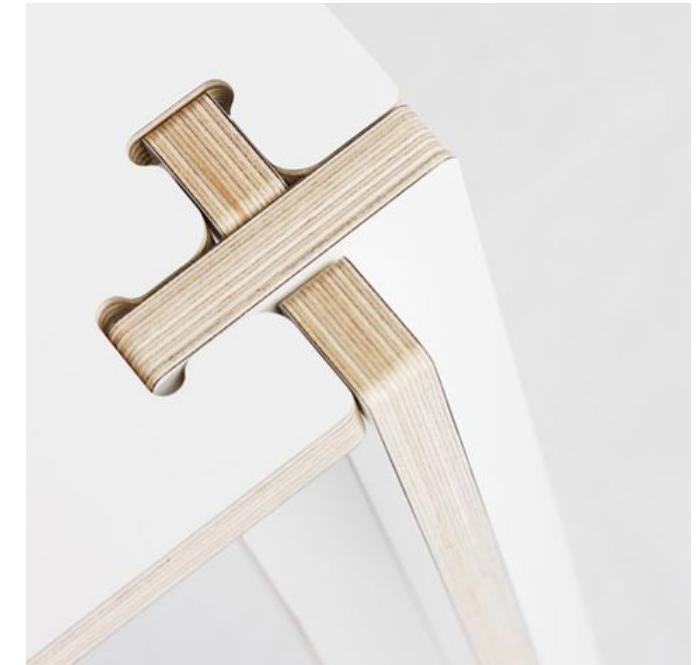
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MDF  
BOARD

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MDF can be used for a lot of things and looks nice when in stark contrast with other materials



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## ACRYLIC BOARD

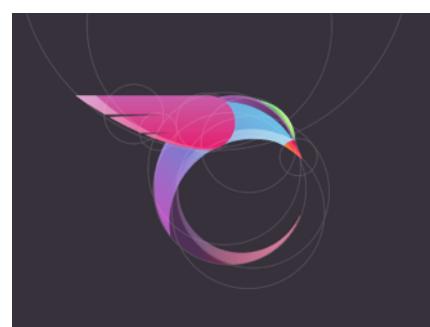
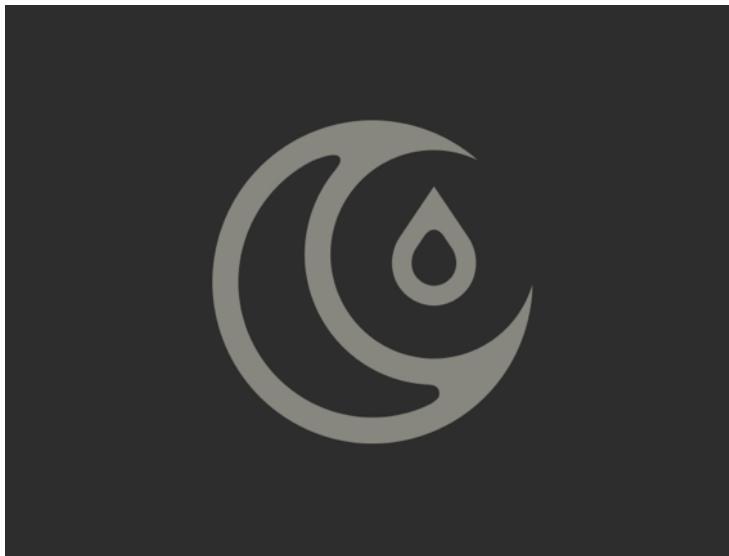
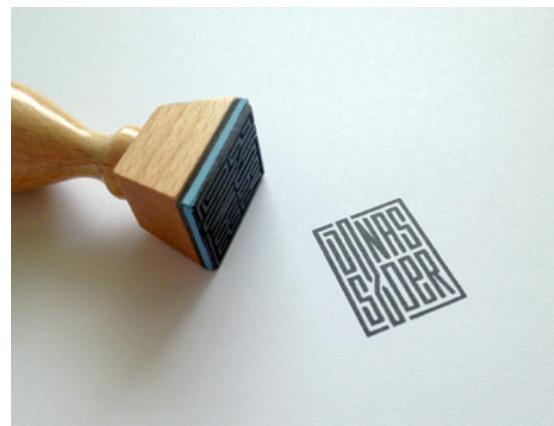
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Acrylic can be used to keep other things inside it



LOGO  
BOARD



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## IDEATION

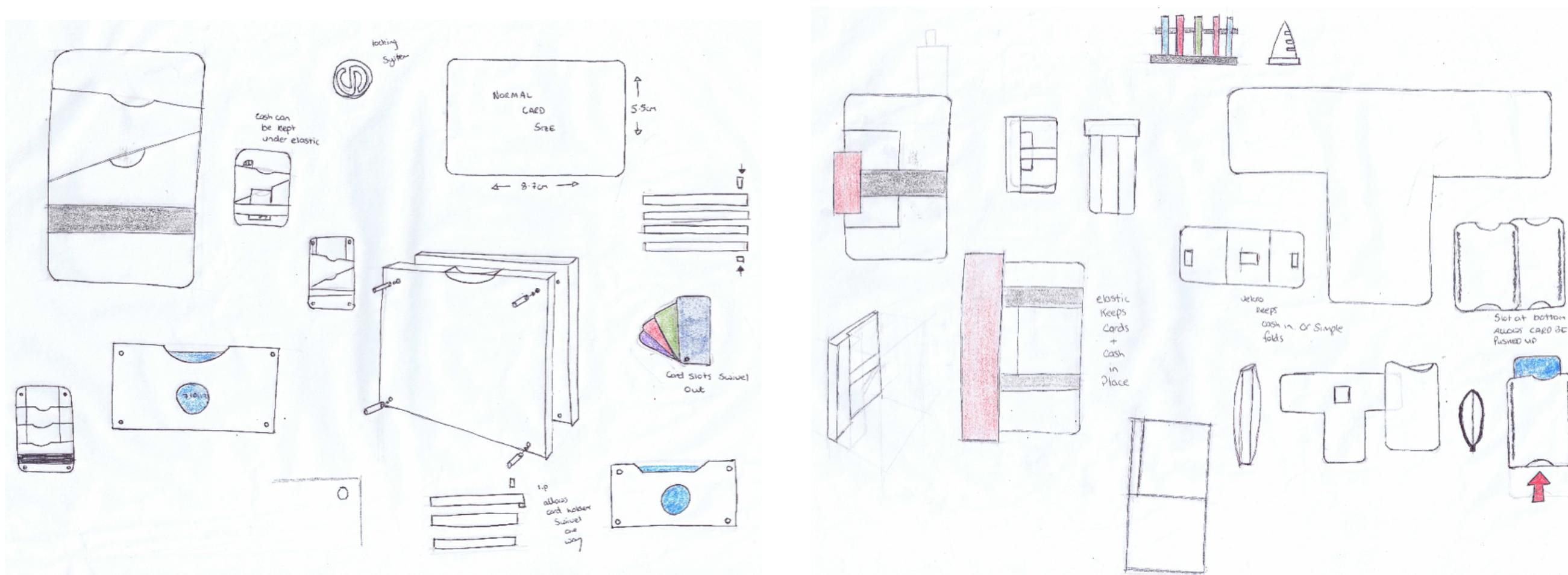
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# IDEATION

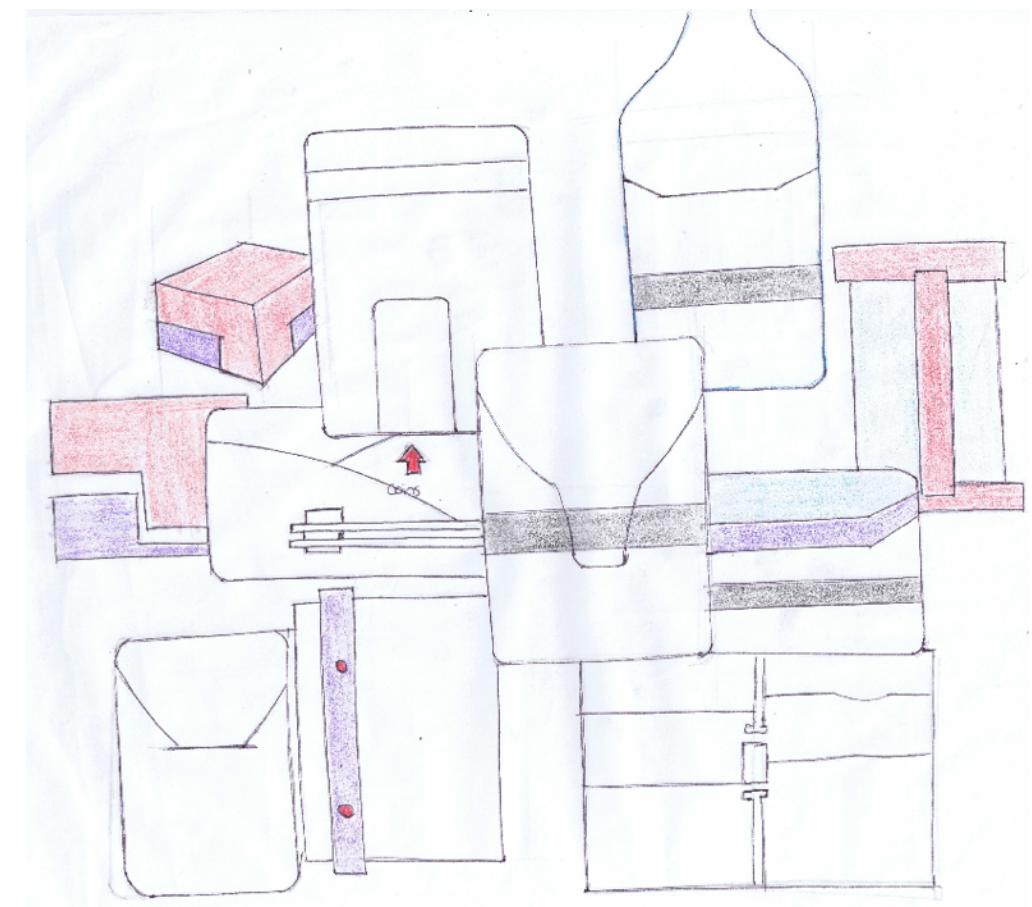
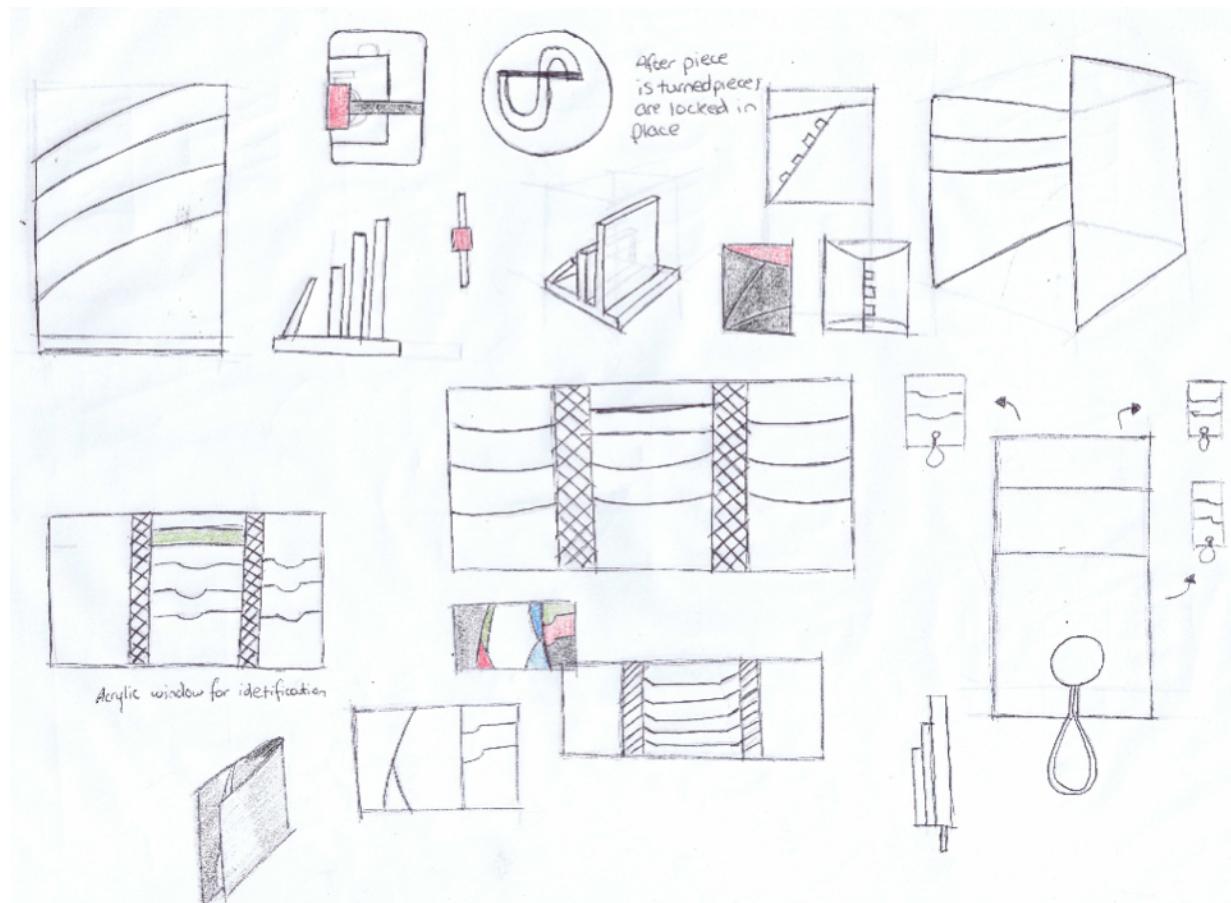
Ideation started with looking at different forms of wallets and different locking mechanisms that could be used to combine different layers of materials.

The forms were explored in a number of different ways including holding cards in place and displaying cards so it is easy to remove cards. A folder like wallet was also explored.



## IDEATION

The cost of materials was kept in mind for the whole of the ideation process. This was done by keeping materials to a minimum. This also allowed to keep the wallets slim and streamlined.



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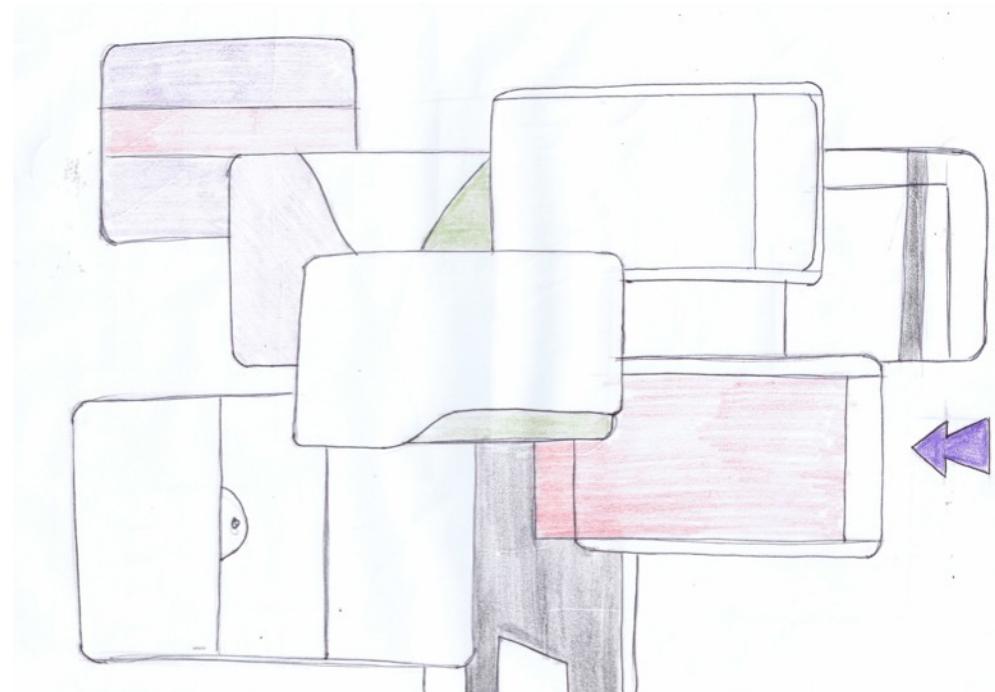
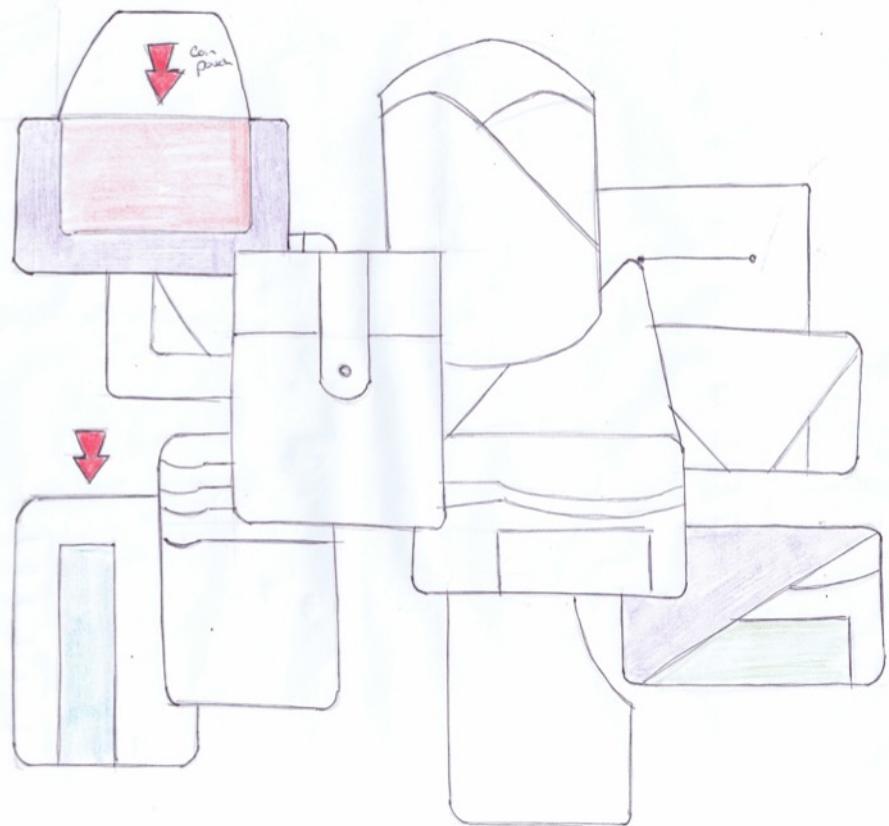
## IDEATION

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In these pages covers for the cards was thought about. These covers allow for additional protection while also giving somewhere for coins to go without falling out. These covers have to have a quick release and not use a magnet to be useful in everyday life.

Angled covers which fold over and connect on the opposite side of the wallet was the standout idea. This idea required too much material to work so was put on the chopping board.



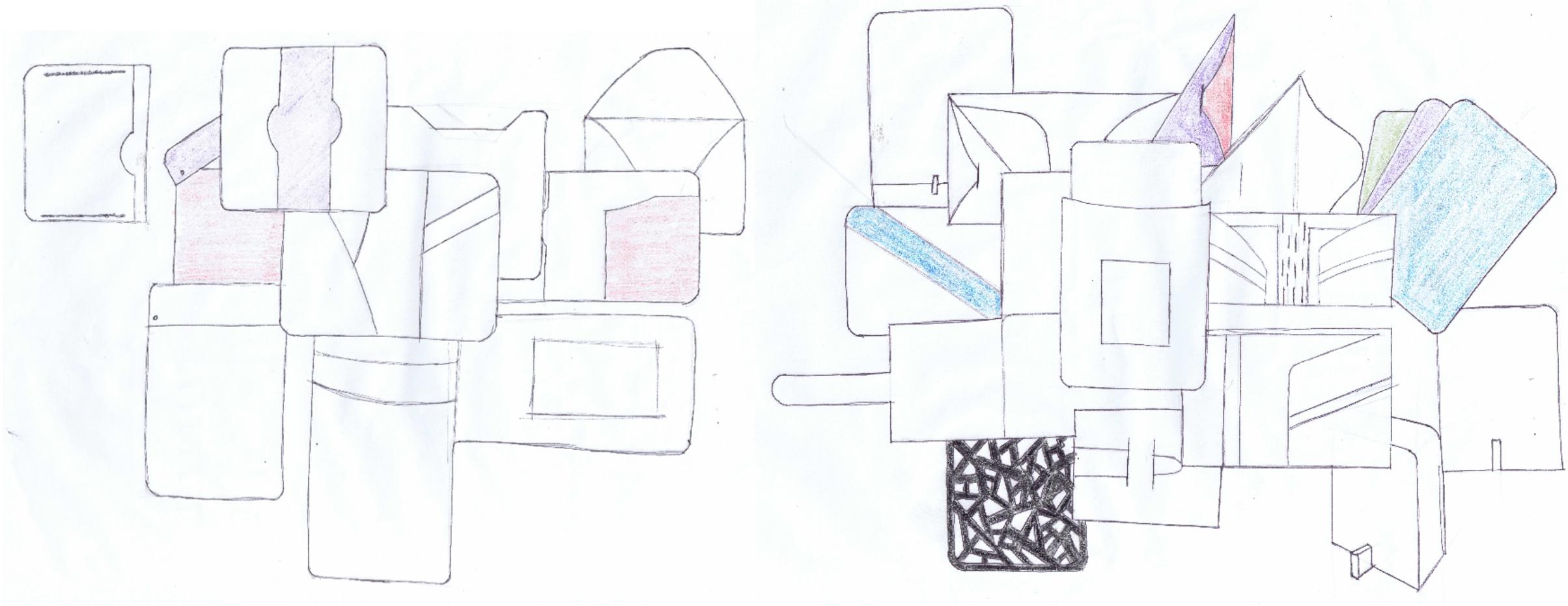
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## IDEATION

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The continuation of looking at bi-fold wallet shapes and various ways the cards can be held in place. I also looked at different ways that the cards are gripped when removing. This is an important interaction because users will need to remove and replace cards quickly when at cash registers in stores.



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## IDEATION

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The most promising wallet iterations were picked and low fidelity models were made of these. Cardboard was used because of it's low cost and availability. While not having the same properties of MDF, cardboard is at least comparable so can be used for these type of models.

It was found that a joint type mechanism would work with a thinner material and that a straight fold would not work in this design. A simple card holder would also work well with a slight hinge redesign



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## Development

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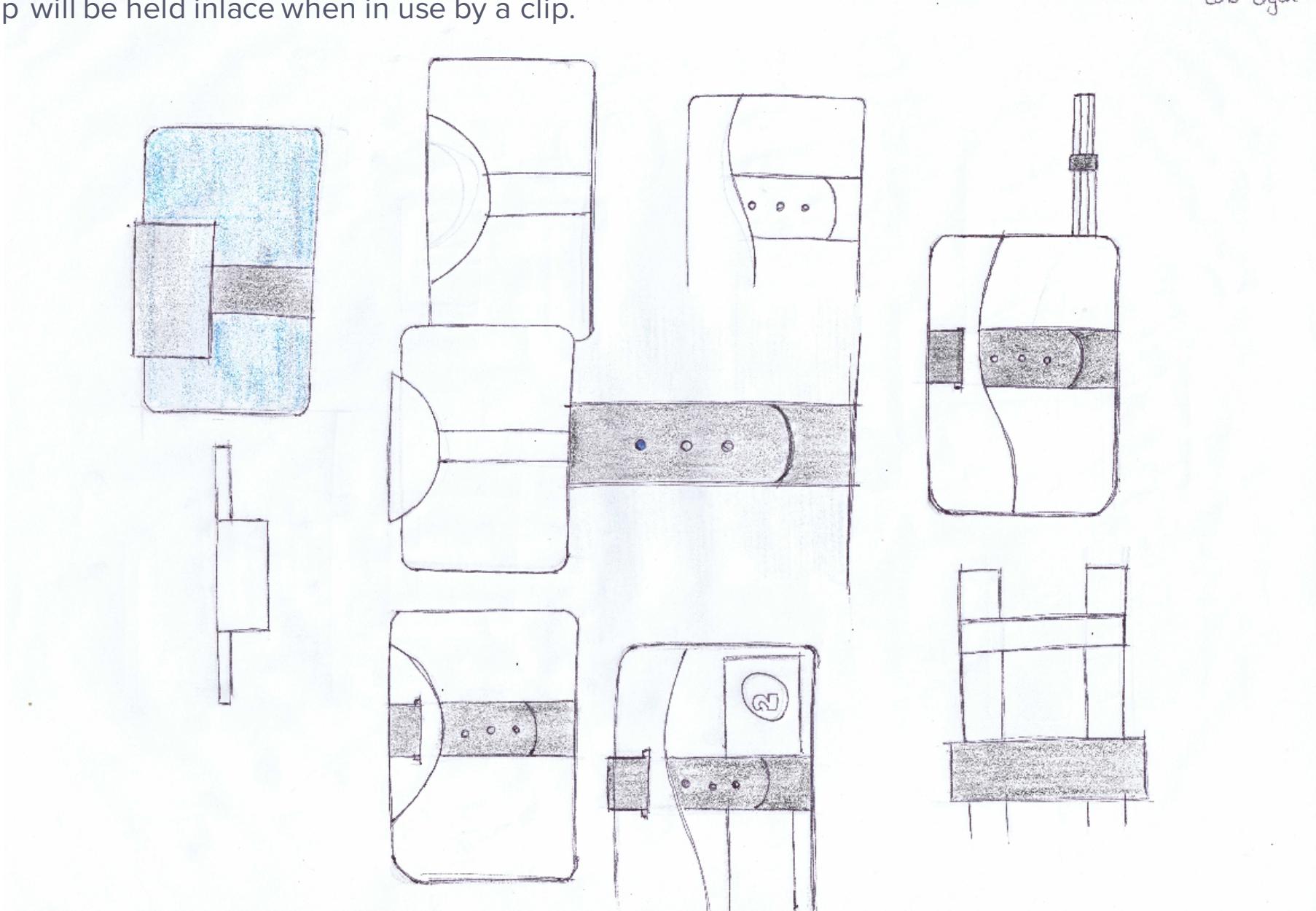
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# CONCEPT 1

One of the ideas generated in ideation was a card holder in which the cards slide into one side of a holder. This shape originally showed a square piece of acrylic with an elastic holding the cards in place.

During Development the shape of this holder was developed. A semi circle was done and a curve shape was developed.

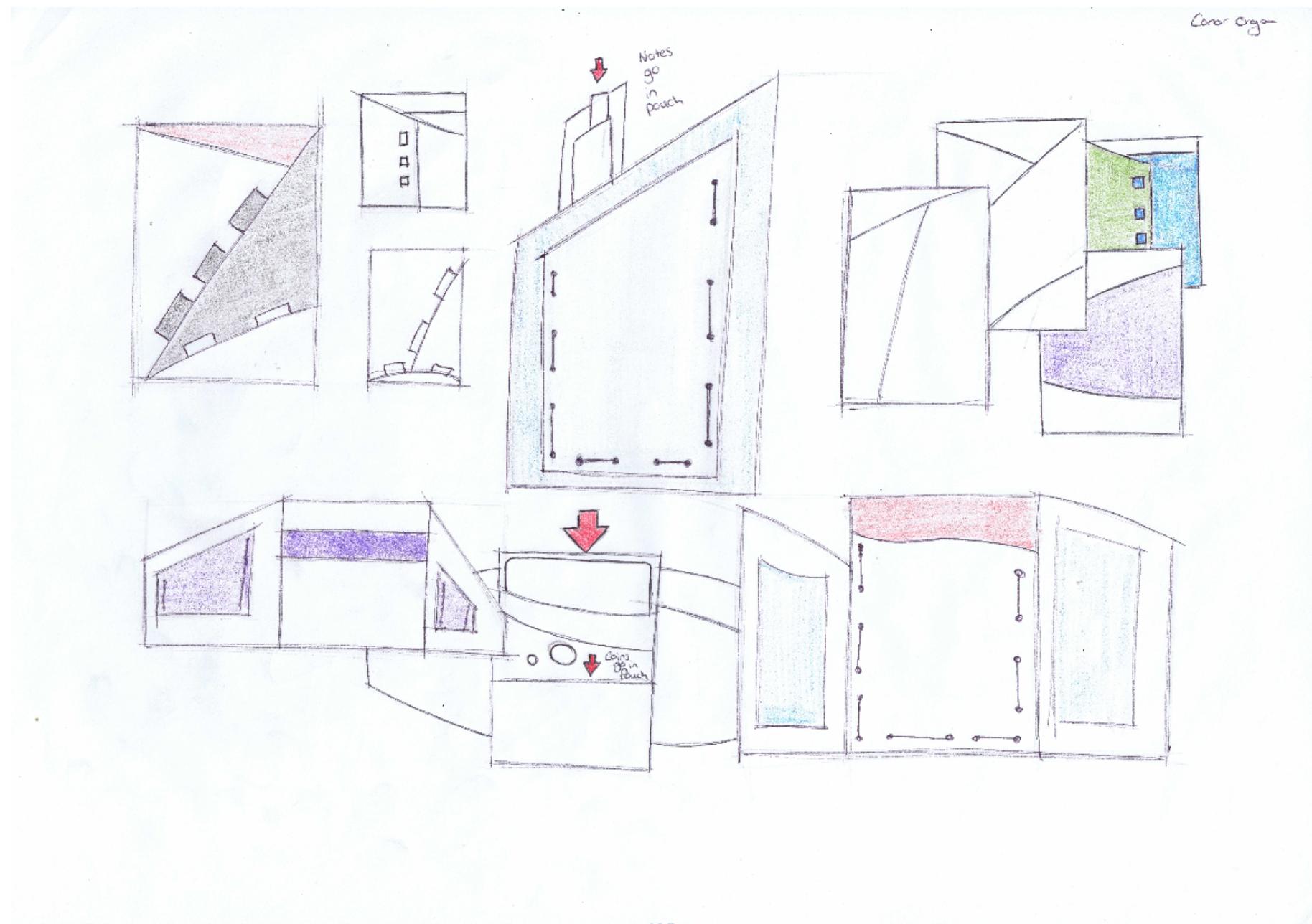
Along with the shape development, a method of holding all the pieces together. A method of using a leather strap was designed. This leather strap will be held inlace when in use by a clip.



## CONCEPT 2

Another idea generated during ideation was a joint based wallet. In this idea the one piece of material holds the whole wallet together. This leads to a simple laser cutting and construction process.

Development was done to see if cash can be held along with cards. This lead to pouches and different fold designs being explored along with some different methods of the joining this pouch to the material also being explored.



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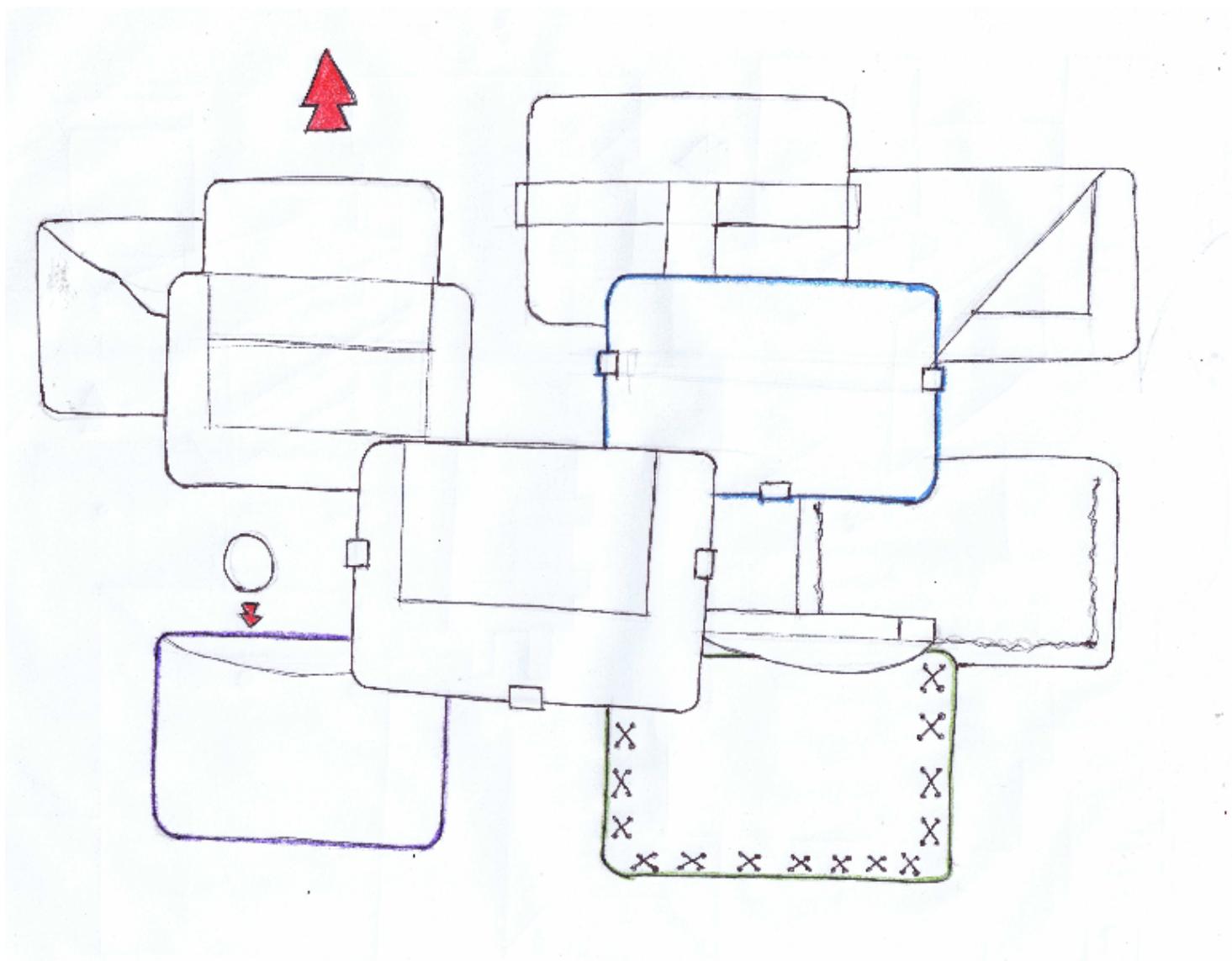
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CONCEPT 3

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The last idea explored was a card holder with a way to hold cash on the front. Ideas were explored for removing the card and holding it in place.

I also explored different ways to hold the materials together and different ways to hold the coins in place without them falling out.



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## MODELS 1

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Full scale working models were made of the concepts. This was to prove the viability of each concept. This specific concept model was made out of cardboard and bristle board. In a high fidelity, laser cut model MDF and leatherette would be used respectively.

While the model looked nice and worked a proper laser cut model would need to be made to fully test the capabilities of this model.



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## MODELS 2

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This concept was cut out using a laser cutter. This allowed for the concept to be judged in a precise manner. The band which would normally be leatherette was kept bristle board. This was because of the lack of an inefficient closing mechanism which keeps the wallet fast and easy to use. A buckle or another simple clasping methods would require two hands to open or close and is an inefficient method.

This concept also had problems keeping the cards in place once the wallet had been hit and the cards fall out. Also the lack of places for cash and coins to go made this concept a no go



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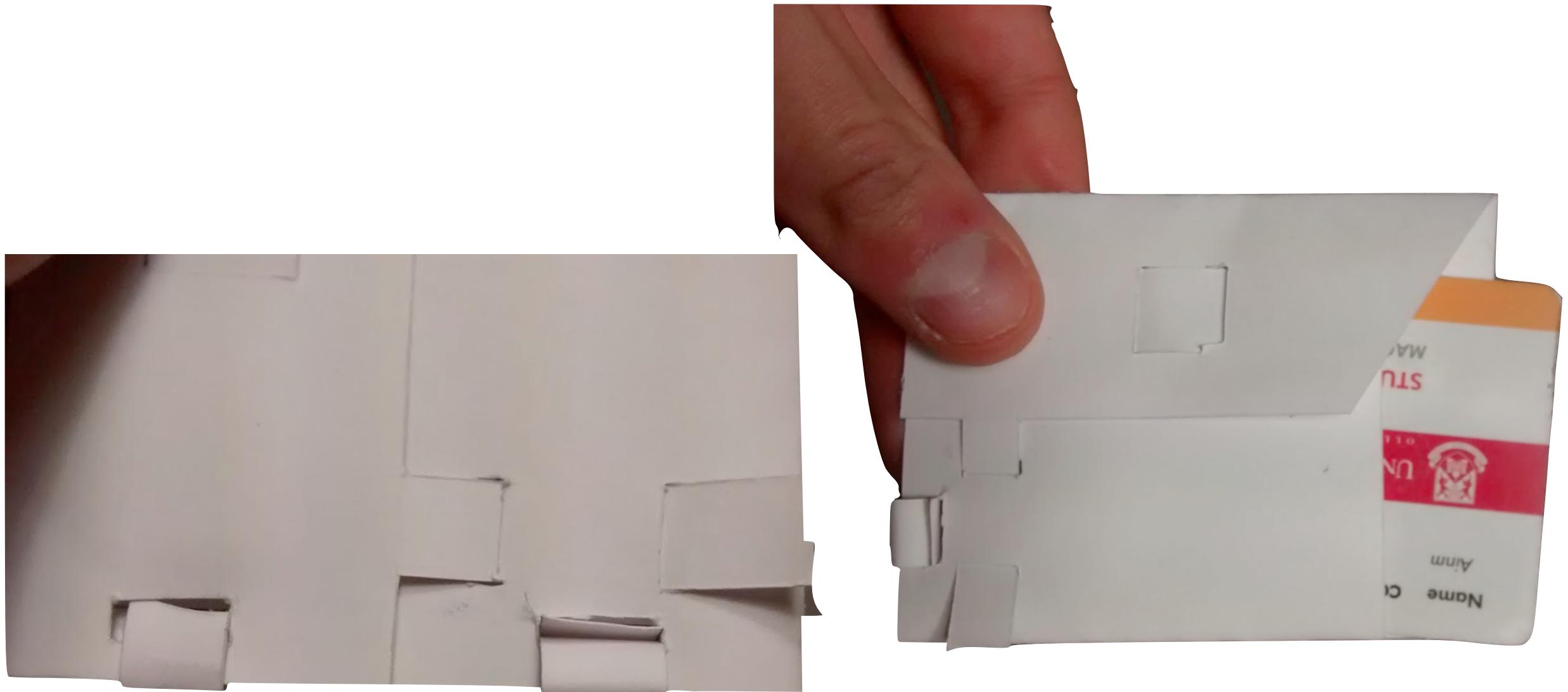
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## MODELS 2

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After making this model out of bristle board and experimenting with different types of folds. This model turned out to be too wide to hold cards.

This first concept model allowed for the cards to fall out of the wallet simply by turning the wallet on its side. This is impractical in normal usage and another model would need to be made with refinements



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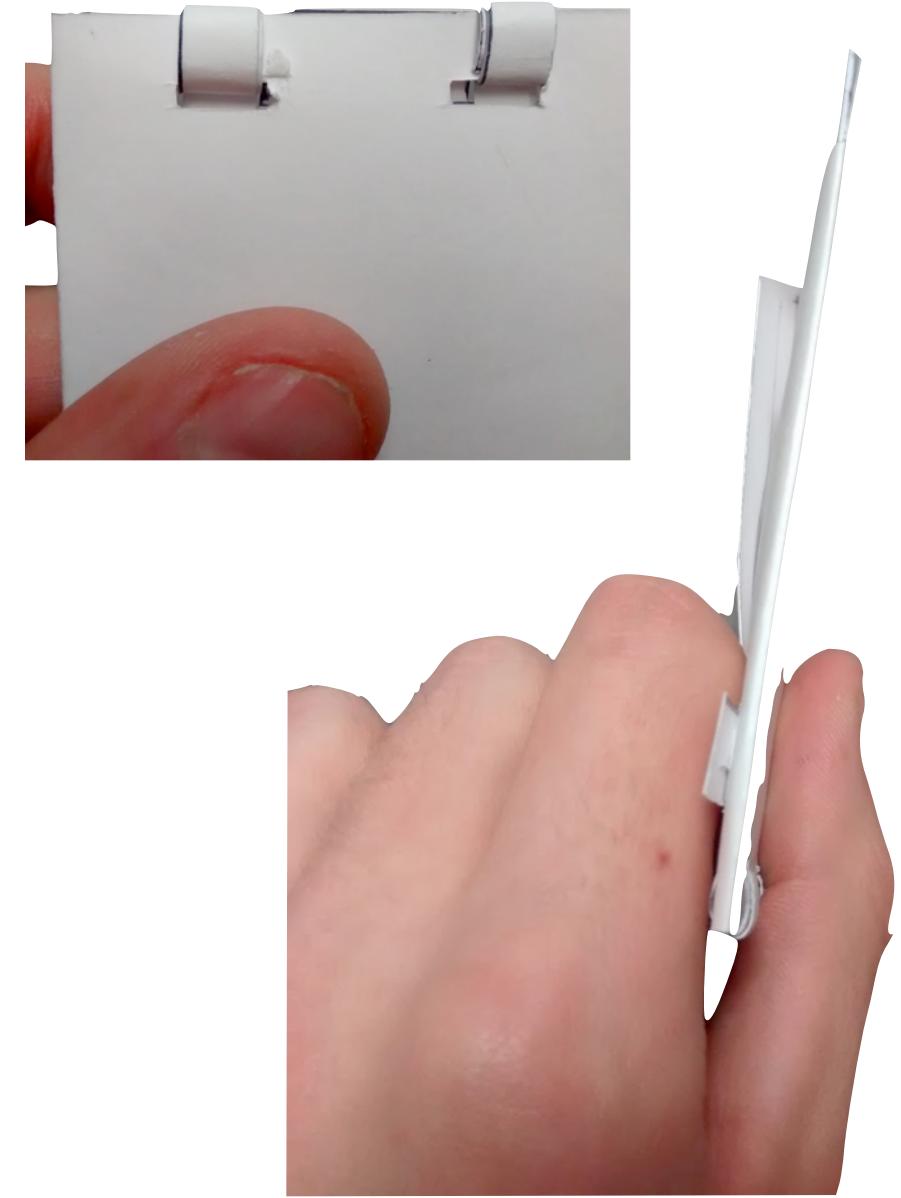
## MODELS 2

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Another model was made out of bristle board with a thinner main body. This model held the cards tight in place and kept them from falling out.

The joints at the bottom of the wallet could have been connected to the main body of the wallet.

Another point from the making of these models is the material is not tight enough and requires another layer of support. This could be solved by another joint not unlike the one an inch or two below where this will go.



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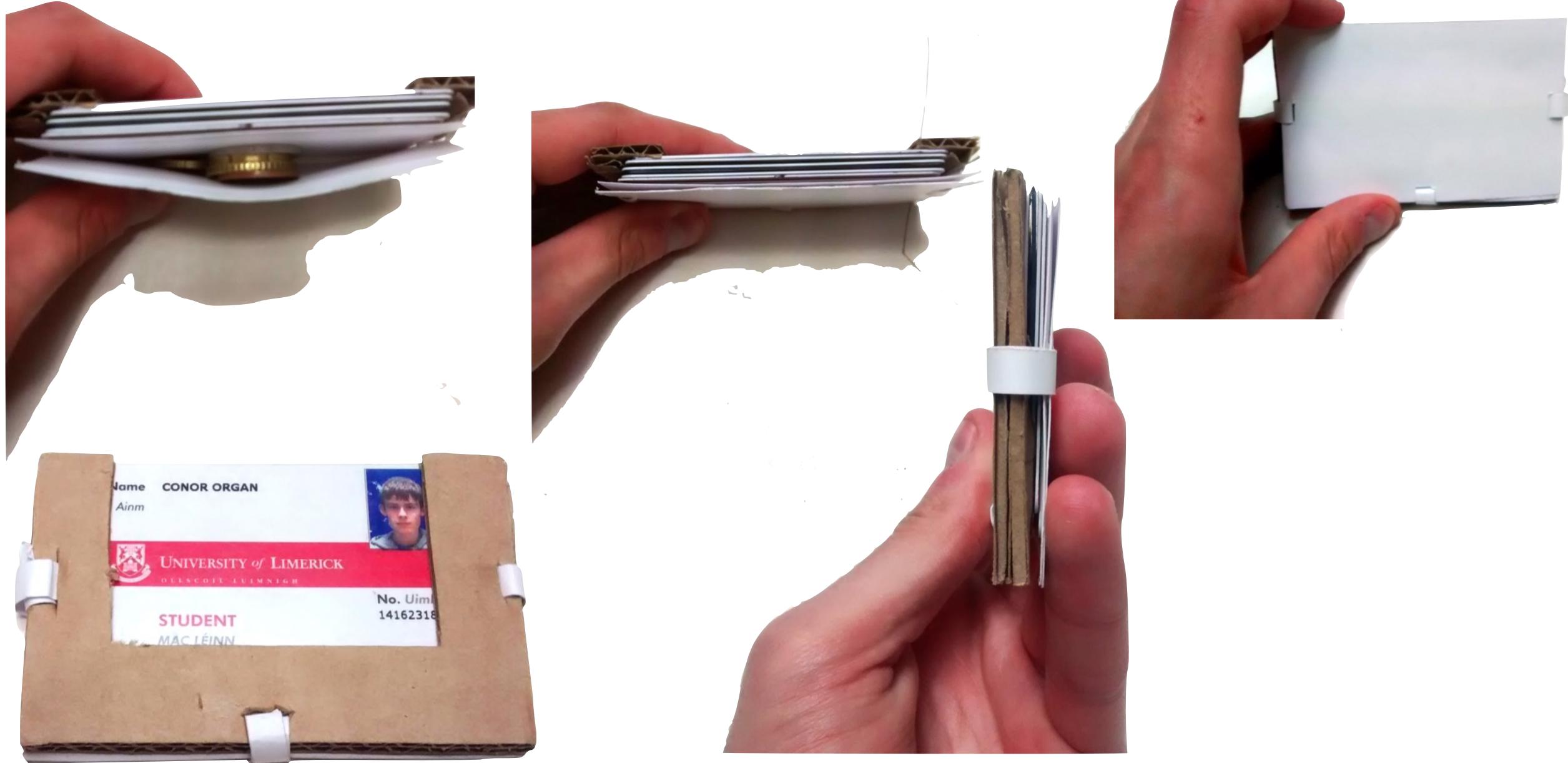
### MODELS 3

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A model of a card holder with a cash pocket was made. This model made from cardboard and bristle board.

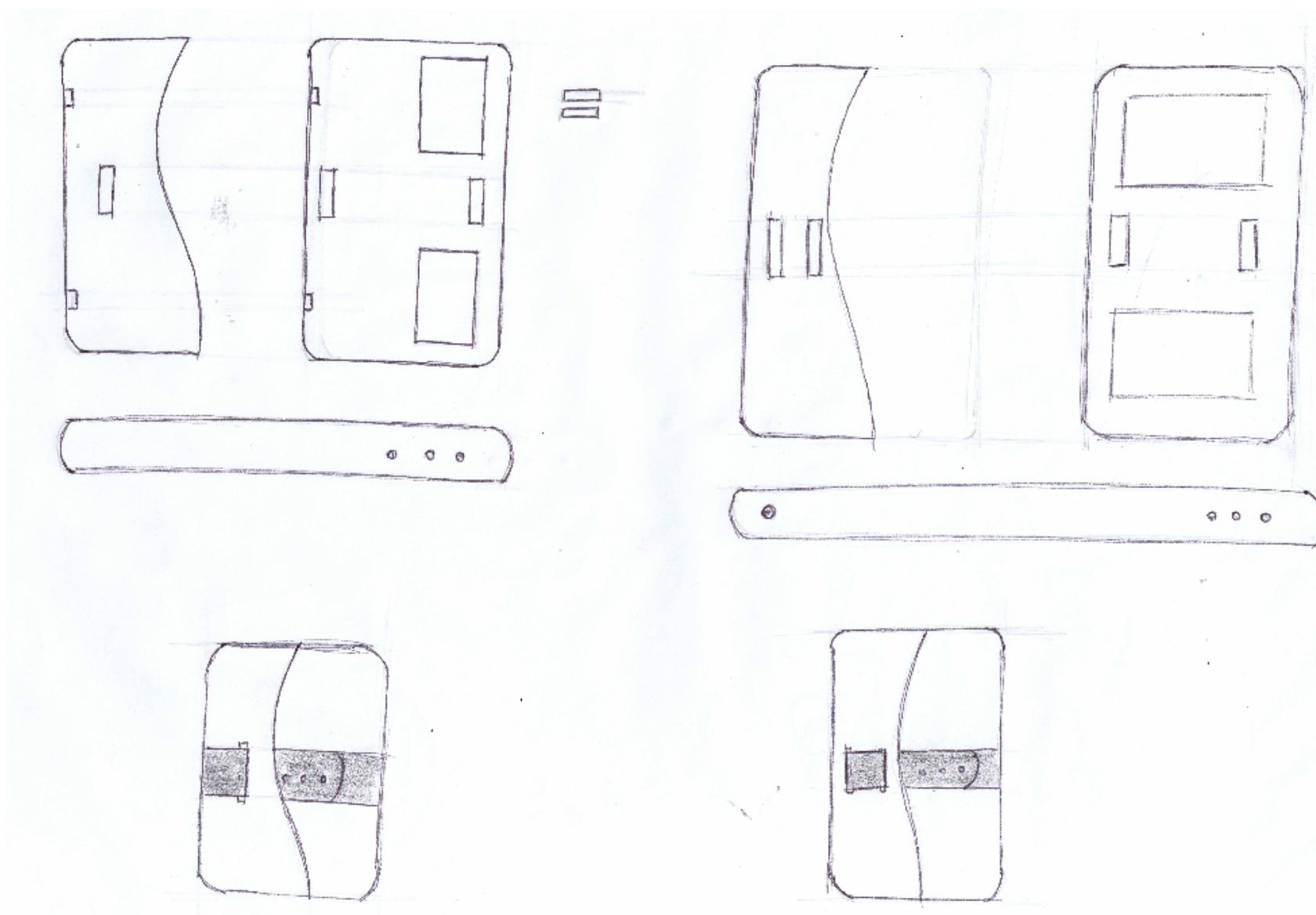
A section of the cardboard has been removed and this is where the cards sit. This wouldn't be possible on a laser cutter and therefore makes this concept unviable. This front face of the wallet would be made from MDF.

The leatherette pouch on the back of the wallet can hold cash and other small objects.



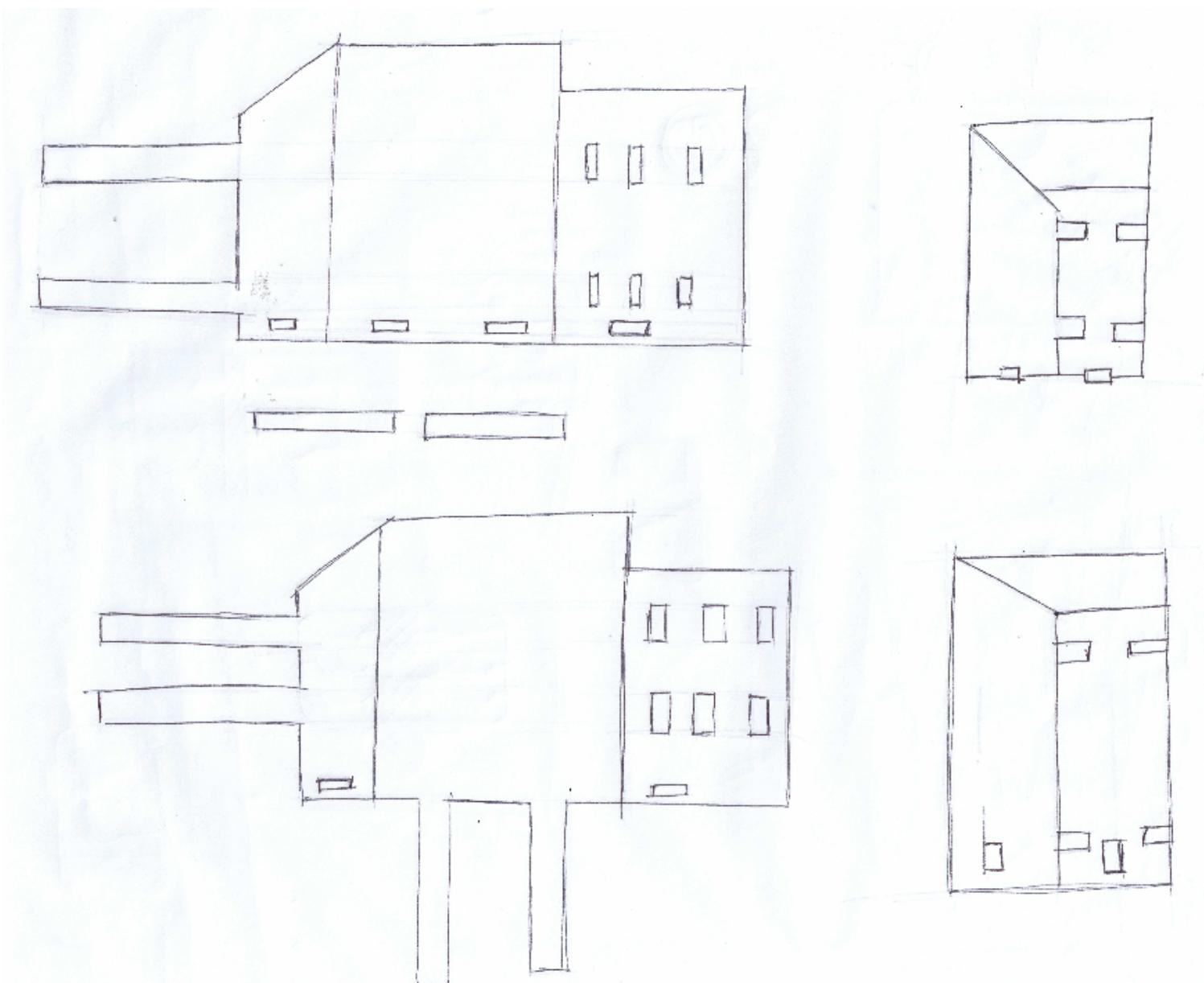
After the Products were made development plans were drawn and were ready for illustrator.

The first concept's final sketch shows all the different parts that would be laser cut. On the left hand side of the page a concept where a near final concept was sketched. On the right hand side of the page shows the final design.



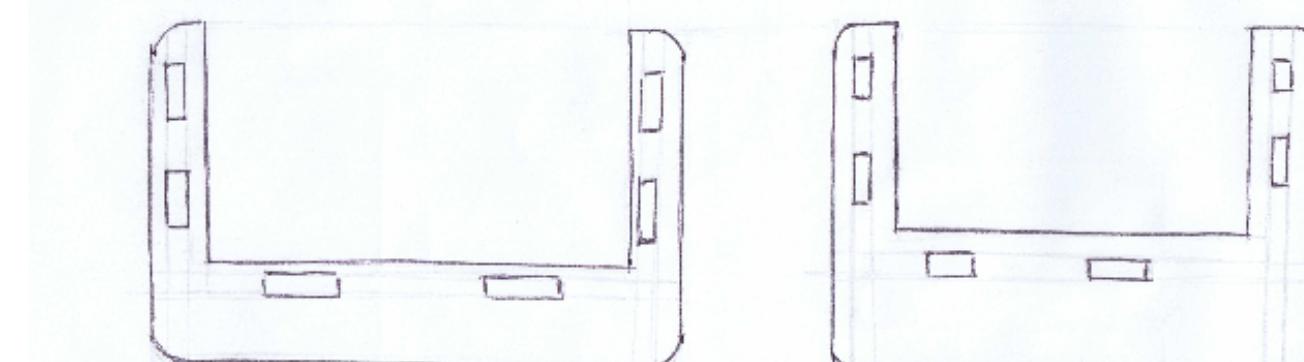
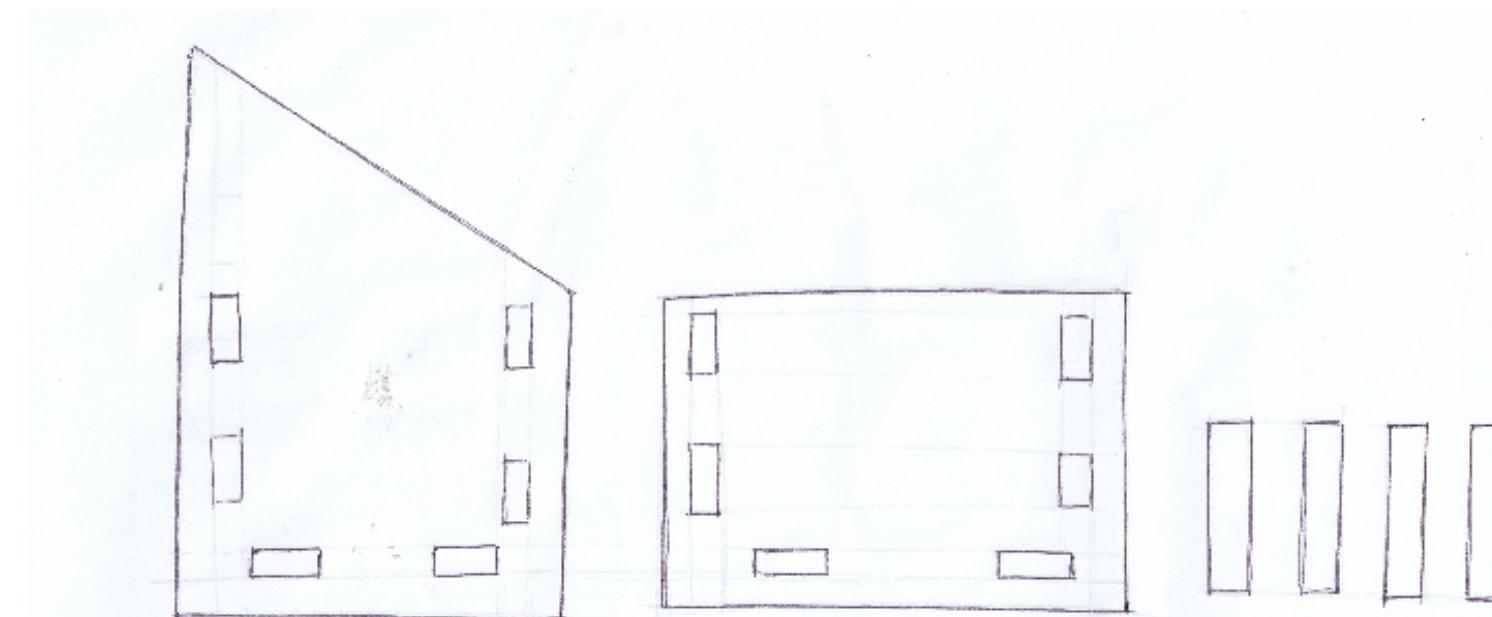
The second concept also had two final developments. The first had a piece of extra material that was used to tie the whole thing together.

The second had these pieces of material already connected to the main body of the wallet.



The third concept shows just one final concept. This development uses 4 pieces of leatherette to hold the main body together.

This concept required the most amount of pieces. This and the difficulty making on a laser cut made this concept unviable.



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## REFINEMENT

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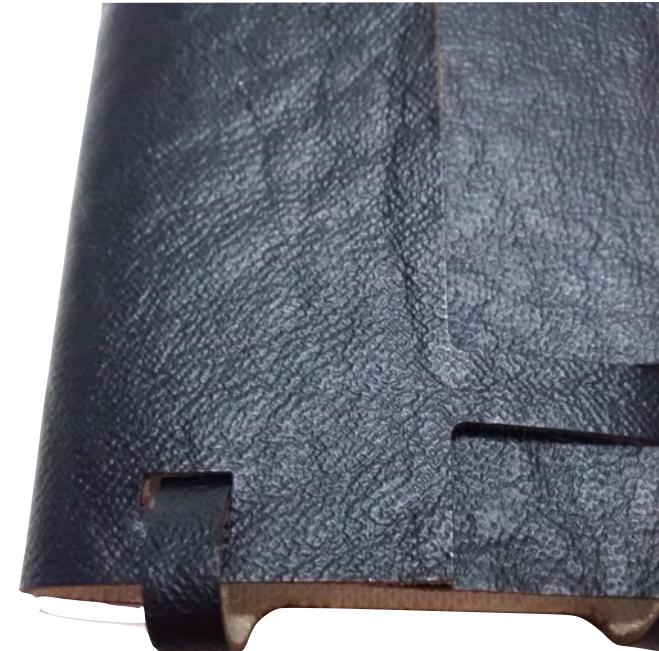
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## REFINEMENT

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A concept was made from leatherette on the laser cutter. This model was made to see the final model in the finished material. This model also allowed for some refinement before a final model could be made.

This model was too tight when made out of leatherette. The holes holding the material was also too big and allowed the joints to fall out of the material and pull the wallet apart when work was done.



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## Branding

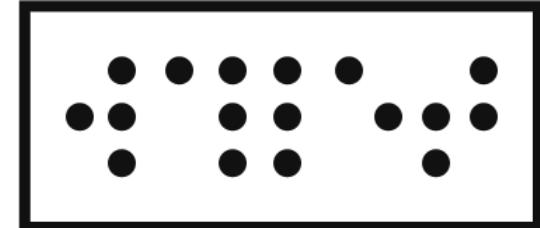
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After the wallet was designed branding was thought about. After thinking of several names and logo ideas. I decided that a simple name of just “Wallet” would be a good choice. This was chosen because of the large market while no single brand of wallet sticks out so people making internet searches will just search “wallet” and therefore will find this product.

This name was accompanied by a logo. After researching and finding out more about different icons I thought of using Braille as the logo.

Braille is a language used by blind people to read and write. This language is made up of number of dots, normally embossed so that the user can read by touch.



a	b	c	d	e	f	g	h	i	j	k	l	m
• :	• :	• :	• :	• :	• :	• :	• :	• :	• :	• :	• :	• :
n	o	p	q	r	s	t	u	v	w	x	y	z
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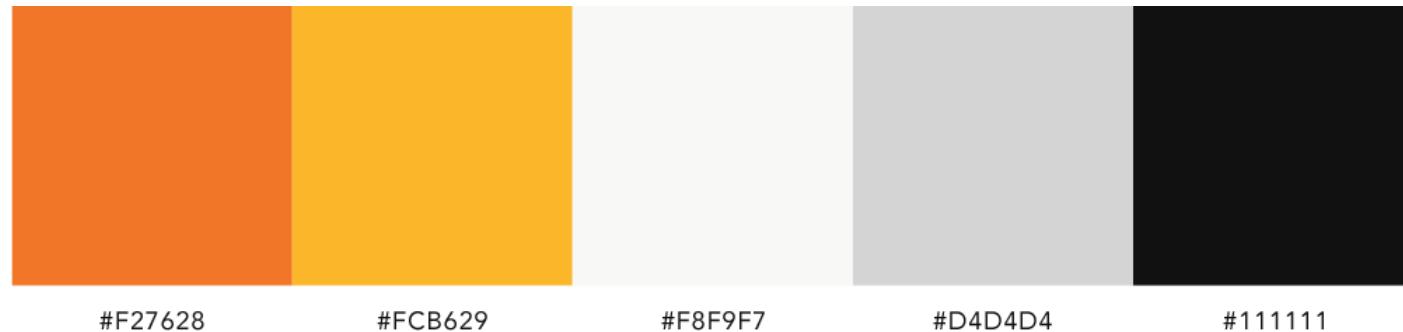
## COLOUR SCHEME

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The colour scheme of the packaging was thought about. The colour scheme had to be both simple and eye-catching. The colour of orange is a very striking colour and catches the eye of the viewer. Especially when paired with contrasting greys and black.

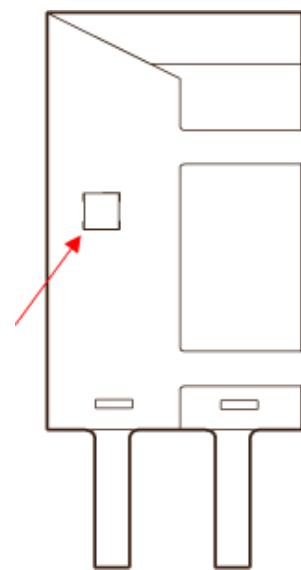
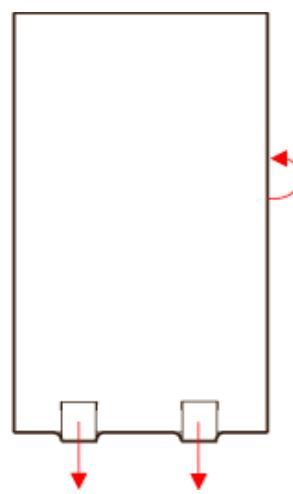
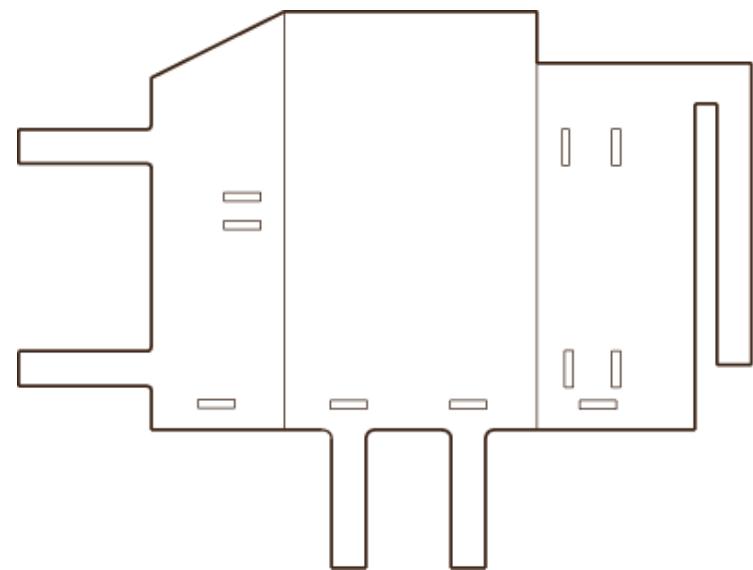
I also chose a lighter shade of orange to show off details.



The style of graphics on the packaging and throughout the project needs to be consistent and not vary. I went to great lengths to make sure this was what happened when designing the graphics.

After much experimentation I decided that a hard line outline will be around the outside of the graphics while details of the product is in a lighter line-weight.

Examples of this are below:



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## Packaging

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FRONT  
FACE

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For this part of the project the first thing that was done was a trip to shops around Limerick to see different types of real world packaging.



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FRONT  
FACE

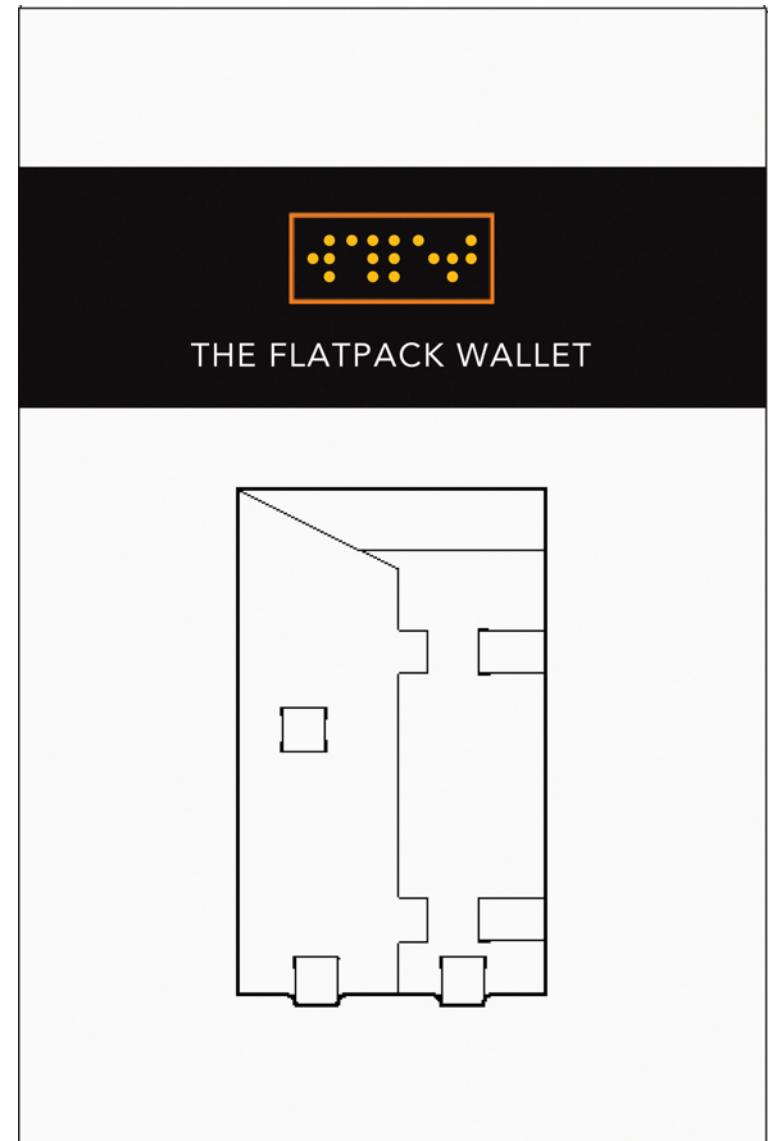
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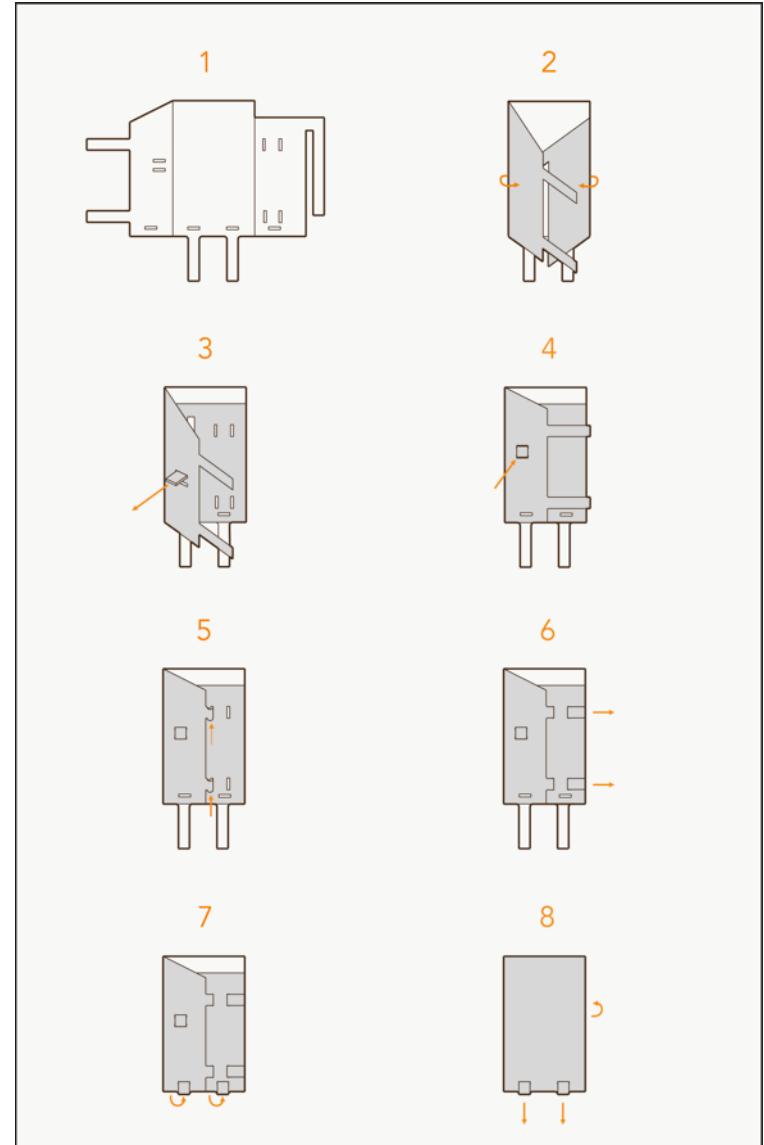
The front face of the packaging features an eye-catching black bar across the front. This black bar gives some framing for both the logo and the tagline.

After the user's eye has been caught the eye is drawn to the view of the actual product. This allows the user have a clear and easy way to see what is inside the product.

This image allows for the user to see the product both fully assembled.



The back face of the packaging has the instruction blueprints for assembly. The contrasting front face of the product allows for the buyer to quickly assemble while still keeping the back simple and straight to the point.



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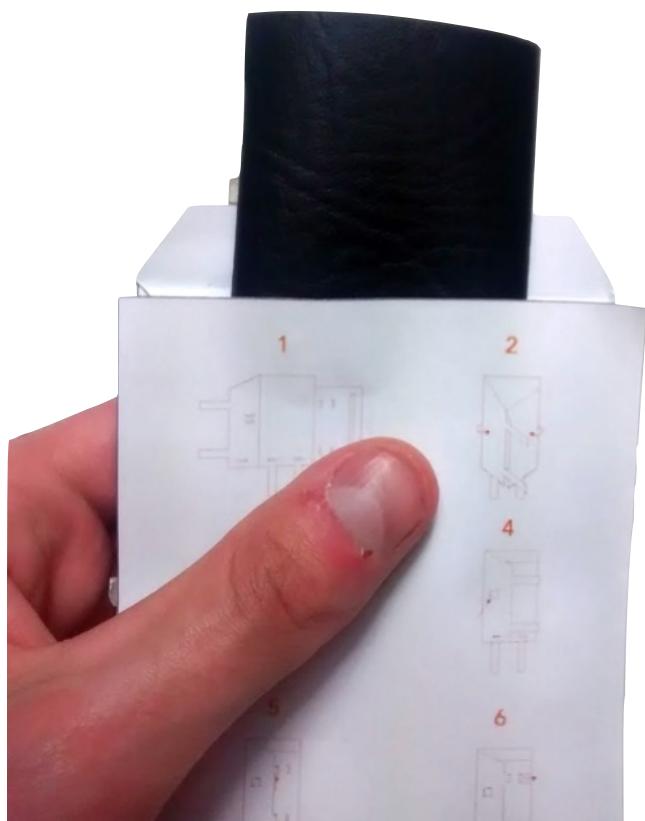
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## PACKAGING

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The packaging for the product was printed out on paper and was improved over a number iterations. These iterations made the graphics and instructions clearer and easier to read. After a number of different versions a final design was picked.

In the first iteration the instructions had no grey for one side of the material. This made using the instructions unclear and was a needed iteration.



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## Instructions

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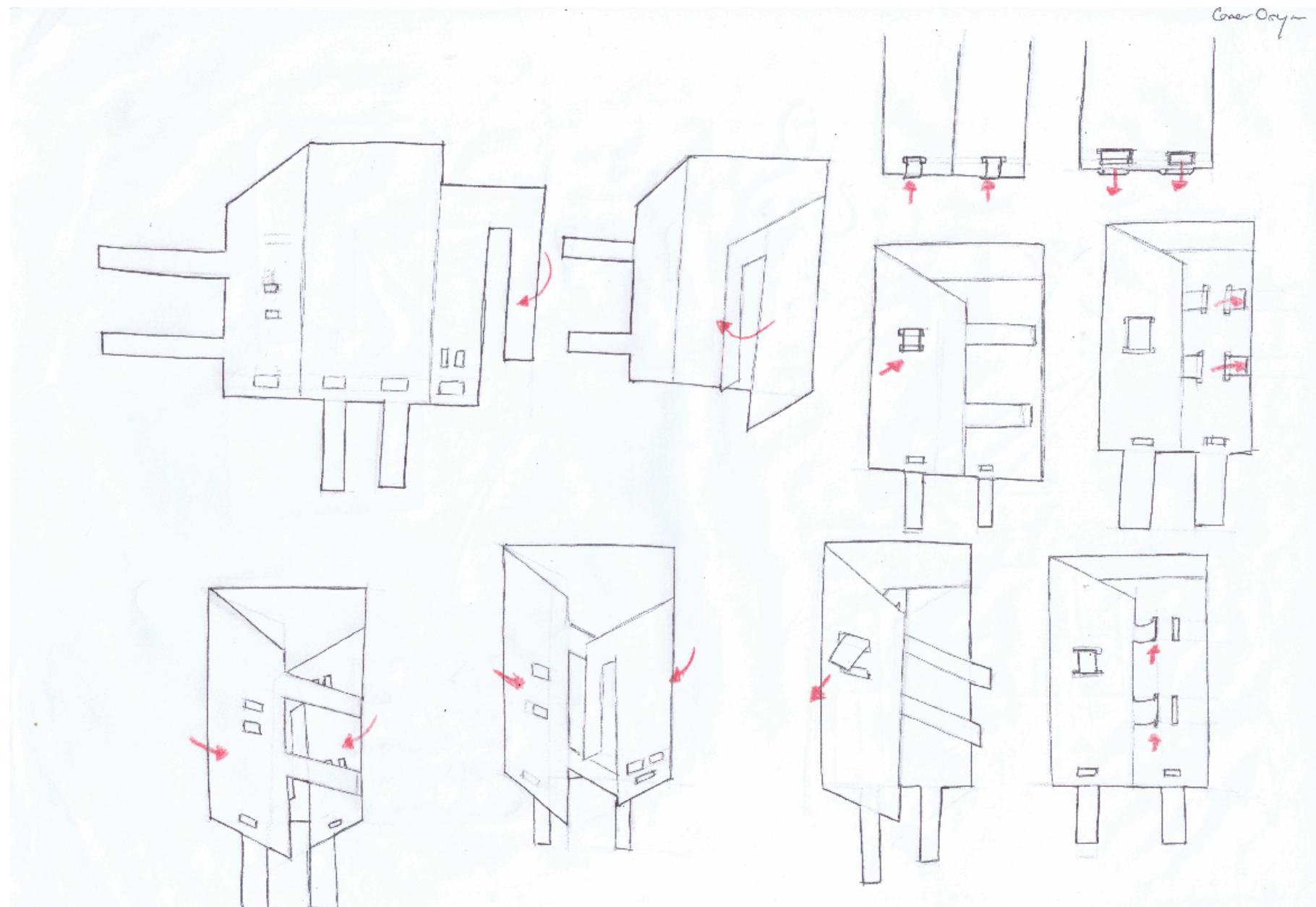
## BLUEPRINTS

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After the design of the wallet was finalised and the product was cut by the laser cutter, instructions were made.

These started off as a diagrams that were drawn. These graphics were drawn to be easy to read and quick to work out.

The red arrows show that the material needs to be pulled, folded and twisted.



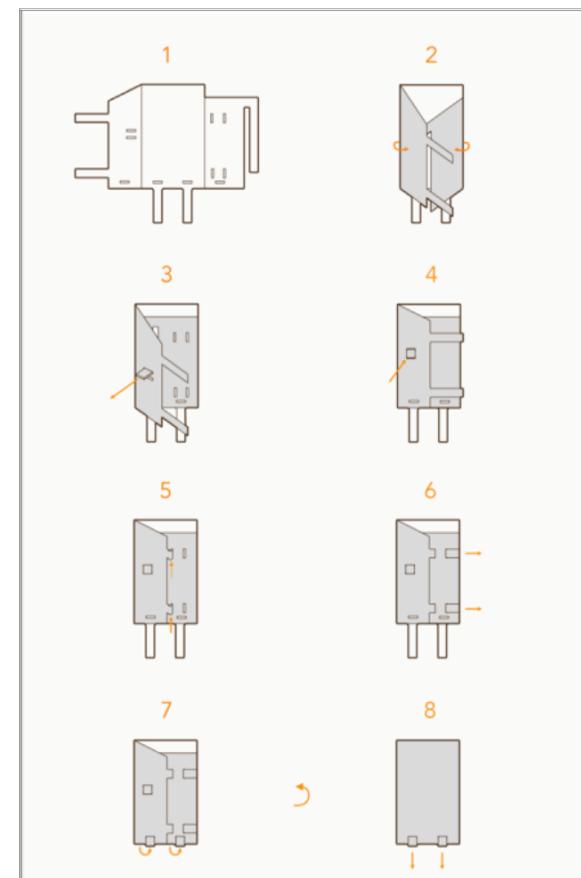
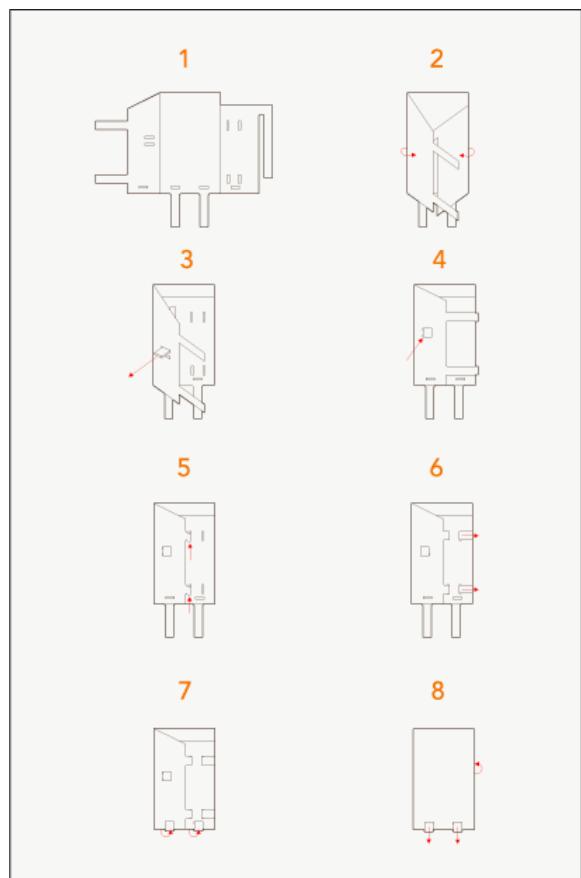
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## BLUEPRINTS

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The first iteration of instructions was a simple black lines on a light grey background. This led to confusion among users as they did not know which side was which and after editing them to include a grey fill on the background. This made the images clearer and easier to read.



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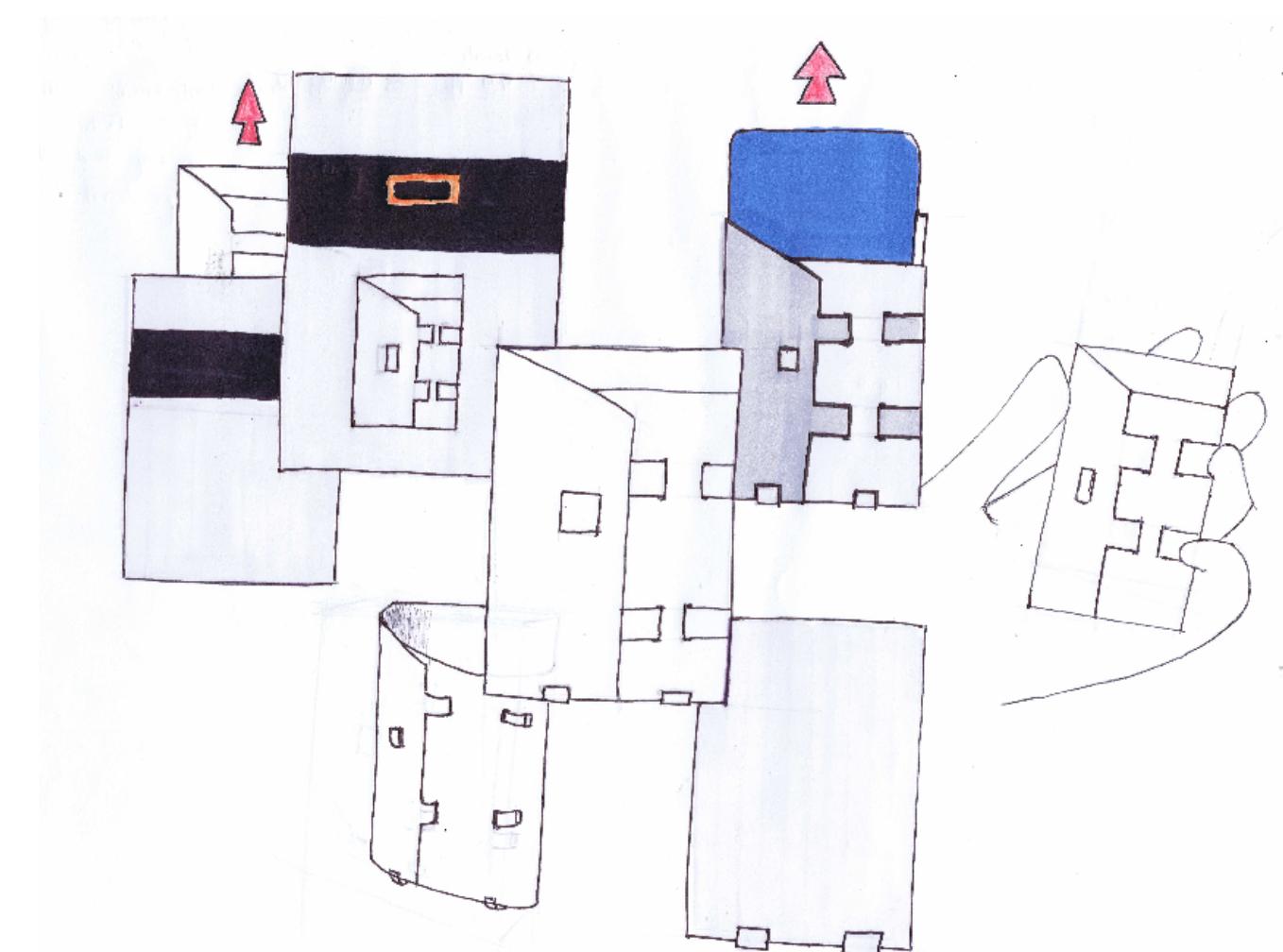
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## Final Design

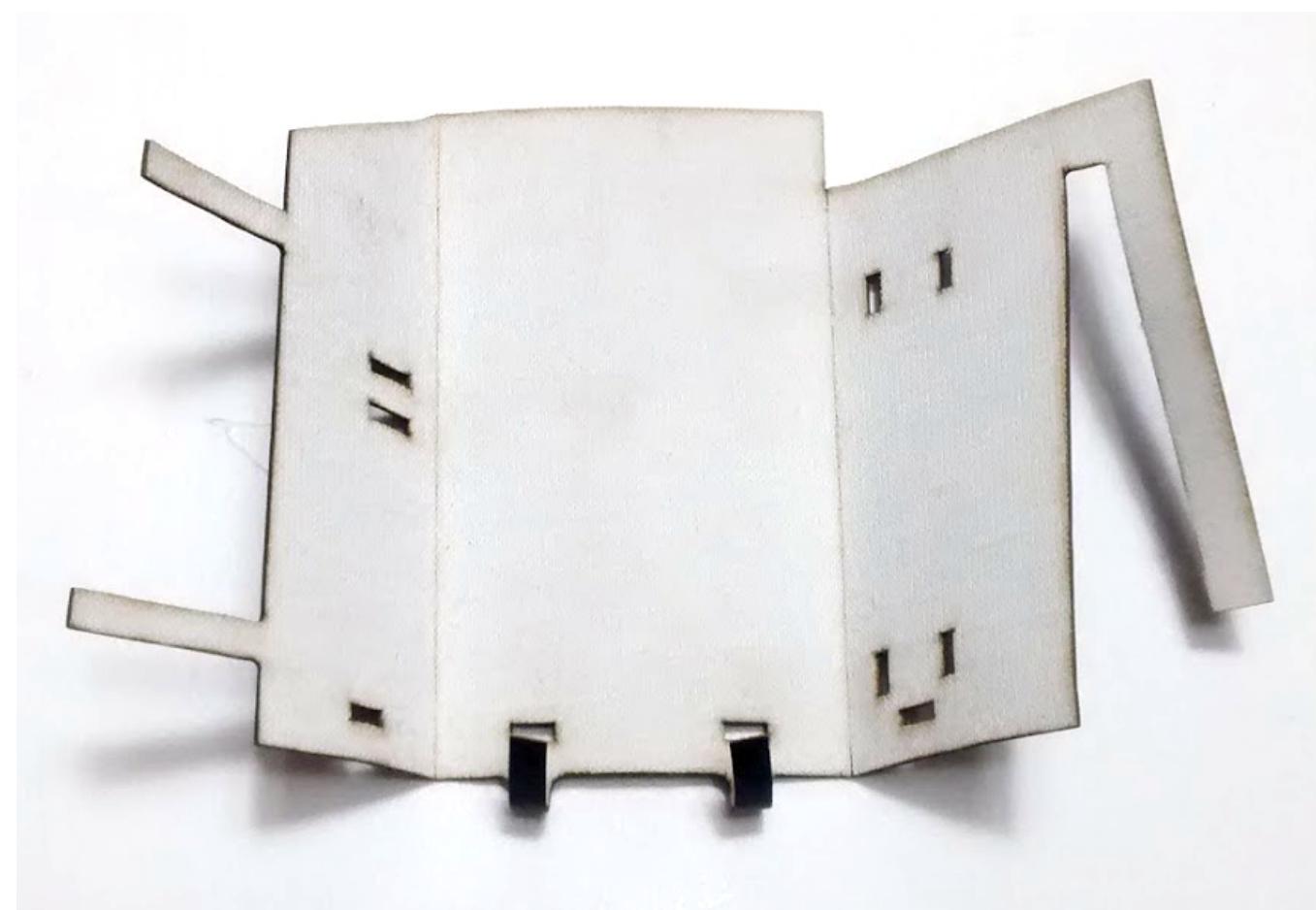
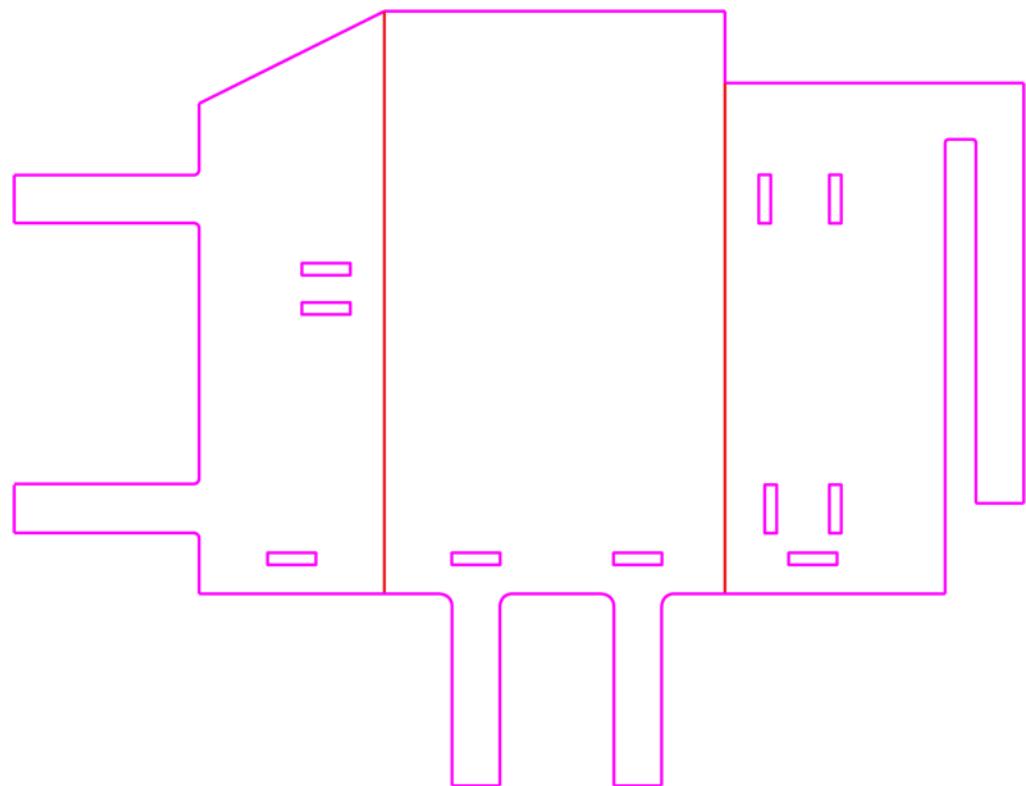
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The final design of the wallet is a leatherette package. It comes dissembled and can be built within a 1 minute. The whole design only has 1 piece and has a total assembled square millimetre footprint of under  $600\text{mm}^2$ . The whole dissembled footprint is  $1700\text{mm}^2$ . This allows for the wallet to fit easily into the users hand. The whole design is only the size of the cards you are holding so it can fit easily into the users pocket.



The final design was made in illustrator before being cut by the laser cutter. This meant that the cutting was precise and followed the design specifications of the product. The red lines were etched by the laser cutter and the magenta lines were cut out.



The final technical drawings for the finished product is below.

