GCSE

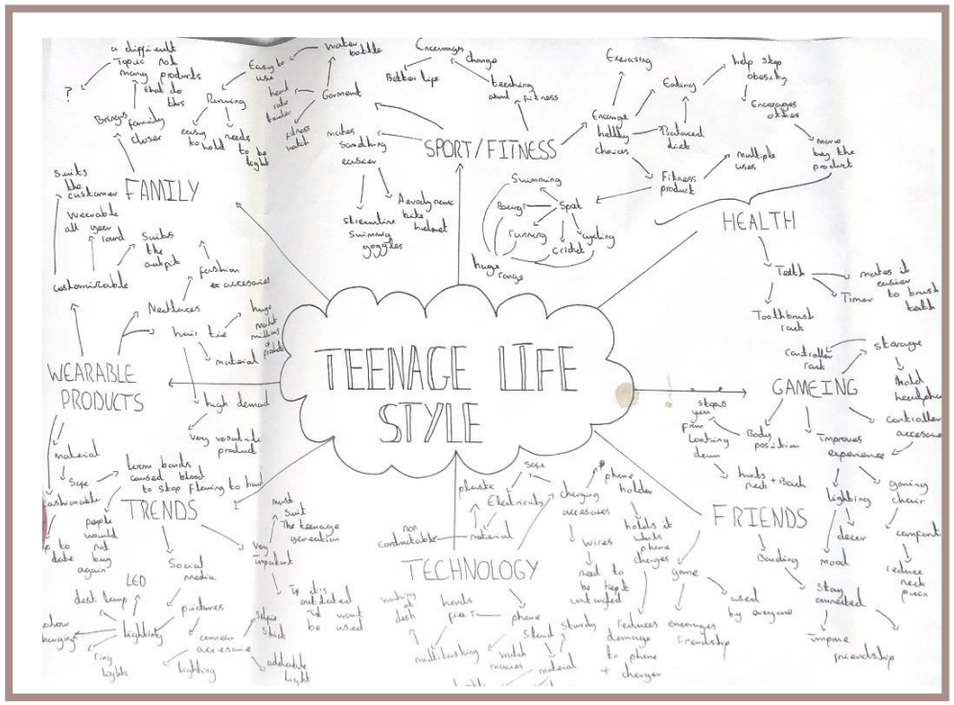
DESIGN AND TECHNOLOGY : NEA

By Oliver brodie

Mind maps

This teenage lifestyle mind map page that I made , shows 8 completely different main stem topics based on teenage lifestyle , the topics that I included where : sport/fitness , health, friends, technology, trends,gameimg, wearable products and family , from each of these main ideas I then stemmed out ideas related to that topic , for example health has branch leading of that says ‘teeth’ now this could be products like tooth brush timers or flashing light timers .

Teenage lifestyle



sport/fitness , this section is thoughts about products that could help the user when completing sporting activities or to encourage healthy lifestyle , products for these topics could include garments such as fitness trackers or safety devices like bike lights or reflective clothing . This is a difficult topic as most of these products already exist and its difficult to think of new ideas for such a big market

Health : this section has a huge range of ideas linked to it , like monitors for heart rate or , toothbrush timers etc. I didn’t have many ideas of my own for this topic though because it is quiet a technical topic that would require a lot of electronic knowledge and lots of research into health problems and similar issues .

Gaming + technology : this is a topic that is extremely popular and demanding in the modern world with all the new emerging technology and gaming systems, games or gadgets . This topic could include products such as lighting , desks , computer stands , back brace chairs , storage , controller add on’s . This is a great topic to go down because of all the options you have when thinking about the product you want to make

Friends + family : this was a difficult topic to express thoughts and ideas on because its very vague , I thought of a few things that would increase together time and help bonding , but nothing else really . This is a topic that I do not believe I will choose

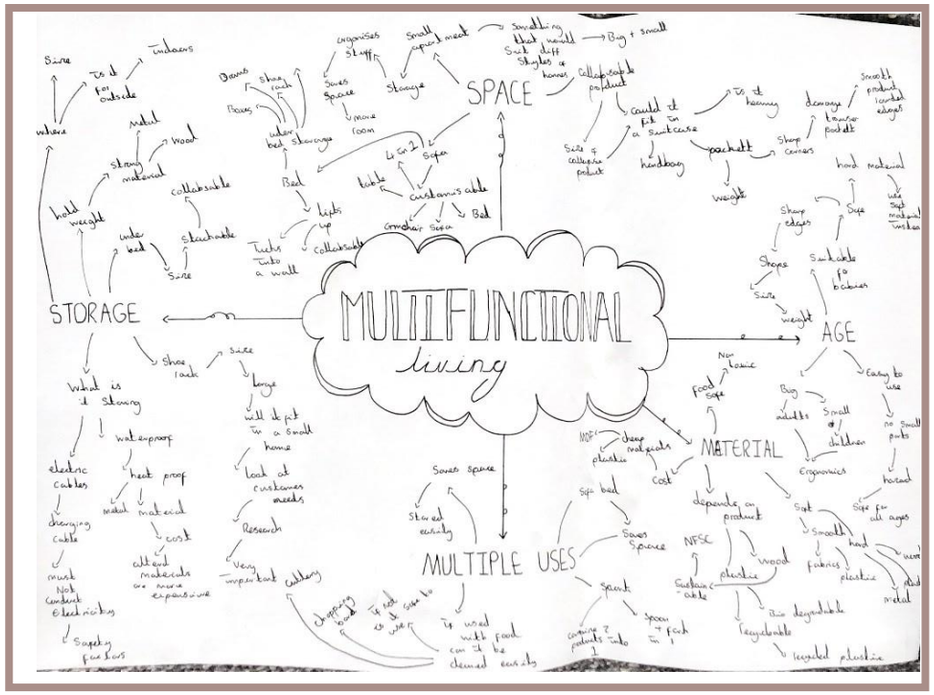
Trends : trends is another broad topic similar to tech and gaming . Trends however has to be up to date , the client would want something trendy not out of date , the issue with this is that trends only last so long for example loom bands , loom bands whent viral for a few months but suddenly overnight new trending products took over . That is why I will not be choosing this topic

Wearable: wearable could include smart watches , smart clothing (smart textiles) watches trackers etc . This I believe is focused on textiles as well as product design especially if I was to choose to deign a item of clothing that performed a function , this would be difficult because I have little but still some understanding of textiles

Conclusion: this topic has a vast range of ideas and smaller topics to go with it , however I feel it is much more difficult topic to create and design for , because lots of the products that fit ‘teenage lifestyle’ already exist or are already on the market to customers , and I feel it would be difficult to come up with an original idea never done before , its also a fiddley topic because all of my ideas I have , involve some sort of electronical part and I did not obviously choose electronics so I have little understanding of electrics and programming

This multifunctional mind map page that I put together shows 5 main topics all related to multifunctional living , the topics include: space , age, material, multiple use and storage . Branching off each of these topics is ideas related to that topic for example branching of from space is collapsible/customizable products . this is only a mind map so these ideas are quite rough and generalised , the purpose of this is for me to express all the ideas I have into one page .

Multifunctional living



Space: this is my favourite topic and probably the one I choose and develop on , this is a wide topic with which I have a lot of ideas for . Some ideas I have include: space saving storage or shelving , multi use furniture , for example stackable shelves or customizable units . There's also a lot to talk about this topic so it would make , making the research pages easier for me and existing products pages easier because there is already a lot of space saving products out there but there's still room for new ideas that haven’t been thought of before

Storage and multiple use . I have put these two topics together because I feel like they are very similar , a products could be a storage unit that also saves space . My only concern is that all my topics for multifunctional living are very similar , however that allows me to include them all into one which gives me a broader range of products I can create for all different types of needs . Some ideas I have for multiple use products include cutlery (like the spork) . Just by searching ‘multiple use products it brings up a lot of completely different products , some of which I can steal ideas from or imitate into my own product , that’s what's so good about this topic is that there's almost endless ideas for endless issues that need resolving

i decided not to discuss the age and material topics because they are too specific and shouldn’t have there own main branch they should have been included in either space or the multiple use topic .

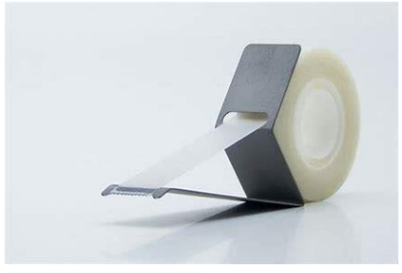
Conclusion : from this multifunctional mind map page I have now the knowledge and understanding of the topic I would like to continue with , which are the space saving and multifunctional topics . I decided on these topics purely based on the great amount of ideas that I had for these topics . Hopefully my final product not only saves space but is also multi use .

Analytical research, Mood board

My chosen client has informed me of the 3 styles of design they are most interested in . The client chose , urban modern, minimalist and abstract . All 3 topics offer me a wide range of design ideas allowing me to have a wider range of product ideas . I have created this mood board for the intention of generating ideas and as a useful research tool

minimalist

About: similar to contemporary design , minimalist style involves clean lines , uncomplicated forms and simple finishes . It is based on the Japanese principle that less is more



The google assistant or amazon echo is a perfect example of minimalist design , it uses two colours that compliment each other , is circular and has a smooth finish

Materials include plastic, aluminium, wood (natural and manmade) and glass

The minimalist design style is most often seen in clocks and lighting. The clock on the right is simply a blank cube with two black clock hands on the face . The product is minimal but very functional

Urban modern

About: urban modern is a fusion of various opposing and complementary styles . Minimalist modern , glamourous chic and edgy experimental all combined in a modern setting

Urban, often is seen with an element of nature incorporated into the products, like these connecting blocks that allow you to plant vertically

This product makes use of road bollards to turn them into a place to rest or sit

Urban design uses sleek finishes , smooth minimalistic appearances and is most commonly used in cities and usually these products create a more social place or improve the area

Abstract

About: an abstract style is achieved by a combined composition of colour and shapes usually based on the clients interpretation , it is often described as fun and playful yet clean and minimalist , abstract design invites individual interpretation

All of these products use either opposing colours or unusual shapes to create a fun abstract appearance

This lamp to the left is turned on by connecting the two circular magnets in the middle

Abstract design is some what similar to minimalist design because it uses a minimal amount of materials and uses sharp circular or rectangular shapes , however it uses complicated forms that's why it is different to minimalism

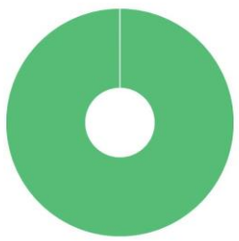
This chair excites the eye with its unusual choice of colour and shapes. If I were to create a product this is the sort of look I would be going for

To conclude: from creating this page I have explored 3 different design methods and styles to help me to decide which style I will choose to go with for whatever my final product may be with each style I chose being different from the other , from what Ive found , my preferred style is minimalist so I would focus on incorporating that style into my design ideas which I will eventually create , I now need to complete a survey to find out other peoples opinions and views on different styles

Analytical research of potential users

PAGE 1

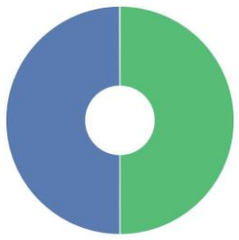
1. in terms of storage , is space an important factor



Answered: 10 Skipped: 0

Yes	100%	10
No	0%	0

2. is it important that your storage looks pleasing to the eye



Answered: 10 Skipped: 0

Strongly agree	50%	5
Somewhat agree	50%	5
Disagree	0%	0
Strongly disagree	0%	0

4. which material would be preferable for storage units

Answered: 10 Skipped: 0

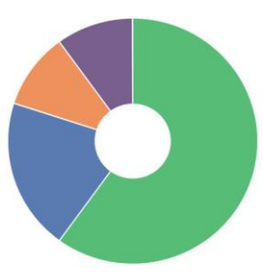
wood	60%	6
metal	20%	2

5. how much would you be willing to spend on storage

Answered: 10 Skipped: 0

10-15	10%	1
15-25	0%	0
25-35	40%	4
35-50	50%	5

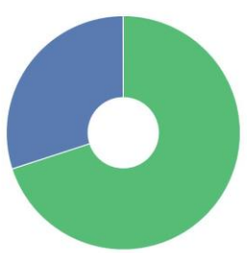
6. what style do you like



Answered: 10 Skipped: 0

modern	60%	
retro or vinatge	20%	
rustic	0%	
art deco	0%	
industrial	10%	

7. is multi use an important factor to you



Answered: 10 Skipped: 0

Yes	70%	7
No	30%	3

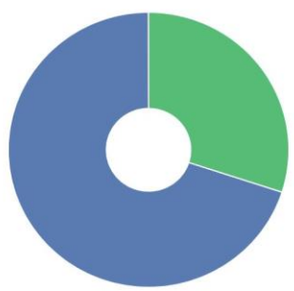
8. is storage that saves space important for you

Weighted Average

Answered: 10 Skipped: 0

	Weighted Average	Row Total
★	2.6	10

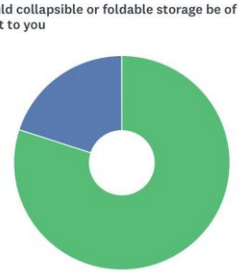
9. do you struggle to find space to store things



Answered: 10 Skipped: 0

no	30%	3
yes	70%	7

10. would collapsible or foldable storage be of interest to you



Answered: 10 Skipped: 0

Yes	80%	8
No	20%	2

By creating a survey for 10 potential users I aim to gain an understanding of their needs, preferences and opinions which I can use to create a product to suit a wide range of people. This page shows the results from my survey and why I used the questions I did .

Question 1. tells me if customers believe that space is important to them it also gives me an idea of way that my product could make use of space or aim to save space

Question 2. tells me if not only does the product have to function but also it must look pleasing to the customer the general answer was yes it needs to look nice

Question 4. tells me what material is favoured by the potential customers the answer came out to be wood so I will try and include wood as the main material in my project

Question 5. informs me of how much the customer would be willing to pay for the product the most picked option was 35-50 pounds , this gives me a rough idea of how much I would sell it for if I was to do so .

Question 6. helps me to decide on what style my product should be made in , my preference was industrial and rustic but from the chart the favourite was modern so I will try to include a bit of both styles into the final product.

Question 7. and 8. gives me an idea of what use my storage unit has and the use of it will be to save space and for the product to be multi purposeful which were both voted for as important factors

Question 9. is a general question that tells me more about the customers needs

Question 10. this is an important question because I wanted to know if storage that could be easily stored or moved was something that would be of use . I will definitely be aiming at creating storage that is able to be stored or collapsed as a smaller version to save space

conclusion

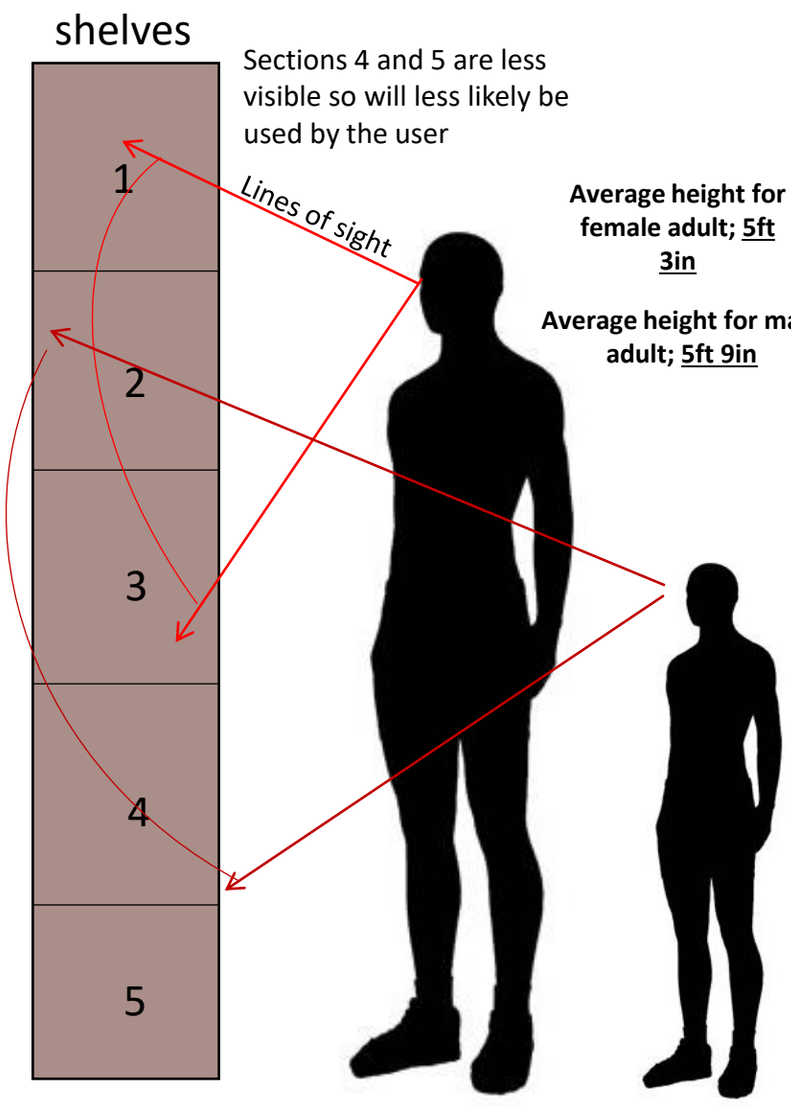
By creating a survey with results from real people that I have conducted and made myself I now know some basic facts and figures- such as price and the potential users thoughts on function or if multifunctional is an important factor. I now realise that 100% of my potential users between the age of 15 & 50 found storage space within the home to be an important factor. 60% liked a modern aesthetic, 70% found it a struggle to find space to store things and 60% of potential users preferred wood over metal and plastic. Multi use furniture was also an important factor. I will use this data to begin to research existing products and gain ergonomic and anthropometric data that I can use to create my design

Analytical research of potential customers

Ergonomics

By completing this page I wish to gather fist and second hand ergonomic data This data will help me to understand the sizing of the product and the average ergonomics of potential customers . This help me create a product that is usable to be used by the widest range of people possible

Standard shelving ergonomics



Sections 4 and 5 are less visible so will less likely be used by the user

To reach the lower shelves the consumer must bend down this could be a struggle for older consumers or ones who may have a disability that refrains them from bending down. Because the lower shelves are harder to get to I may consider there being wall attachments on the back of the shelves so they can be held higher up and there are no shelves on the floor

Average height for female adult; 5ft 3in

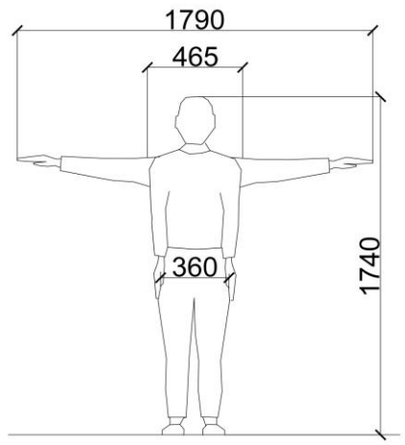
Average height for ma adult; 5ft 9in

Average height for

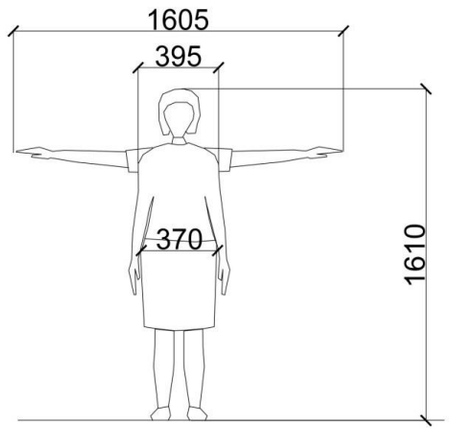
	Male child	Female child
5 years	3ft 7in (109.2 cm)	3ft 6.5in (107.9 cm)
6 years	3ft 9.5in (115.5 cm)	3ft 9.5in (115.5 cm)
7 years	3ft 12in (121.9 cm)	3ft 11.7in (121.1 cm)
8 years	4ft 2.4in (128 cm)	4ft 2.5in (128.2 cm)
9 years	4ft 4.5in (133.3 cm)	4ft 5in (133.3 cm)
10 years	4ft 6.5in (138.4 cm)	4ft 6.5in (138.4 cm)
11 years	4ft 8.5in (143.5 cm)	4ft 8.7in (144 cm)
12 years	4ft 10.7in (149.1 cm)	4ft 11in (149.8 cm)

From this data based on average heights I can conclude that :

- **The shelfs in most use will be ones most visible to the eye**
- **The unit must be usable for height ranging from 109.2cm to 5ft 9in**



MALE:
Eye height: 1630mm
Shoulder height: 1425mm
Elbow height: 1090mm
Hand height: 755mm
Reach Upwards: 2060mm



FEMALE:
Eye height: 1505mm
Shoulder height: 1310mm
Elbow height: 1005mm
Hand height: 720mm
Reach Upwards: 1905mm

From this data I can conclude that

- **The unit must be no higher than 1900mm**
- **The most visible shelf will be at a height of around 1500mm based on eye height**
- **This is data based of an average of multiple people and not first-hand data**

Primary data collected first-hand from myself

Arm reach: left = 55cm right= 54cm
Height : 170.2 cm
Hand length 23cm hand with 10.1 cm

Arm reach: left = 50cm right= 51cm
height 165cm
Hand length 17cm , hand width 8.6cm

Arm reach: left = 41cm right= 41cm
Height 133cm
Hand length 10.8cm hand width 5cm

Conclusion

from creating this page, I have created a conclusion of dimensions of specific areas for example hand length with data collected first hand for each point . whilst creating this page I have gathered information about the global averages for 6 different key dimensions I may need to use when creating my product , specifically my products size and its dimensions . I will now move on to complete further research which will aid with the design of my product which is yet to be decided

I have collected this specific data from my clients Aswell as other members in the household so that my product is suitable for all , the data I have collected 1. tells me how tall the product can be , with the largest height possible being 133cm tall , (this is the height of the smallest member of the house) the height of the product also matters for safety reasons , the product has a risk of falling on the smallest client especially if it is larger than them. 2. arm reach gives me a perspective on the clients reach to allow me ensure all parts of the product can be used from where the client is positioned , for example if the product was to wide and the client could not reach from one end to another for example if it where a desk and the draw was positioned to far away . I could also use this data to decide on the depth of the product , if I where to create a cupboard or shelves , the client needs to be able to reach for items at the back. 3. hand width and length tells me how big or small the product needs to be so it can fit in the clients hand comfortably or how difficult or easy the product is to use based on the clients hand size . These are all key figures I will need to think about when creating my final product

Biomimicry

The reasoning behind this page is to gain a greater understand of natures natural symmetry and shapes , biomimicry will feature heavily in my product so this research will come in very useful

Examples of biomimicry in existing products

This chair or bench has been designed to appear like leaves but fit together just like honeycomb , the product uses two examples of biomimicry from different parts of nature.

The product appears to be made of a smooth material which could have been done to feel like the smooth surface of a leaf when you touch it. As well as using biomimicry , the product also uses space saving techniques and can be re arranged and fit together in multiple patters to fit the customers needs and use of the product

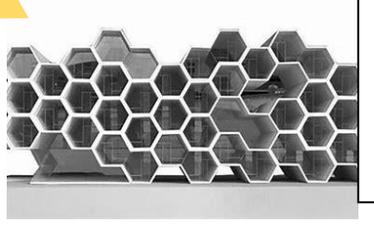
This product has been designed to appear like a shell to be more specific it looks like a fossil . The product as well as looking like a shell , functions properly because it would be no good having completely curved sections otherwise anything placed onto it would slide down , so the designer has added these little blocks that stick up so you can place books or small objects onto the shelf.

What is biomimicry

the design and production of materials, structures, and systems that are modelled on biological entities and processes.

Bees and Biomimicry use in my product

My multifunctional space efficient storage unit heavily focuses on mimicking a bees honeycomb hive in the way that each storage block is in the shape of a hexagon . The reasoning behind this is that bees design their wax hives as hexagon shapes to store honey because it maximises the use of available space , for example , if the shape was a circle then there would be gaps between each little circle in the hive and this would waste valuable space . The hexagon shape can also interlock inside one another so practically the smaller blocks fit inside the big blocks , this allows for the user to store the storage unit itself as a smaller unit saving even more space



I really like the idea of incorporating the environment and bees into his project , it gives the project a more deeper meaning with the inspiration taken from honeycomb

This table only uses 3 blocks but can be customized into around 5.000.000 different shapes , that is an almost endless selection of ways to organise the 3 simple hexagon blocks

All of these products and structure mimic that's shape and design of the bee hive , as shown all the products fit together in various ways such as the seating int the far left which can be customized because of its shape , customization is a key factor in multifunctional living as it allows the user to change the product to best fit to their particular needs in a particular situation, for example a user living in a flat may want a smaller table so , so they only use two or three hexagon blocks , but a client with a larger space may use all the blocks because more space is available . That's what is great about the product being customizable

conclusion

ConFrom making this mimicry page I have a better understanding of a bee hives natural shape and form and why the bees choose that shape , I have also thought about the products uses and customization to fit my 'multifunctional living ' topic that I chose at the start . From researching about products that use hexagons in the design I have also researched existing products on the market and briefly looked at how they have been designed and the materials used . I believe I will be using a sustainable wood that way I am helping the planet and also the bees

It would be great if I could include something on the product that reminds the user of the bees which inspired the design . I could possibly leave a stamp mark of a bee on the underside of the product or make it a feature and engrave a bee into the side of the product using a wood burner

Existing products research

Honeycomb shelving from etsy

This product is made up of multiple hexagon blocks made of some type of wood probably oak because of its colour . The interior of each hexagon is painted white , this could have been done to give it a modern crisp and cleaner look . The blocks as the website “etsy” describes are connected by metal hooks which allows you to change the pattern in which you place the blocks on the wall

Evaluation

Price: £20 per 3 blocks which works out at £6 each

Material : oak
(one side painted with white acrylic)
Iron hooks + nails

Use : displaying books , plants, picture frames and other small objects

Sizes Side length = 150mm

What makes this product so great is it customize ability and versatility .

From this existing produce research page I aim to explore in depth similar products that are already on the market , and to see how I can possibly take ideas from these existing products and add them to my final product in the design stage . This page shows multiple existing products and an evaluation on each of the products. Not only does this page show one idea it shows multiple ideas that show use of biomimicry just like the honeycomb shelves on the right . My idea is to create the honeycomb style shelving, but I wanted to include other ideas as well to make the page more diverse

Client feedback

I love this design and I love how it looks like a bee hive on the wall and think that it would look great in my home as it would fit in very well with the rest of the furniture , I love the shape and size of it and how I can customize it and make it bigger and smaller depending on what I need to display , I think it would make a great addition to the home

This shelving was designed by movasi and was made to encourage the user to 'design' their own 'composition' . It was also made to be ''easily buildable and adaptable'' meaning anyone can make and use this shelving

What makes these blocks so unique is their multiple uses , they are chemical water , heat proof so can be used for things like tables or benches

This shelving is inspired by rock formations in cliffs and rock faces ,each block has a unique shape unlike any other products on the market , its outrageous design is what makes it a staple piece in the home ,as well as looking good it also functions well by allowing the user to change or adjust the product to suit their needs by removing or adding these rocklike blocks .

reddot design award

This design won a red dot design award for is unique design and appearance and its use of sustainable materials . The blocks come in 4 different styles and 2 colours as the image to the right shows , two hollow blocks with no back and 2 blocks with backs , this makes the product more customizable, and it can be used for multiple uses such as a small table if the back block is flipped .

Client feedback

This idea is amazing and looks completely different from anything ive ever seen before , my favorite thing about it is its versatility and customization so I could make it however I want . However, im not sure it fits into my home with the rest of the furniture which is a must so I would have to go with the hexagon shelves.

Evaluation:

Price: one block is $60 which is around 55 pounds

Material; 100% recyclable polypropene

Use: displaying and storage

Conclusion

This page explores 2 existing products related to my theme of multifunctional living as well as my idea of creating shelving. Each idea has been annotated thoroughly and includes information such as material which may come in useful when I am deciding what material is will use for my product. This page will help me design my product by comparing it to similar products that are already on the market

Client needs design brief and specification

This page lists the clients needs , the design brief which covers everything that needs to be addressed when creating the product and a specification which covers every small detail and everything to know so far about the product. This will inform my subsequent design ideas.

Client needs

1) The product must function properly and do what it was made for
2) The product should allow the client to save space
3) The product should include some multifunctional features and uses
4) The product should fit in with the rest of the interior style I.e. modern style
5) The product should be easy to use and access
6) The product should be easy to clean
7) The product can me made of any chosen material if it fits in
8) The product will last a long time
9) the product is safe to use

The client needs list has been gathered firsthand by myself , it lists all the specifications that my client has listed or has ideas of . The main idea from the client is that it should function well, and it must be multifunctional , meaning it should have more than one use . This could be a lighting element or maybe something completely different .my client insist that it fits in with the rest of the home's interior , the interior of the home is a modern sleek look , there are lots of shades of grey and monochrome color's , there is however a few wooden elements .

Design brief

My client that I'm designing for is my mother. I will be designing a multifunctional display unit to store, display and hold items such as books and home accessories. The product should be customizable and multifunctional. The clients maximum spend is £150 the price should not compromise the quality of the product. The product will be made of sustainable timber that is FSC certified. It will have a wooden finish but with a modern sleek look , to fit in with the home décor. The product should be easy to use and maintain and should be modular so that it is easy to store and transport.

Conclusion; This page has allowed to to begin to finalize an idea , the client needs will be very useful to me when I design the final product because I can use the list of 8 needs to make sure the product is exactly what the client is looking for. The specification has allowed me to write down everything that needs to be happening or included in my product an by doing this I can keep referring back to what I wrote and compare my product to my spec later on in the project

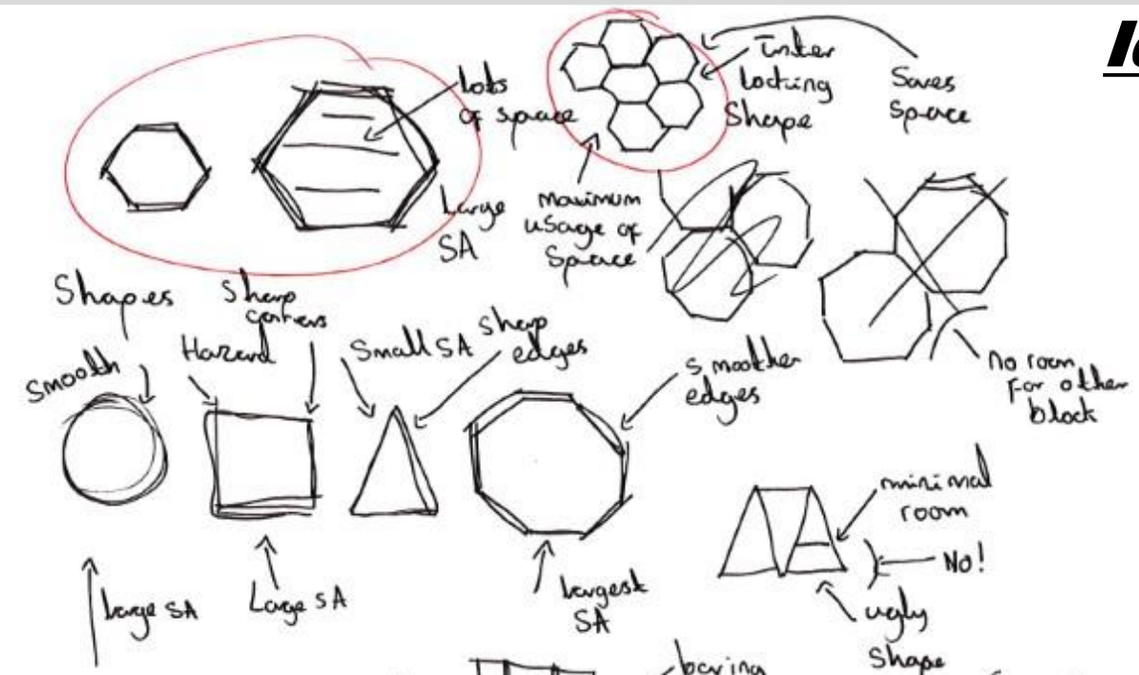
specification

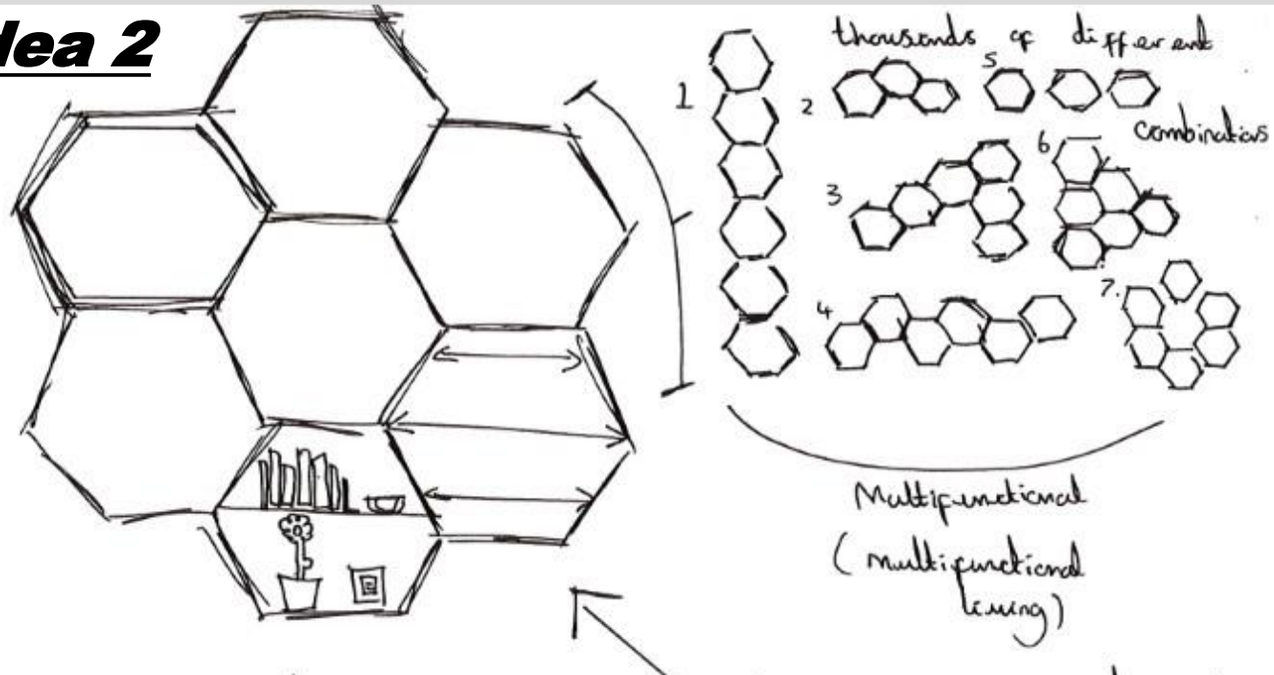
This specification covers all the specific features my final product will include and any further useful information about my final product as well as the tools materials etc. I will use in the design process .

(1) The hexagon shaped hive inspired shelves which can be customized on the wall due to the variety of sizes will be made of a sustainably sourced wood preferably with the FSC mark on. The reason for this choice is because the product shouldn't create problems no matter what stage of use its in only solve problems .(7) The wood can be either hardwood or softwood it mainly depends on the price and the quality of the wood as I don't want to make the product more costly than it needs to be . The wood must withstand the impact of products being placed onto its surface and it(6) must be easy to clean , that means I will have to sand it well and add some type of protective coating onto it , this will also help it to last longer. The type of joining method I will use will be a MITRE join and this will be supported by a dowel rod . the MITRE joint will offer extra support because it uses a larger surface area .(1) Function: this is the reason for designing the product , the key functions are to do what any other shelf would do like display/hold objects , but I don't want my shelf to be like every other shelf I want it to be different , the ways I can make it different to other similar products on the market is by including(3) lighting features , customizable attachments like level shelves , coat hooks and so on , the point is that it can be customized to whatever is needed. (4)Its appearance should look natural but not so much that it doesn't fit into the homes theme which is modern crisp and sleek . By natural I mean that the wood won't be painted over or covered , this is so that you can still see the natural grain and texture , but it will need to be varnished so it has a clean finish .(5) The products size is based upon my ergonomics research page which explores the specific sizes of my clients. The product must be mountable onto the wall , this also means it can be placed anywhere by the user without damaging the users property e.g screw holes in the wall . My plan is to place a a small hook or L shaped wall mount onto the back of the largest piece , there will be no need for the others to be attached to the wall because the largest piece will support the weight of the rest . My idea is to allow the user to take down and put up a mix of different sized shelves based on what they are being used for , because of the 6 different sized shelves this makes customizing the product even easier for the user . The shelves will join together with magnets that will sit flush with the exterior of the wood . The magnets will allow the user to click the shelves together in the easiest way possible that doesn't require any skill to do so . The magnets will have to be strong enough to support the shelves all of which vary in weight because of their different sizes . (9) The magnets should be able to hold the biggest shelf as safely and securely as the smallest shelf . If the magnets are not strong enough the product becomes a safety hazard to the user and could injure those using the product . (2) A final point is that the product should not only fit its multifunctional purpose but also save space in the home. Either during storage of the product or when the product is being used

Design ideas

This design ideas page shows my initial ideas , some of the ideas where inspired by existing products I had found prior to completing this page and some of the ideas came to me after I completed my biomimicry research page. The ideas have been drawn out in pen and annotated .





Feedback: fantastic , I love the unique shapes and there a variety of designs to choose from . Next I would like to see some more ideas

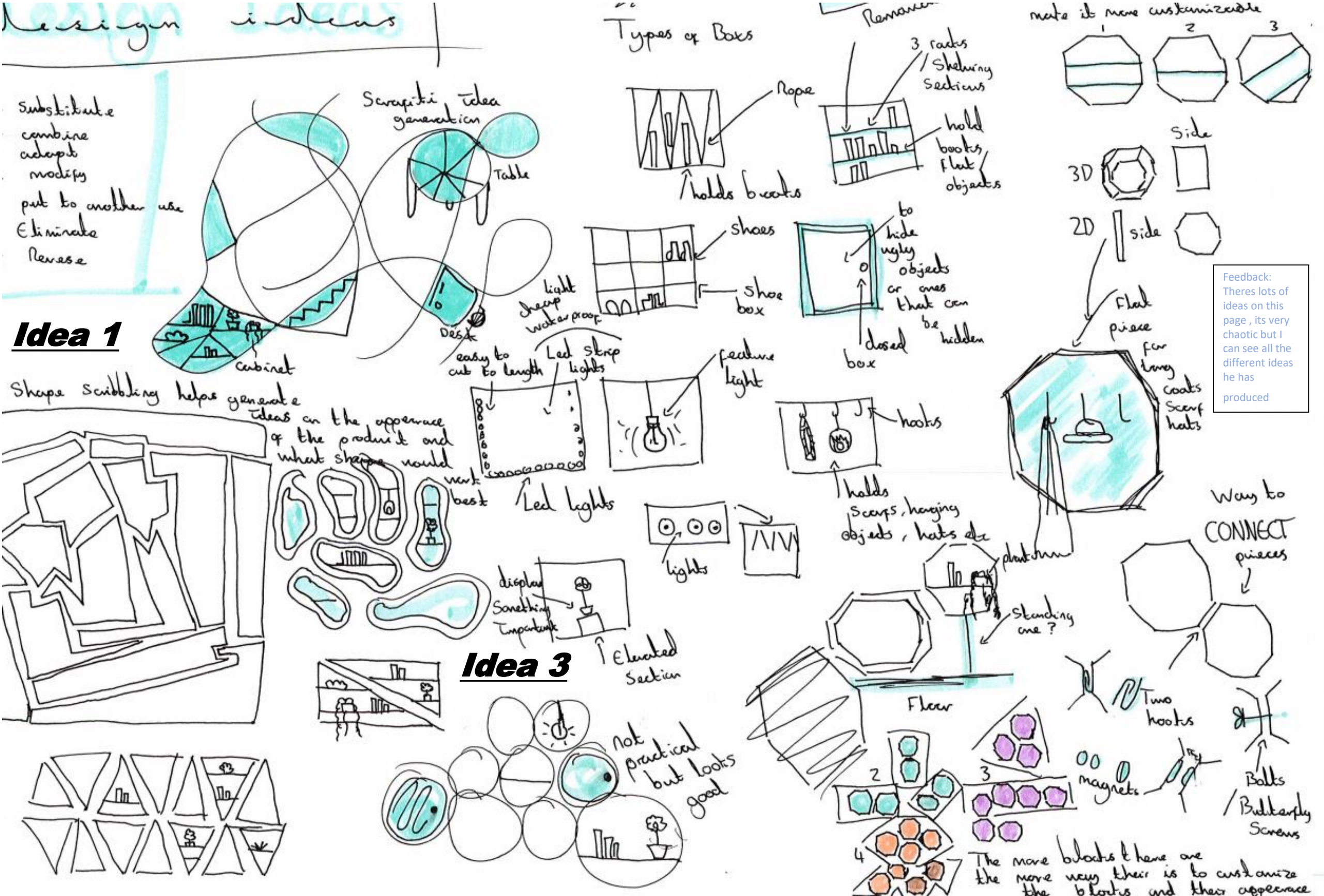
Conclusion

By completing this key page in my project I have projected my ideas from my head to paper , by sketching them out I can narrow my ideas down and pick the idea I like the most or have a few ideas in mind and pick the one that would be best for my theme of ‘multifunctional living’. By annotating the ideas I have picked out the goods and the bad about each idea and that should make it easier for me to pick out the right one

Design ideas

This is my second design ideas page and is much fuller than the last , ive really tried to think of as many ideas and anything I possibly can , there are multiple sketches and

random shapes that helped me to produce new ideas



Feedback:
Theres lots of ideas on this page , its very chaotic but I can see all the different ideas he has produced

This page compares my 3 design ideas to my clients listed needs , this will help me understand exactly what my client is looking for

Design ideas vs client needs

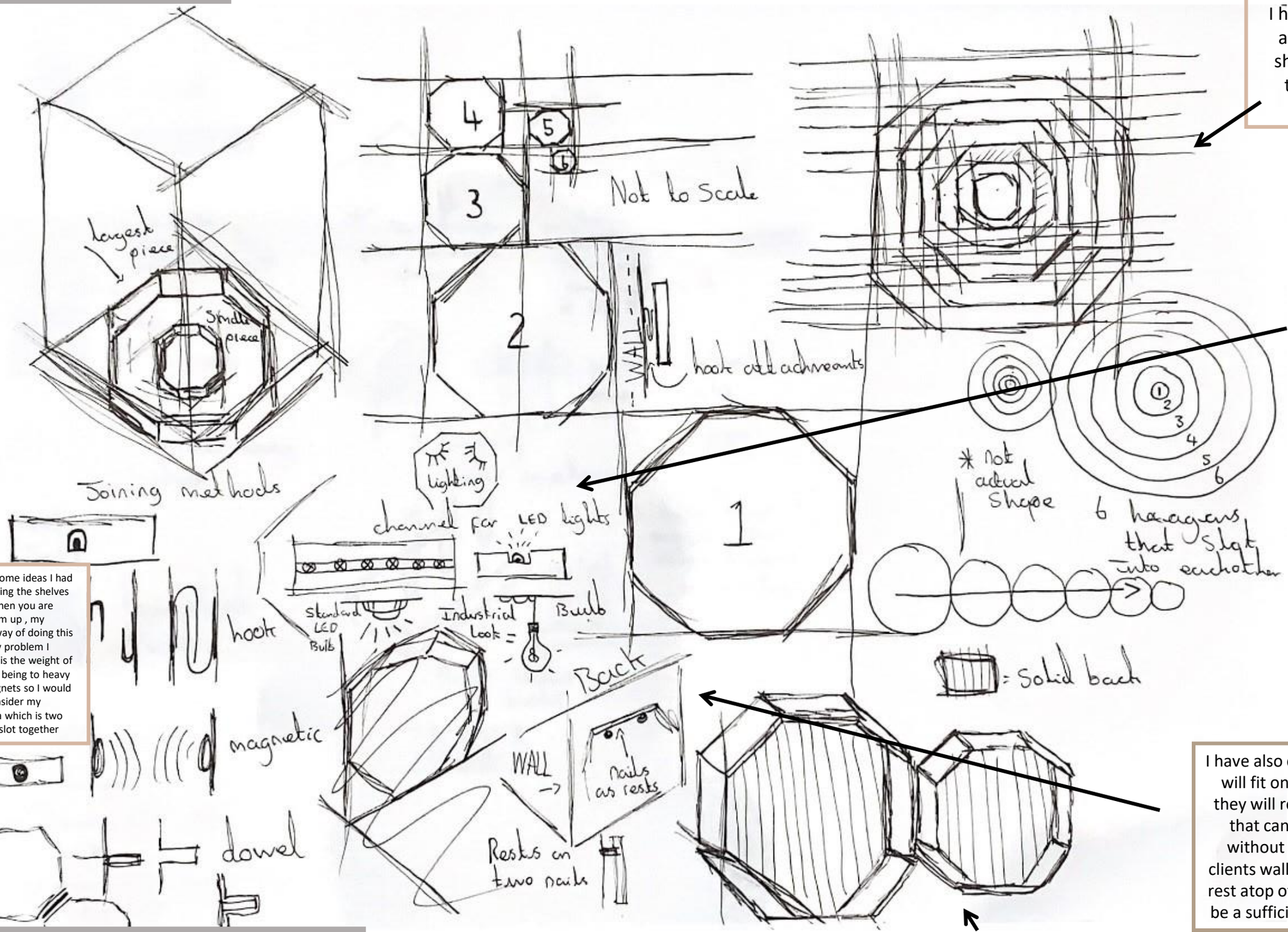
	(1) Must be of usefulness and helpful to have	(2) Save space in the home	(3) Should include more than one function	(4) Must; fit in with the rest of the interior of the home	(6) Easy to clean, maintain	Easy to dis assemble or re arrange	(5) Easy to use	(7) Must last a long time
1	It is useful to have in the home more based of off its unusualness and appearance for aesthetic factors , but not so useful for functionality	Yes it does save space because it doesn't waste any space with large gaps or areas that could be filled in , it utilizes all the given space that's why its such a peculiar shape 7/10 ***(copy from page 10)***	Multiple additions could be added to this product to make It better , a few ideas for thing that could go with it can be found on design idea page 2 . Including additions like lighting fixtures , hooks , doors and dividers etc	The home although modern and full of art with a open plan living style , I believe that this product would be out of place in the home , its quite a striking piece and would take the attention away from the res of the home which is not the aim of this product	dust or dirt could easily get trapped in all of the sharp corners which could be difficult for the client to clean by hand	I'm not too sure on this one but from the looks of it I would say it would require some thinking to put together as it is almost like a huge jigsaw with lots of different pieces	The product is not easy to use as its variation in shapes and sizes means only certain items can fit inside the shelves . Its difficult to assemble and requires patience	Yes the product will last well , it all depends on the material used and its durability , resistance and toughness
2	It is useful to have in the home , it saves space , serves multiple functions, acts as storage , looks aesthetically pleasing . It fits all the criteria's	Yes I plan , if I go ahead with this design, to create ascending size hexagons so that they can fit into one another for storing away , this allows the user to save all the space that would have been taken up by a traditional shelf (***Copy from page 10)***	Multiple additions could be added to this product to make It better , a few ideas for thing that could go with it can be found on design idea page 2 . Including additions like lighting fixtures , hooks , doors and dividers etc	The shapes of the product would fit in with the shapes found around the home because it's a simple geometric shape . The color of the wood will have to be changed either by paint or wood dye etc because a solid wood finish wouldn't fit in with the grey and white color theme in the home	This product is very easy to clean as it has no small corners of opening that dust or any other type of mess could get stuck in , it can easily be cleaned with just a wipe	This idea would require little thinking to put together , its like large Lego blocks and there is no wright or wrong way to put it together as it is customizable by the user , so they can put it up however they like.	the product would be easy to use , it requires no assembly skills , it can store any type of item obviously within the size of the shelf itself .	Yes the product will last well , it all depends on the material used and its durability , resistance and toughness
3	It is useful to have in the home , although I've already said its not completely practical when compared to the other ideas , it still serves a purpose which is its use . So I cant say it doesn't have a purpose I can just say its not as good as idea 1 and 2	No , it doesn't save space because in between each circle there is quite a significant gap which could be filled in . This gap once more and more are there creates a lot of useful wasted space which is not good **(*copy from page 10)***	Multiple additions could be added to this product to make It better , a few ideas for thing that could go with it can be found on design idea page 2 . Including additions like lighting fixtures , hooks , doors and dividers etc	The interior of the clients home is filled with rectangular shapes and squares , the home is very symmetrical and features lots of straight beams and glass as well as furniture that is mostly rectangular in shape , the circular shelving would definitely not fit in with the rest of the home	Out of all the ideas this product is the easiest to clean , it has no corners or gaps for dust or anything of the kind to rest , because of its shape any mess would just fall of the sides . It would be very easy to wipe the product down	If the product is resting on the floor then there is the chance that the pieces could roll away , however if the product is mounted on the wall then their should be no problem putting the shelves together and you can stack them on top of each other	The product is not easy to use , flat based objects cannot be stored on these shelves without the use of platforms inside the circle however that would waste space .	Yes the product will last well , it all depends on the material used and its durability , resistance and toughness

This page shows my sketches that I completed of my final design. As well as a detailed description of my illustrations

Developing design ideas 2

I have sketched this to show (not accurate) the way each octagon shelf fits into each other . This is to save space when storing the shelfs .

I have considered adding a lighting feature incorporated into one of the octagons, preferably the largest one . In order to make the lights non visible and more pleasing to look at I have considered adding a channel for the led lights to sit into . This means that you will not be able to see the actual strip of lights and it makes the section flush and level , but still provides a great light source



These are some ideas I had for connecting the shelves together when you are putting them up , my preferred way of doing this is . The only problem I would face is the weight of the shelves being to heavy for the magnets so I would have to consider my second idea which is two hooks that slot together

I have also considered how the hexagons will fit on the wall . My idea was that they will rest on two small pins or nails that can easily be put into the wall without causing any damage to the clients wall . The hexagon shelf will then rest atop of the two nail and that should be a sufficient strength to hold them up

From completing this page I have now finalised my idea and have begun to sketch it and consider all the aspects such as , size , functionality , materials (next page) and joining methods . This page gives me a clearer understanding of my final design

The largest piece will have a back to it , this is because when you are storing all the pieces together they all have to rest on something so they don't just slip through , so to solve this issue the large piece which all the other pieces fit into will have a back to it , the back piece will be made of the same material as the rest of the hexagon so that it blends in well

Feedback: he has clearly developed his idea a lot more here and I can start to see a general idea of what the final product may look like.

Further research- Materials, joints and testing

This page explores 5 different types of wood joint techniques for a range of different uses . Using 10 pieces of plywood I have created 5 examples of joints , by creating these joints and investigating their appearance and strength I was able to find the right joint for my project. I was also able to test their strength and with the pieces I put together a box to show how all the pieces connected , I have included photographs of each joint.

Dowel joint

The fifth joint I tested was a dowel joint , a dowel joint is similar in a way to a butt joint however it has a drilled out hole the width of the dowel rod in one side of the wood and a hole for the dowel to fit into in the other piece of wood except its on the end of the wood , the dowel rod slots inside of the hole with a perfect fit and a hammer is used to make sure the rod is snug inside the hole , this joint holds a lot of strength and is almost impossible to pull apart or twist especially when there are more than one dowel rods in the joint , the more dowel rods that are used the stronger the joint . This joint could also be a possibility for my product because of its strength and durability .

The fourth joint I tested was a finger joint , a finger joint requires each end of the wood to have a one Centi meter deep by 1 Centi meter wide cut , similar to castle turrets , if cut precisely each piece will fit into the grooves of the other piece. This joint leaves a pattered edge. The finger joint is the strongest and most durable of all the joints I have tested. The finger joint has the largest surface area of all the joints making it the hardest to break , it's almost impossible to pull apart the pieces when a layer of glue is applied between the 2 pieces of wood. This is a possible joint I could use however I'm not entirely sure how I could create a hexagon from a joint that fixes together at a 90-degree angle although I could if I cut the wood at a 45-degree angle before cutting out the grooves.

This box displays the dowel and finger joint being used to create a square box , it shows how more than 1 type of joint can be used in a product

This box shows how each joint can connect to make a complete square ; it shows off 3 different types of joints

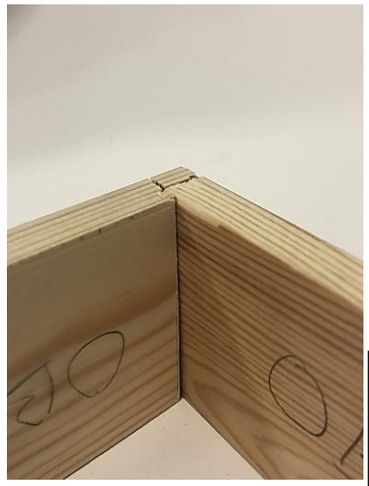
Butt joint

The first join I explored was a butt joint , a butt joint is the simplest joint . Two pieces of wood are joined edge to side with a thin layer of glue , this joint is the weakest of all the joints and will likely break off if dropped . This joint is used in cheap furniture or projects that need little structural support . This joint would not be ideal for my project because I'm looking for a stronger joint that will last longer. This joint snapped easily when I applied pressure onto it whilst I was making the other joints and I had to re make it a second time , this perhaps shows its not the best for what im looking for.

Finger joint

Lap joint

The third joint I made was a lap joint , a lap joint is created by cutting a center meter wide by half a center meter deep cut into the end of one of the pieces of wood . The second piece of wood fits into the first with a tight fit leaving no gaps if cut precisely . This joint is as strong as a mitered joint and has a smooth finish with only one visible line on the outside . However, this joint is time consuming and is much harder to reproduce that the mitered joint . This joint would not be ideal because I can not make a hexagon shape product from a joint that creates a rectangle or a square. This join is easy to snap off because theoretically it's the same as a butt joint just cut in a different way with a slightly larger surface area



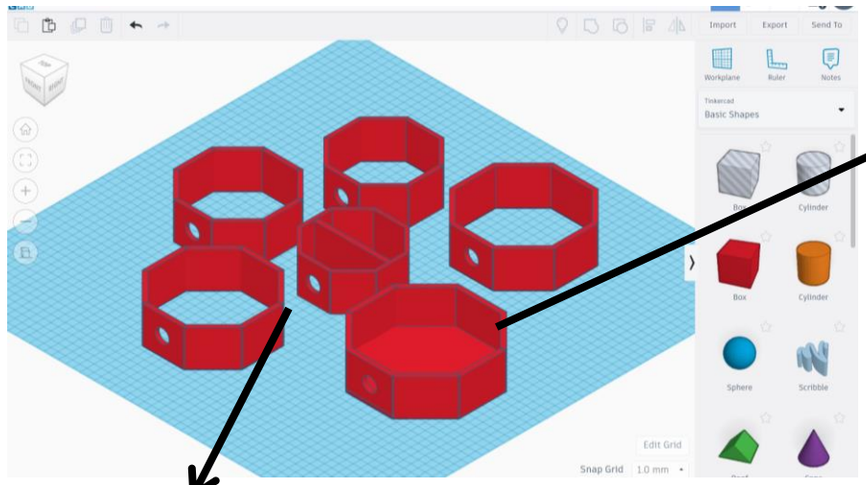
Mitered butt joint

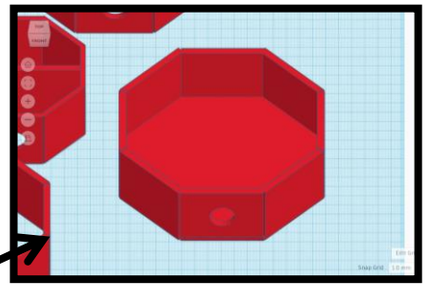
The second joint I explored was like the first except it is mitered so that means it has been cut at a 45-degree angle on both ends of both pieces of wood , this cut improves the strength of the joint as it now has a larger surface area . Glue is applied in-between the joint. This would be a more suitable joint for my project as its more likely to withstand any force or damage and will last longer . A mitered butt joint is typically used in most flat pack furniture as It is simple to assemble but with a more secure approach. This joint was harder to bend than the first joint and I felt it was more secure

Conclusion: testing a variety of different joints allowed for me to visually see the appearance of the joints and physically test the strength of the joints , without testing these joints it would have left me with a harder decision on which joint I would have chosen . The joint ive chosen from testing all 5 different joints is the mitered butt joint , with this information I can now move on to creating a 3d model of my design.

Developing design ideas 1 (CAD modelling)

Side view (laid out)



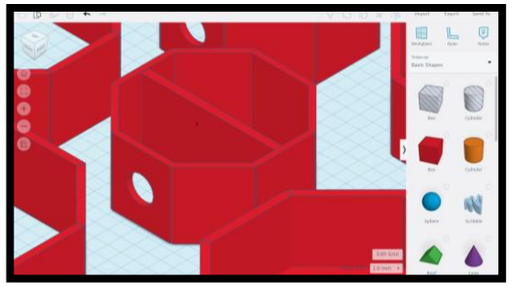


Here is an enlarged image of one of the 6 hexagons , this is the largest of all the hexagons . I added a base to this one in order for easy storage of all the other hexagons when they lot together to prevent them from sliding right through . The thickness of the base is the same as the sides .

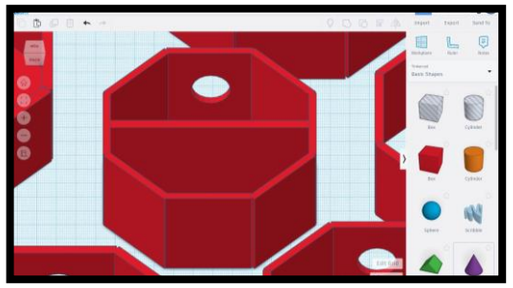
This cad model final design page shows off my final piece. This page includes a detailed description of every aspect of my design as well as information about the functions and aspects of the product. I created the models on tinker cad in order for me to visualise my product , fix any issues with ese , explore the scale , and to easily add or remove (make changes) if needed . The model will be 3d printed and ready for an analysis and an insight on how well it works and preforms its job

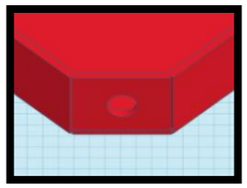
The shelf block has a shelf that runs through the centre of the hexagon , this specific hexagon can be used to hold objects on multiple levels as well as add another use to my project .

The shelf block must be the smallest block in order to allow them to all slot into each other , otherwise if the largest block had the shelf piece you wouldn't be able to stack any other hexagons inside because the shelf would be in the way , so therefore it has to be the smallest one because nothing else gets stacked into that one



Shelf block

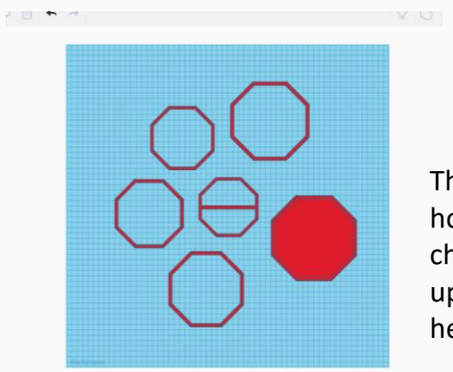




Each hexagon has a whole , the hole is for a single earth magnet to fit inside , the use of magnets will allow each hexagon to be put together in hundreds of different layouts and easily disassembled . I have no realised that 2 sides of the hexagon will need a hole so there is a magnet of each opposite side , if not then there would only be one connection spot on each hexagon meaning you could only connect 2 hexagons together at any time

The top view shows the sizes of hexagons as well as the large piece which has the base plate on . This is the layout in which they will be printed in order to prevent any of the pieces sticking together

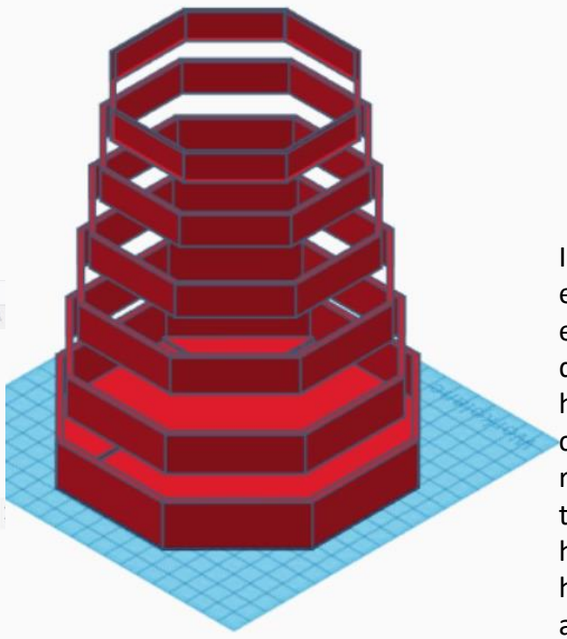
Top view (laid out)

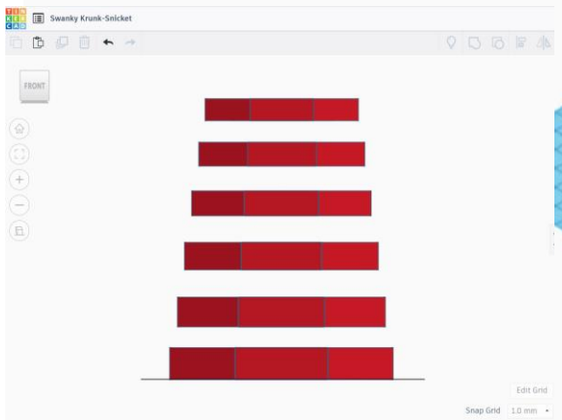


The cad model shows 6 hexagon however depending on what I choose to do this number may go up or down so I could have 5 or 7 hexagon in my final prototype

The exploded view shows the basic shape of each of the hexagons and how they would slot into one another . If cut correctly my final product should all slot together with a small gap in-between each hexagon to ensure they don't get stuck .

Exploded stacked view





I used the software ~~CAD~~ as it provided a free tool for me to easily create my design within a matter of hours , the software was easy to use . To create the hexagon shapes I created 5 rectangles by dragging and dropping them onto the surface , I then adjusted the height and width of each rectangle and placed them together corner by corner at 35-degree angle , I then selected all the rectangles that formed the hexagon shape and merged them together and locked them in place , I then copy and pasted that hexagon and adjusted the size , I did this process 6 times for each hexagon . For the hexagon with the shelf I just dragged and dropped another rectangle and adjusted it to fit and merged the pieces together

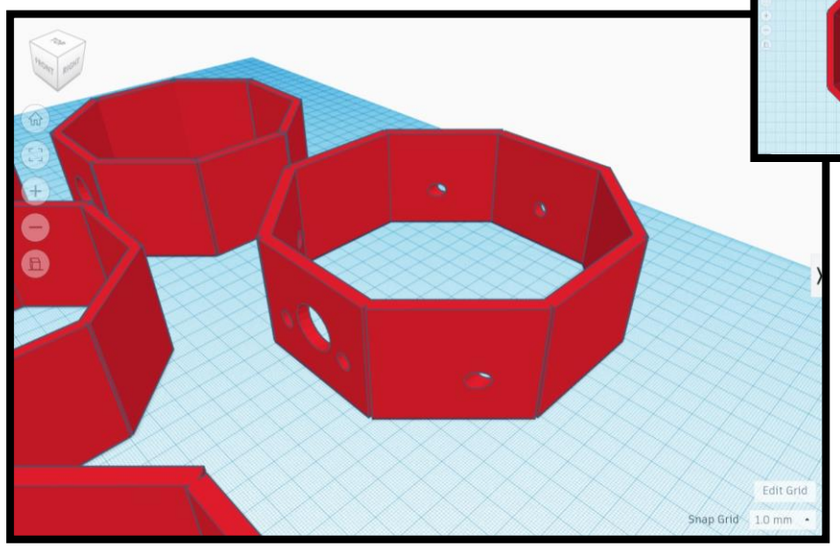
Conclusion

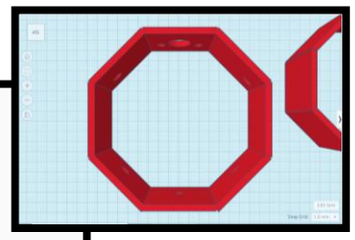
to conclude , my next step is to analyse additional features that I will add to the cad model which are not shown on this page , and print my cad model as well as provide a detailed page analysing the model with pictures and annotation , by creating this page I have established a clear image of what my product will look like and described its functions and features

Developing design ideas 2

This page explores the functions of 2 of the shelves in more detail and explains what there purpose is and how they will benefit the user . This page also includes 4 images of the model I created on tinker cad

Rope book rack block

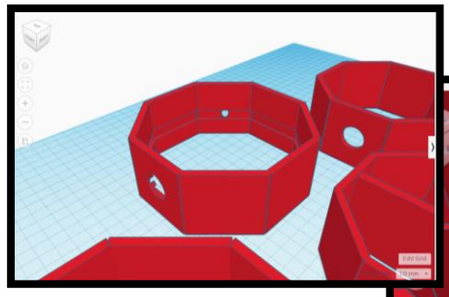




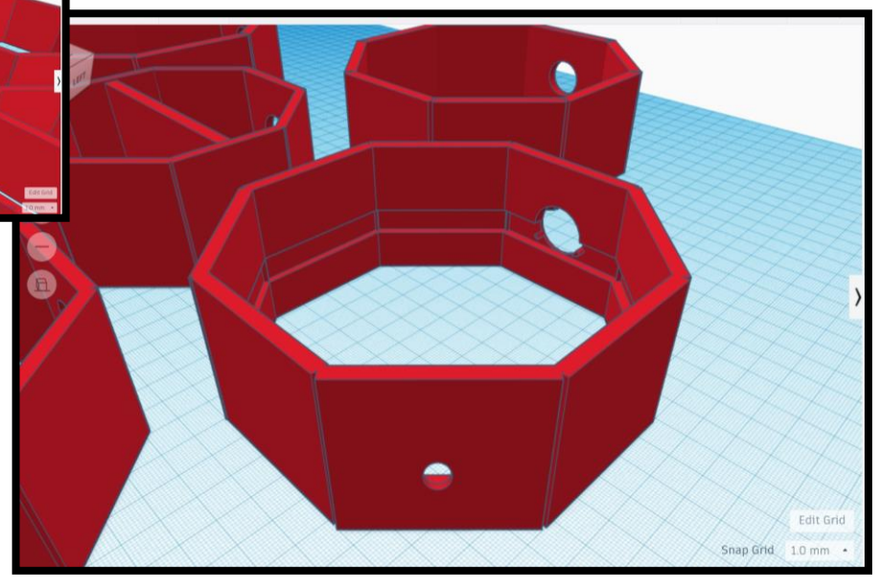
Top view of the rope book rack hexagon shows how its shape and size remains the same , im hoping that when this is being printed it holds up the weight on top and the hole doesn't get filled , this is just a prototype however so I can easily make adjustments to the design

The idea behind the rope book rack is to add another element to my design that links back to my main focus of 'multifunctional living' the rope will thread through each of the holes which have been positioned to create a zig zag pattern which various sized books can slot into , however an issue with adding rope into the second largest hexagon means that the other smaller hexagons will not be able to slot inside this hexagon so I may need to think of an alternative way of including this feature . This is just a prototype so I can experiment with this and if it doesn't work I can make alterations or scrap the idea completely

LED light strip channel block



When printed , the led light strip channel block should have a channel that runs around the centre of the hexagon , this hexagon Is the 3rd largest hexagon out of all 6 . An issue I might face when this is being printed is the accuracy of the printer . If the printer is not accurate enough then it wont print the channel , it will just print it as a solid hexagon , however this is just a model and can be altered



The idea behind this was to include some sort of lighting feature , one of my first idea was to have a vintage Edison bulb hanging in the centre , however this would have filled all the space in the hexagon and would have left no space for anything else defeating the purpose of storage , so in order to overcome this I had the idea of using a less space consuming source of light which is to use LED strip lights , the LED strip can be cut to any length as well as shaped glued and bended around corners , they produce a strong level of light with a very low amount of power required . The led lights will sit in the groove which goes around the hexagon creating a flush and level finish on the inside

3D printed cad model

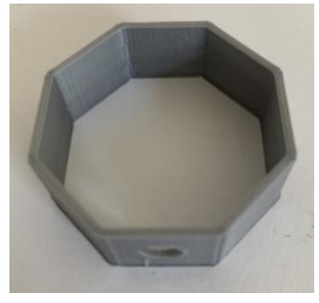
Here is a top view of my 3d printed cad model , I only printed 5 of the 6 hexagons as I decided 5 was enough for my final design

Shelf piece

Here you can see the shelf piece printed exactly as I wanted with no warping or mess . The shelf runs straight through the middle and the hole is in the centre on the front , there is nothing I would change about this piece

Base piece

Here you can see the largest piece , the largest piece printed cleanly with no faults , unfortunately it printed with different dimensions but It still gives me an understanding of how the product will look etc



Im happy with how it printed and there's nothing I need to change about it .

Rope piece

Here you can see the rope piece also printed exactly how I wanted it too , all of the holes printed without filling up with filament or collapsing ,the hole also printed exactly in the middle . there is nothing I would change about this design .

3rd piece

This is just an ordinary piece with no added features , this piece printed with no imperfections and fits into the other pieces smoothly , I'm happy with this I wont need to change or edit it

To conclude , I have printed out my product on the printer and evaluated it , I won't be making any changes as the design is exactly how I want it and im pleased with how it turned out . The next step is to complete some further research like the materials I will use .

Materials research and testing

This page discuss the different materials I could potentially use for my project, along with research into each material so I can find out what's best for my project. This page mainly focuses on types of wood rather than other materials because from the start I had planned on using wood as it is the most sustainable natural material available

In order to get a clear understanding of the type of wood I will use I need to first look at the properties , appearance , surface texture and uses for a variety of different wood types , and come to a judge meant as to which wood type I will use

1) Walnut - is fine-textured and strong. It is resistant to shrinking and warping and best used for cabinetry , furniture and wall panelling.

2) Oak - strong yet bendable. It resists absorption of moisture and is best used for furniture, desk, boat framing and flooring, furniture, veneers and tool handles. Oak is sustainable however its not cheap

3) Spruce - is very hard and strong. It decays easily so that wood protection is needed to prevent it rotting It is lightweight and shrinks moderately. Usually used for spars and masts for ships, crates, boxes, ladders

4) Pine- has very uniform texture that is easy to work on. It is not susceptible to warping and swelling and is best used for house construction, furniture, panelling, boxes and moulding.

5) Maple - strong, hard and fine textured. This wood is best used for fine furniture and flooring. Maple wood is also costly. Maple is a sustainable material

6) Fir - has very low resistance to decay but has uniform texture. Best used for doors, furniture, frames, windows, veneer, plywood and trims.

7) Man-made boards come in different types too. plywood which is made of thin layers of wood that are glued together. chipboard and MDF (medium density fibreboard) which are made of wood chips and dust particles glued together to make a board.

Testing two types of wood finishes on pine

I used a clear finish wax suitable for all types of wood as you can see below. This wax is for interior use only

The first finish I chose to test was wax , waxes a made from a variety of minerals , vegetable and animal sources , a wax does not penetrate the surface of the wood instead it sits in the grain of the wood and on top of the wood creating a thin layer , wax does not enhance the wood however it gives it a crisper finish with more defined grain texture , it softens the surface of the wood and makes the wood nicer to handle. Waxes repel water and prevent rot or oxidization of wood , this is extremely important in preventing any damage to the wood over time.

Conclusion: the type of wood I will be using is pine wood , pine is most suitable for the project with its properties , the wood I have tested on is pine wood so it would make sense to use it to create my project . I will be using wax to finish the wood and a variety of 3 sized grit sandpapers which i have tested on pine . i will now need to create a manufacturing plan and begin to construct my project

I used a quick dry clear varnish for all types of wood , both interior and exterior use

The second type of wood finish I chose was a clear varnish , varnish is a protective coating with a thin consistency that penetrates the surface of the wood . A varnish in its simplest form is a paint without its pigment , it has the same effects of paint but without the color . A varnish will protect the wood from rot , oxidization and repel water. It leaves a thin glossy like coating that darkens the color of the wood and makes the grain stand out.

Results of testing the finishes

Varnish

I applied the varnish using a paint brush and found it was quite easy to apply and it absorbed into the wood quite nicely , it took around 20 minutes to dry and has left a darkened appearance colour as you can see where one half is darker . Personal I prefer the original colour , the varnish leaves a resin type feel to the wood but without compromising the texture.

Wax

I applied the wax using a old rag cloth , I found it very easy to apply and it dried very quickly , it enhanced the grain in the wood without changing the colour and left the surface of the wood feeling extremely smooth to the touch

My conclusion from this test : personally I prefer the appearance and feel of the pine with the wax finish rather than the varnish , for that reason I will be using wax on my final product . The product will be indoor use only so weather resistance is not a key factor however if it was I would be using varnish

Sandpaper:

Below are 3 different grain size pieces of sandpaper ranging from the largest being 100 grit and the finest being 600 grit. I will start with the largest grit to remove any splinters or uneven edges and move down to the finest to soften the surface and smoothen the wood

100 grit

240 grit

600 grit

Manufacturing plan

	Process	Quality control	equipment	Health and safety	Possible problems
Cutting	The wood will be cut into 5 sets of equally but different sized raw planks of wood for each of the 8 sided shapes using the band saw for faster more efficient cutting which will leave me with more precise cuts . to ensure each plank has a 22.5' cut at each end I will use a hand saw and a mitre block , the mitred pieces will form the octagon . There will also be one smaller plank which will be used as a shelf piece in one of the octagons this will be cut on the band saw	i will use a mitre that is securely held still with a clamp in order to cut the ends of the wood at a perfect 22.5' angle every time . I will use a clamped straight object such as a block of wood or metal to ensure the wood cut on the band saw has straight edges and is all the same width	I will use : Band saw , hand saw , mitre block and a clamp .	When cutting the wood on the band saw I will wear goggles and an apron to protect my eyes and clothing . I will maintain eye contact with the saw when cutting in order to avoid my hand slipping. When using a hand saw I will make sure I'm sawing away from myself . I will wear goggles in case any splinters or dust flies off.	If the mitre is not accurate enough then one wrong cut can make a huge difference to the shape of the product
Drilling	4 of the octagons will have two holes drilled either side (although not shown in model) the holes will be drilled centrally and will be the width of a small magnet, because 2 magnets will go in both the wholes . One of the blocks needs a larger whole drilling at one end and another block needs a few extra holes drilling , I will drill these holes using a pillar drill and clamp and make sure I select the right size drill bit. I will mark out the points in pencil beforehand	When using the pillar drill I will secure the piece of wood in place using a flat clamp, this ensures an accurate hole every time . I will find the exact size drill piece for the magnet holes so that the magnets fit perfectly without a gap into the holes	I will use: pillar drill and a clamp	When using the pillar drill I will make sure the drill piece is tightened into the head of the drill and pull down the drill guard when im operating the machine . I will wear goggles to protect my eyes and keep a good eye on the wood and the drill when im cutting	The drill bit may not be the exact same size as the magnets I use which could leave a small gap, however this could be resolved with glue to fill the gap .
Constructing	Once the wood is cut into the desired size and angle (mitre) I will begin to assemble the pieces , if my angles are correct all 8 pieces should form a perfectly accurate octagon. I will join each piece together with pva glue as this will act as a strong bond as well as drying clear so no mess is visible , each piece once glued together will be held at each connecting area by a small spring clamp in order to prevent any gaps or movement when drying. One of the hexagons has an additional shelf , the shelf piece will be slotted in once the octagon is made and held by pva and 2 small tacking pins either end. The octagons will be left to dry flat so gravity does not move the pieces .	I will use a guide cut at 157.5' (22.5 + 157.5 = 180') to ensure each piece is connected precisely at a 22.5' angle . 8 clamps will hold each piece together when drying to prevent movement . Excess glue will be wiped of with a damp cloth and the 2 pins will be hammered flush with the woods surface	I will use , spring clamps, hammer , pins , pva glue and a guide block cut at 157.5'	When using the hammer I will make sure the wood is secured and my fingers are well out of the hammers way	The pieces might not form an exact octagon if they have been cut wrong
Surface finishes	Once the product is assembled and all the pieces have dried together I will sand down the wood starting with a large grain sand paper and moving to a smaller grain to ensure all the splinters and bumps are sanded down and the wood is smooth to touch . Once sanded I will use bees wax to soften the feel of the wood as well as protect it , on top of this I will use a type of wood treatment that protects the wood from rotting or water damage , because the shelves may be used to hold something that has the possibility to spill or drip onto the wood	When sanding the wood I will make sure it is sanded evenly so that all the surfaces of the wood are as smooth as each other . Also when I'm applying the bees wax and protective coating I will apply it evenly so no excess is left	I will use: Sand paper in various grades , bees wax and water protective wood treatment	The wood treatment could be irritating to the skin or stain the skin so I need to check the label before I apply it and if it is then I will wear plastic gloves	The sand paper leaves marks on the surface of the wood , the wax or protective coating leaves stains or isn't absorbed by the wood

Conclusion: creating a manufacturing plan allows be to plan out each step of the construction process without going into it now knowing what im doing . This has allowed me to think more specifically about which tools Im using and the process of each step along the way , all that is to do next is finalize a cutting list and begin constructing my design

Manufacturing specification

Tool/machinery	Description
Tables saw :	The table saw is used to turn the large planks of pine into the correct sized rectangles used to build the walls of the product . This is the fastest method of accurately cutting the large wood
Sanding disk :	Each rectangular piece of wood must then be sanded at each end at a exact 35 degree angle
Jig :	I used a jig made of wood to sand the wood at exactly 35 degrees each time without any off cuts . The jig was cut to 35 degrees and held beside the sanding disk with a metal clamp
Pillar drill :	A pillar drill is to be used to drill 2 holes in each side of the hexagons , the holes' must be positioned in the exact same place on both sides of the pro
Jig saw table saw	The jigsaw will be used to cut any finer details or remove any uneven edges on the wood . A jigsaw is for finer work as it only has a small blade and table
Clamp	Clamps will be used to support the wood in place whilst its in the process of drying , clamps prevent the wood from slipping and moving out of place and ensure a more secure bond between the glue and wood
File	The file is used to quickly remove excess material such as uneven areas in the wood or areas I may have missed while cutting the wood , the file can also be used to remove excess glue

Product description

My product is aimed at a user looking for a space saving multifunctional product , the product can be used by anyone and is suitable for all ages . It is inspired by the appearance of honeycomb and the patterns created by bees inside the hive however it is octagon shaped rather than hexagon shaped . The product will suit the interior of most homes with its light-colored wood and modern sleek appearance . The product can withstand spillages , knocks and even accidental drops , the reason for its incredible durability is because of the octagonal shape and the use of a Mitre joint increasing the the surface area between the contact of each piece of wood where it joins .

The product is safe to use and contains no specific safety hazards that could injure the user , one thing the user may need to be mindful of is any danger they put themself in whilst moving the shelves as my product can be customized and each octagon can be detached .

The product is created from sustainably sourced pine wood certified by FSC standards . By using a sustainably sourced wood it means by product hasn't affected the planet or the environment as much as non-sustainably sourced wood may have done , the tree the wood came from will have been cut down and a new tree replanted in its place. Reducing the damage done to our planet.

Production type

My product is a one of production , meaning its just the one I have made . If I where to produce it in batch production though I would need to provide a sheet of dimensions and joining methods which I have explored , my product is capable of being batch produced in a factory if I were to choose to do so . The reason for choosing batch production is I feel it would be the fastest and simplest way of mass producing my product . My product can be assembled easily with the use of only a few materials

Assembly materials

My product has been assembled using : pva glue Aswell as super glue to ensure the attached magnets are fixed in place . I used super glue for the magnets because ordinary pva glue wouldn't bond well with the iron magnets so super glue was the best option. Just with the use of pva glue my product is durable and can withstand knocks , because of its shape it holds well together .

Quality control

To ensure the product is constructed to the highest of standards possible a quality check must be made on each component , the surfaces must be smooth to the touch , light in color and no splinters or defects in the wood must be noticeable . The product must withstand slight force without splintering or breaking to ensure the joints are secure I completed a drop test which was done accidentally but proved that it could withstand the impact . The product must have no sharp edges that could harm the user , each edge of the octagon must be rounded off. The magnets supporting each hexagon when joined must be securely super glued in place and any residue must be sanded off

Illustrates the compact design when stored

Illustrates one of the hundreds of variations the product can be constructed bt the user

Illustrates the magnets used to hold the pieces together

Safety

Safety is key during construction , when using large machinery , goggles must be worn to protect yourself from any fragments or splinters that fly off. Clamps and supports need to be used when sanding and drilling.

To conclude , every aspect of manufacturing the product has been specified and materials , tools , machinery and construction methods have been described . I have considered the type of large-scale production I would use and covered points such as safety and quality control . Moving on I must evaluate my final product and include client feedback.

Final product vs specification

One final evaluation must complete of my final product is comparing my completed product to my specification points that my client and myself made earlier on , the product will be compared with each of the nine different spec points and analysed thoroughly, by completing this table I can see if my product has met all the points and any points it hasn't

	is it multifunctional ?	Does it save space ?	Does it fit the homes interior ?	Is it easy to clean ?	Has it been made sustainably ?	Does it look right ? (aesthetics)	Does my client like it ?	Was the product produced without difficulty ?	Does it perform its role/function ?
Final product   	Yes, it is multifunctional and although it may only be a prototype it still has multifunctional characteristics , the product has multiple arrangements that can be created with all 5 blocks , the shelf block adds an additional feature and had this been the real product there would have been a total of 4 multifunctional elements , my product has hit this point successfully For me the product does what I hoped it would and it seems as though it works well and performs its key function	yes, it saves space , it saves space for storing household items or organising things , in the products simplest form its storage blocks or display blocks for whatever the user might want to put on them . The product saves space also in terms of when its not in use or certain parts are not being used . Each hexagon stacks into one another and can be stored that way together preventing the loss of space whether its in a small or large home I agree I think that the product does save space and I can use it to store whatever I want and it keeps my thing organised	yes, the product fits with the client's interior , the clients home has many neutral grey and white walls with a few red accents . The product doesn't entirely match all of the homes interior style and this is because if I wanted it to completely match, I would have had to paint or add a surface dye to the wood and I definitely did not want to be doing that as it would have ruined or spoiled the natural grain and colour of the wood which isn't the look I would be happy with , I think the product still would look great in the users home despite its slight difference in appearance . It fits in very well with my home and I believe it has been designed with the style of my home and décor very well as it fits in just as I hoped	yes, my product is easy to clean . The additional layer of wax finfish I used on the wood and all over the product prevents any damage from cleaning products or water , the wax repels any liquids preventing them from penetrating the wood and ruining it . There are no tight corners or hard to reach gaps that the user would be unable to clean or keep tidy , each block can be individually cleaned as they all come apart. I assume because of how it looks and the extra addition of wax that it will be very easy for me to clean an because it is woo it wont get too dirty	yes, in a way my product has been sustainably made with 1 key material . The wood I used which is pine wood had been sustainably sourced preventing damage to the planet which is exactly what I did not want my product to do especially as it is inspired by bees and natural forms . However, some parts I am unsure as to whether they are sustainable for example the magnets I used , I don not have information on how the materials where sourced and if they were sourced ethically and sustainably I agree if it has been made from sustainably sourced wood then hopefully it should be sustainable	In terms of aesthetics and appearance its turned out exactly how id have hoped it would and my client agrees with mee on that one , from the start I hadn't had an idea of the material I would use and the material had I chosen for example oak would have left me with a darker coloured product with a different wood grain that would not suit my clients home so im happy with the wood I chose and how it looks when its altogether and I believe so is my client For me the product looks great , the shape , the colour and everything about it fits in with my home and there is nothing I would personally have changed about it	I think all through the project any decisions and choices I've made my client has agreed on with me . My client was very free to let me design almost whatever I wanted as long as they like the idea I've created and its appearance , function and use etc . Having a client that gave me lots of freedom to choose what I could do allowed me to be more creative rather than narrow minded . The client loves the product and states its exactly how they imagined Its exactly the kind of product I was looking for , it does what it should and It looks great , I love the thought behind it and its style . I wouldn't change anything about it	the production of the product went quite smoothly bar a few minor things, the first of which being sanding the edges of each piece of wood at a 35 degree angle , the first time I did this I found I had sanded to much off because I hadn't marked where I needed to stop but that problem was quickly resolved and the next time I tried I made sure to mark how far to sand the wood , the second problem was attaching the magnets with hot glue and super glue , some of the holes for the magnets where to large and had left a space , to overcome this issue I had to use hot glue to fill the gaps and hold the magnet in place , luckily you can't see the hot glue so its difficult to tell that anything went wrong	It performs all the functions it has . Each hexagon easily magnetically join together in any order you want and easily slot together again . The reason I said it performs all the functions it has is because as I've mentioned its only a prototype and does not include all the features I had in mind . Despite that the product still has a function and fits this spec point For me the product should be able to display anything I want it to and store away all my items which I have no place for me to store , it will help keep my home tidier and less clutter will get in the way

Conclusion : to conclude I have made a judgment for each spec point as to whether my product has met that point and I have also included any areas that may not have fully met that point . From completing this table I've realised my product has successfully managed to match almost all 9 points and my client has got a product that she is extremely happy with . Moving on I will now draw a close to the project by completing an evaluation page of my entire product alongside with client feedback .

Final product evaluation

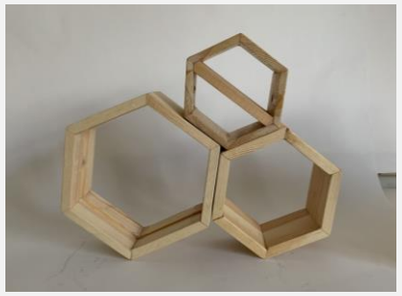
This final product evaluation page finalises my project and includes photos alongside with annotations of my final product.

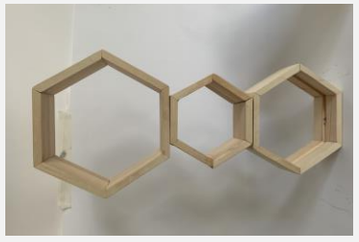
The final product

From sketches to a finished product project it was clear that I had one strong idea in mind through the process, a product that not only solves a problem with space but incorporates a theme of multifunctional living . Its important to keep in my this that I have classed as my ‘final product’ is just a prototype however a prototype that has been crafted carefully and had a lot of thought and time put into it . Although it may only be a prototype on a half scale it demonstrates the skills I used , the tool and processes I used and the function and appearance of the product . The product has been inspired by the work of bees and the honeycomb pattern they create in there hives , a hexagon shape which can be re arranged in a multitude of different positions and shapes the user may wish to create . The product shown above uses all 5 octagon shelf pieces to demonstrate the appearance of the product as an entire , this only being a prototype means a few things have been purposely missed out which I will cover.

Having a great looking product that is pleasing to the eye is just as important as its purpose . I feel my product has a modern appearance with a natural aesthetic yet at the same time it could easily fit into a variety of home styles , there's nothing the hexagon shaped shelves wouldn’t suit , whether its in the kitchen or in the bedroom storing and displaying all kinds of items such as spices and plants or picture frames and tools . Whatever it is my product will do its job around the home whilst appearing pleasing to the eye

Gallery of a few of the products combinations





The key aspect of my entire project was to create a product that would allow the user to use it how they wish , I completely agree that I have managed to fulfil that idea . My product has a total of 125 different combinations using all 5 of the hexagon blocks allowing the user to position them in every possible way they can think off . The user may not wish to use all 5 hexagons which is fine as the spares can easily be stored as they all fit into one another hence saving space when not in use . A product with so many possibilities gives the user more freedom with what they choose to do .

The product is easy to use and simple to assemble however the user wants . The use of strong earth magnets supporting each octagon allows the user to attach and detach the pieces with ease and however they want , its so simple to use anyone could do it . There's no tools or knowledge necessary to arrange the product in the way you want .

As you can see each of the 4 smaller hexagons have 2 magnets positioned on opposite sides of the octagon and the largest one having 5 magnets on all sides except the bottom the largest hexagon has 5 magnets because this piece is like an anchor where all the other pieces can branch off in any direction .

Had this not have been a prototype the largest piece would have had some type of wall mount used to mount the product onto the wall , the largest piece would be the only one with the mount as all the other pieces would branch off of it held in place by the magnets .

The magnets are placed inside of perfect sized holes and super glued in place . This leaves the outside of each piece with a smooth surface and no magnets sticking out the sides which would compromise the appearance

Conclusion of product

My half scale product created from sustainably sourced pine wood demonstrates a minimalist approach to a multifunctional space saving product . Creating this product I have explored and tested a variety of elements such as wood type , joints and finishes and other aspects such as ergonomics and finalised all my decisions into this final prototype . I have explored a variety of design ideas before finalising on just one and created 3d prototypes on cad . This project has allowed me to show and explore my creativity and has demonstrated how I can get my ideas from paper to physical form and produce what I think to be a high standard product

Client feedback

the product is nothing less than what I imagined it to be , it does exactly what it should and is extremely easy to assemble and use as I please . The appearance of the product is great I feel it really suits the environment it will feature in and has been designed and created to a very high standard . Overall Im very pleased with the product

As I said before this product is only a prototype and with having such a limited amount of time and resources has not been completed to full scale or with every component . Components I have not included which would have been in the real version are : an LED light strip sat in a cut out groove inside the 2nd largest hexagon and rope bookshelf weaved in a zig zag pattern through the 3rd largest hexagon . Both of these would feature in the real product which would also have been double the size of this prototype . However just because it’s a prototype doesn’t mean it doesn’t give me a very clear understanding of the real version as it is almost exactly the same and performs almost the same functions