

Design and Technology -
Industrial Design
Pavilion Project: Belonging



Year 11 HSC Portfolio

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Part 1. Identifying and Exploring the Need

Defining the Need

1. Framing Questions

What are the possibilities of a pavilion?

The Oxford dictionary defines a pavilion as a temporary building used at public events and exhibitions (Oxford, 2021). The word “pavilion” stems from the Latin and French word meaning both “butterfly” and “tent”. This is because the canvas of the tent resembles a butterfly’s spread out wings (*Online Etymology Dictionary*). There are many different interpretations of what constitutes a pavilion - it could be a seating structure, shelter, stage or a meeting place.



Define ‘Pavilion’ in your own words.

I believe a pavilion is a structure that is semi-permanent or temporary, meaning it can be assembled, disassembled, and reassembled. Pavilions are structures that are beneficial to humans as they provide functionality and to service a need. A pavilion can service a need in a variety of ways - this includes shelter, entertainment, sporting, seating, relaxation, education and numerous other capabilities.

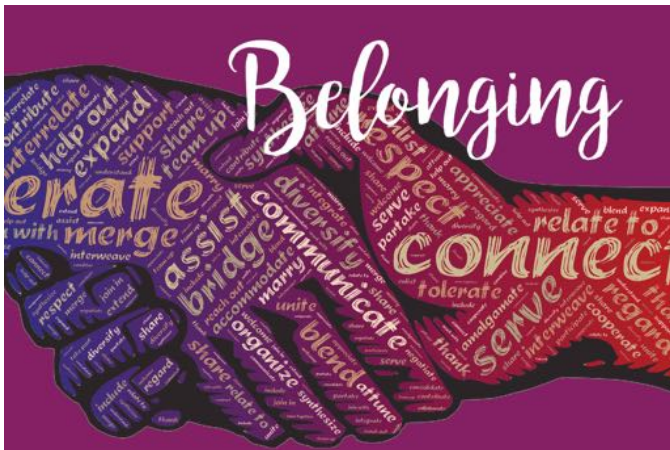
Define ‘Design for Disassembly’ in your own words.

I define ‘Design for Disassembly’ as a design with three main objectives - functionality, mobility, and durability. The first objective encompasses the practicality of the object or structure. The goal is that the structure is fit for purpose and provides the required function. The second objective dictates that the structure or object can be taken apart or folded down with relative ease, so that it may be moved once it has served its purpose for the given timeframe. The third objective highlights the importance of a durable structure that can continue to fully function once reassembled.

What are the important factors to consider when designing a pavilion to be in use for this time frame.

Assuming that “a term” means a term of school and assuming said school is Canberra Grammar School, the pavilion would need to withstand the weather patterns in Canberra at

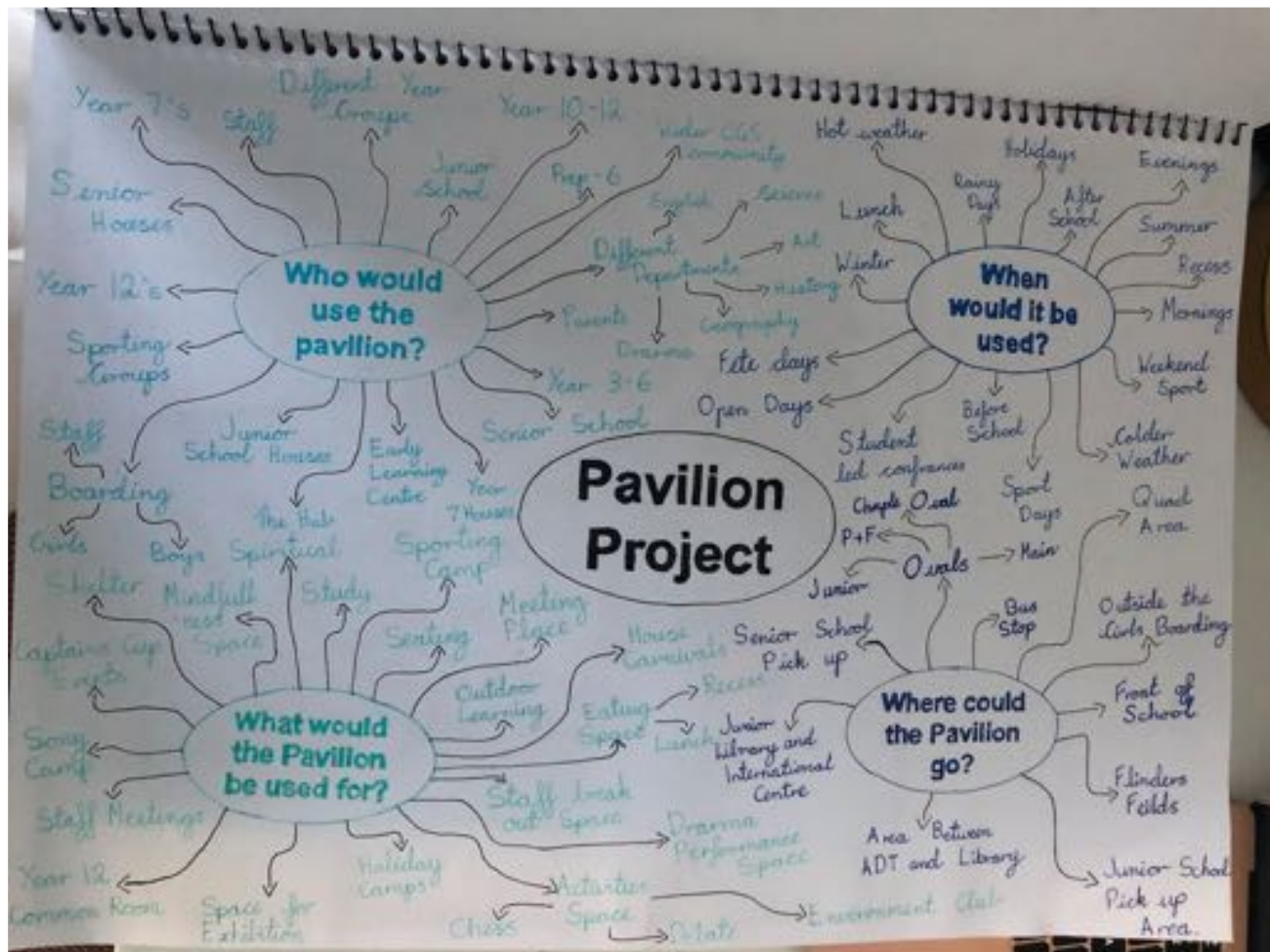
the term belonging as the emotional need to be involved



2. Possibilities of the project

Pavilion Brainstorms

I have created a variety of different Mind Maps to display my ideas, understanding and thoughts of different areas of the project. The first Mind Map consisted of my ideas of belonging and what it means to feel like you belong. The mind map covers many different areas of belonging.



The second mindmap, as seen above, focused broadly on the 4 different questions that we were asked to consider about Pavilions. The 4 Questions to consider and explore in the mind map were: Who would use the Pavilion, When would the Pavilion be used, Where could the Pavilion go and What would the Pavilion be used for? I completed the mind map with many different solutions to the question with a broad scope that did not focus on a specific area, so that my ideas varied. The benefit of the mind map is that it allowed me to creatively express my ideas and expand on ideas.

School Map Analysis



Using a School Map, we went around the school to observe different areas of consideration for the potential placement of our pavilions. These different locations served for different purposes. For example a pavilion for the Junior School would not be placed at the Senior School bus stop. On my map I have highlighted a number of different locations for which a pavilion could be placed.

Although after looking at the different locations I found there to be some factors which led to disadvantages to some locations. Factors such as slopes/gradients of hills would be a challenge and a pavilion would need to consider this factor. An example of this is on the slopes of the P and F oval. Some areas which I investigated were too small for a pavilion to be placed, such as the Junior School Quad area which is located outside of the Junior School Hall. A further factor which needs to be considered is the effect that a pavilion would have on a specific area. An example of this would be the Ovals. If a pavilion was placed on the oval this may interfere with sport, P.E, quality of the ground and interruptions to lunch and recess activities.

Some areas in the school that were suited to a pavilion were places that were open and central to the school. These areas included the Quad, Front car park, outside Sheafe area, near the library and near the Junior School playground.

From this experience of identifying different areas, I found that many different factors need to be considered not only when deciding on a location of the pavilion. I discovered that a

designer must also consider the location and its specific challenges, weaknesses and strengths in order to be a success.

Senior House's Pavilion

1. Outline the Design Need.

The need for this Pavilion is to provide a space which can be used by all the different Senior Houses and can be disassembled. As Houses are such an integral part of belonging at CGS, a Pavilion which can be altered to suit each individual house is a perfect idea. A multipurpose space which could be used for house activity afternoons, carnival events, house meetings, tutor groups and house dinners are some examples of its possible use.

2. Who is the end user or target market who will use this product?

The end user for this specific Pavilion is each of the different houses in the Senior School, more specifically the staff and students in each of the houses. The students are the main target audience. The students in these houses range from Year 7 to Year 12 and range in age from 12 years old to 19 years old. As the Pavilion would be placed on school grounds, the pavilion is aimed at the school community and local market. As CGS is a co-educational school the Pavilion will be for both female and male students and staff. As the age range varies so does the students' interests, however, as this would be used as a house area, the space would be focused on the individual houses. Students would find out about the Pavilion through their Houses using the Pavilion.

A way that the students could find out about the pavilion is through the use of social media or advertising campaigns made by the students as a way of including the students in the pavilion. Parents and other members of the wider CGS community could find out about the pavilion through the advertisement campaign or via social media.

3. What is the Function of this pavilion? Does it have a secondary function? Why do people need it?

This pavilion's primary function is to be a space which can be made individual to each house and be disassembled and assembled after its use. The pavilion can be made to suit each of the 10 different Senior school houses and will be used for a number of different functions including; house activity afternoons, house meetings, carnivals and the carnival trails (swimming, cross country morning runs and athletic standards).

The secondary functions of the pavilion are unlimited. The pavilion could be used for shelter, studying, reading, sport meetings, year group gatherings,

outdoor learning, seating area at recess and lunch, outdoor band rehearsals, staff meetings, ect.

People need this pavilion as a place which promotes belonging in Houses as the house system is integral to the culture of CGS. It would be a place of mentorship, friendship, belonging and a place for students, staff and parents to congregate along with the many other secondary functions the pavilion provides.

4. What is the point of difference with your product compared to others?

The point of difference for this particular pavilion is the interchangeable component, which makes it unique to each individual house. One example of an interchangeable section for the pavilion is the top part of the pavilion, which could be made to accommodate each house. These wall sections would display the house specific colours, names, symbol, motto and or pictures and names. These different aspects would make the Pavilion unparalleled compared to others and promote a feeling of belonging in the different house communities,

5. What features will your product design have that will appeal to the target market?

An aspect of the pavilion which will appeal to the target market is the interchangeable top. The interchangeable top makes the Pavilion capable of being accessed by all the different houses. It also allows for the unique feeling, atmosphere and look of each individual house group. This is not only an aesthetic appeal it is also functional as it incorporates each house into using the space.

Additionally, the pavilion also features many secondary functions that will benefit the target market making it more appealing.

6. Where might this Pavilion go?

Location 1.

The first location option for this pavilion is close to the Pick Up and Set down area as it is a larger space and is not confined to the restrictions of the trees or path. The only restrictions for the pavilion would be the light posts. This area is easily accessible by parents, visitors, students and staff first entering the senior school campus grounds. This makes it ideal as the pavilion could be used as the first.



Location 2.

A further location ideal for this Pavilion would be the main oval and P+F Oval as they are used for House carnivals such as Athletic Standards and Cross Country Runs as well as the Athletics Carnival. These two ovals are both open with lots of space which make them desired venues for the Pavilion.



Junior School Houses Pavilion

1. Outline the Design Need.

The need for this Pavilion is to provide a space for the Junior School to be able to use for House activities and other House events. Houses play such an important role in the CGS community and a space which embodies this would greatly add to the sense of belonging at CGS within each House. Another design need is for the pavilion to be able to be disassembled after a period of time, such as after a term and then be able to be reassembled when needed.

2. Who is the end user or target market who will use this product?

The target market or end user for this pavilion is the Canberra Grammar Junior School students, staff, parents and visitors. The main users would be the students themselves nevertheless the staff and parents will also utilize the space. The students range from ELC students who are 3 years old ranging up to students who are 12-13 years old. As the pavilion is for Canberra Grammar School most students live in the Canberra area and the pavilion is for a local market. As Canberra Grammar School is a co-educational school the Pavilion is for both boys and girls. The interests of the students vary as the age and gender differ across the students. However, as they are all children some interests may be similar. The pavilion is focused on their houses making it a common interest of the children.

A creative way students could find out about the pavilion is with a creative poster and naming competition held in the Junior School as a way of engaging the students

in the pavilion. Staff, Teachers and the wider CGS community could find out about the pavilion through the competition or through the opening of the pavilion at a school event such as a carnival or student lead conference. This would be convenient as the parents would already be in attendance and would not be an inconvenience.

3. What is the Function of this pavilion? Does it have a secondary function? Why do people need it?

The primary function of the pavilion is a space which the 4 different Junior School Houses can use for house meetings, buddies, activities in houses and could be used for carnival days.

The secondary use for this pavilion is that it can be used as a multipurpose space. This secondary function includes the pavilion being used as a sheltered area for students at recess and lunch, a workplace area where outdoor learning could occur and a place for students, year group meetings, parents or staff to sit when watching sport or students on the playground.

People need this pavilion as it will serve as a communal space for students to have a place to go for their houses which will promote a sense of belonging, as your house is your home away from home. The Pavilion also has many other functions which will benefit the Junior School such as providing shade and shelter for students, staff and parents.

4. What is the point of difference with your product compared to others?

The Point of Difference for this pavilion is that it has been designed for Canberra Grammar Houses and with the intent for it to be able to be assembled and disassembled. The benefit of this is that the pavilion can then be placed in a number of different locations when needed. As the pavilion is designed for the Junior School Houses, the design for the top will feature unique patterns, the House names, House mottos and House specific animals making it unique to CGS's Junior School.

5. What features will your product design have that will appeal to the target market?

Features that will appeal to the target market is the inclusion of a play area under shade to be used by all different age groups at recess, lunch and before and after school. The colourful top which includes each of the 4 Junior School Houses is also inclusive and would be aesthetically pleasing. The space could also include outdoor toys and could be used as an activities space. Collapsible seating could also be incorporated in the space for students, parents and guardians and teachers to use to sit on. The chairs could feature unique engravings on the tops such as the House mascots or other logos or words. This would promote the sense of belonging and inclusion as well as improved wellbeing and enjoyment. All of these factors would appeal to the target market.

6. Where might this Pavilion go?

Location 1.

This first location is close to the Junior library and International Centre. It would be a prime location for the Pavilion as it is an open space and does not have a main use currently. It could be placed on the dirt part and could open out to the turf grass as a larger seating place. The bright colours in the Pavilion top would make the space bright and lively. It is also located near classrooms meaning students could use the area for work and outdoor activities.



Location 2.

The second location where the Junior school Pavilion could go is in this open play space for the students during lunch and recess. The space is level making it a perfect spot to place the pavilion as well as the added bonus of the location being central to student classrooms and inbetween the Library, Oval and play equipment.



Location 3.

The Pavilion would be located in the area between the Junior school and P and F Oval, near the Junior School basketball courts and Junior School Oval. This would be perfect as the pavilion would provide much needed shade and shelter to this area as there is no protection in this area of the Playground.



CGS Heritage Pavilion

1. Outline the Design Need.

The design needs to create a pavilion which can be assembled and disassembled on the school campus, which embodies CGS's pasts, incorporates its present and exhibits its future. This pavilion would focus on being a headquarters area for the school to be used as a central location for school tours, events and for visitors. CGS has a need for this pavilion as they do not currently have a space which epitomizes this purpose. The purpose being a place showing the past, present and future of the school and or a place which demonstrates the story of CGS. This would add value to visitors, parents and the community's experience at CGS. It would also positively impact the staff and students at CGS as a place which displays history and demonstrates CGS's future.

2. Who is the end user or target market who will use this product?

The target market for this pavilion is aimed at anyone involved in the CGS community, comprising of the past, present and future of CGS. As the target market is so broad there is no specific age, meaning the pavilion needs to accommodate for a wide range of people. The age ranges from babies and or young children looking at CGS to much older people such as grandparents and CGS alumni.

As CGS is an international school people live across the world. CGS has international students and diplomatic families from around the globe. However, as the school is in Canberra most people would live in the area. This pavilion is also set for a local market.

The Pavilion is a non gender specific space and is inclusive of all. The interests of the target market vary due to the age difference, however, what they have in common is CGS. Therefore the aim of this Pavilion is to be focused on CGS and its heritage and future.

3. What is the Function of this pavilion? Does it have a secondary function? Why do people need it?

The primary function of the Heritage Pavilion is to display Canberra Grammar Schools past achievements and history, present goals and the schools future aspirations. The pavilion will provide this through a number of engraved wall markings which explain Canberra Grammar. The pavilion will be a focal point of the school and could be used for many different purposes. However, it's main purpose would be for visitors to the school, open days and the school Fête.

The secondary purposes of the pavilion would be a sheltered seating area for students and staff as well as a source of knowledge about the school for students to utilize. The pavilion would also act as a meeting point for students, staff and visitors.

Canberra Grammar School needs this pavilion because it encompasses every detail of the school and would add to the understanding of the school.

4. What is the point of difference with your product compared to others?

The Point of Difference of this pavilion is that the pavilion has been designed with the main intention of being a place to display CGS's history as well as its aspirations and objectives of the School. The pavilion may also serve a number of other purposes for students, staff, parents and visitors.

5. What features will your product design have that will appeal to the target market?

The greatest feature that will appeal to the target market is that the Pavilion was designed for the sole purpose of CGS. All considerations and designs have been made to accommodate CGS's individual needs. An example of this is the writing on the structure's walls which will display the past, present and future of the school. Another feature, unique to Canberra Grammar is a place to display each year's motto from Mr Smart. Features like this are individual to CGS and add value and appeal to the target audience.

6. Where might this Pavilion go?

Location 1.

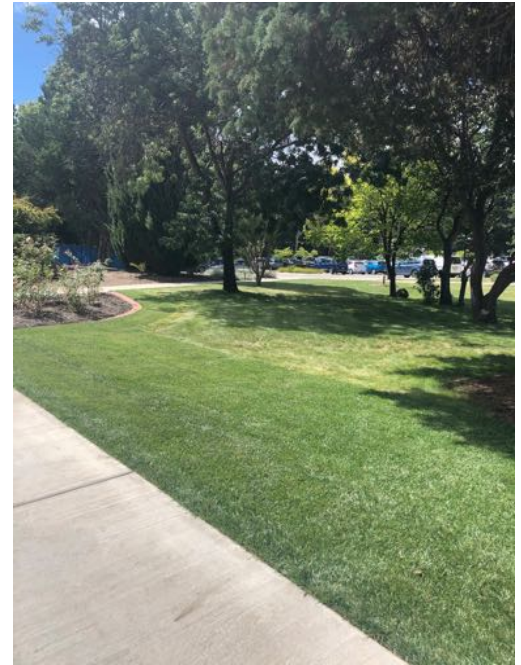
The second location option for this pavilion is closer to the Pick Up and Set down area as it is a larger space and is not confined to the restrictions of the trees or path like location one. The only



restrictions for the pavilion would be the light posts. This area, similar to the first location, is where parents, visitors, students and staff first enter the senior school campus grounds. This makes it ideal as the pavilion could be used as the first meeting point when entering the Senior School Campus.

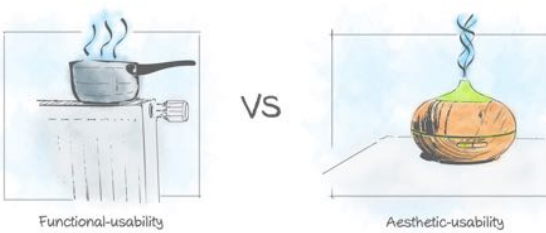
Location 2.

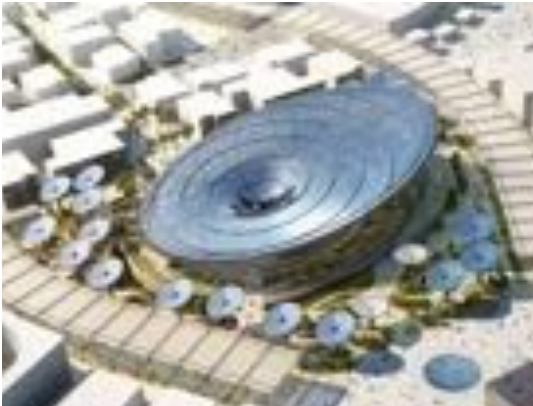
This first location is out the front of the Residence near the pick up area. It is near a path which leads to the Residence, Snow Centre and Quad. This is a central location for School Open days and is near the front of school, where parents and students will first enter the Canberra Grammar School, Senior School.



3. Research Plan

Area of Investigation	What do you want to find out?	Value out of 5	How will I find out? (Primary source, Secondary Source, Experimentations)	What did I find out?
Aesthetic	How do you make a product aesthetically pleasing to your target market?	5	Design principle: Aesthetics (2017). Available at: https://uxdesign.cc/design-principle-aesthetics-af926f8f86fe (Accessed: 10 March 2021).	<p>During my research I found that to make a product aesthetically pleasing you must first identify a clear target audience. If this is not established a designer does not have a clear audience to target and understand their particular interests and appeals.</p> <p>You must also consider, understand and implement current trends, such as technology, fashion, design, sport, ect. These evolving trends influence the target market and will impact the aesthetic appeal viewed by the target audience.</p> <p>The final point which was made in my research was that visual appeal plays an important role in aesthetic appeal. Visual appeal plays a key role in if a product is aesthetically pleasing. Key elements of visual aesthetics include: Colour, Pattern, Shape, Scale, Line, Texture, Visual weight, Balance, Proximity and Movement.</p>

				 <p>The diagram shows two scenarios side-by-side, separated by a 'VS' symbol. On the left, a pot sits on a stove with steam rising from it, labeled 'Functional-usability'. On the right, a decorative vase with a blue ribbon tied around its neck sits on a surface, labeled 'Aesthetic-usability'.</p>
Function	What Functions do Pavilions serve?	4	<p>What is a Pavilion? - Build Your Own Pavilion (2021). Available at: https://buildyourownpavilion.serpentinegalleries.org/what-is-a-pavilion/ (Accessed: 11 March 2021).</p>	<p>Through my research I learnt that a Pavilion is an inviting space for people to enter. A Pavilion is a temporary or permanent structure which provides many purposes including: shelter, meeting point, seating, theatre, cafe, lecture space, events, exhibition, sport, play, relaxation, work, ect.</p>
Materials	What types of materials of weather-proof and durable?	3	<p>Pyzyk, K. (2018) 5 of the world's most eco-friendly building materials, Smart Cities Dive. Available at: https://www.smartcitiesdive.com/news/most-eco-friendly-building-materials-world-bamboo-cork-sheep-wool-reclaimed-metal-wood/526982/ (Accessed: 14 March 2021).</p>	<p>Environmental concerns have become a more important issue in regards to materials when designing. Through my research I have found some of the most eco-friendly building materials.</p> <p>The first material is Bamboo. Bamboo grows at an incredibly fast rate and has a high strength to weight ratio. It is also durable and lightweight.</p> <p>Like Bamboo, Cork is a fast growing resource which when left uncoated is naturally fire resistant and when burned does not release toxic gases. Due to cork being semi impermeable it does not absorb water or rot. Its flexibility and resistance means that cork reverts to its original shape after being put under pressure.</p> <p>The use of reclaimed and repurposed wood and metal are another eco friendly material. As the metal and wood are being repurposed for construction this is an eco friendly alternative to using new metal and wood.</p>
Need	Why are pavilions built?	4	<p>What is a Pavilion? - Build Your Own Pavilion (2021).</p>	<p>Pavilions are built for a variety of different needs. Some of these needs</p>

			Available at: https://buildyourownpavilion.serpentinegalleries.org/what-is-a-pavilion/ (Accessed: 26 February 2021).	can include: shelter, meeting place, theatre, seating, events, exhibitions, to play, relaxation space, working, for lectures and many other possibilities. A single pavilion, however, can also serve a number of different needs.
Environmental	What are examples of environmentally friendly/sustainable pavilions?	5	Terra - The Sustainability Pavilion Expo 2020 Dubai (2021). Available at: https://www.expo2020dubai.com/en/discover/pavilions/sustainability (Accessed: 22 February 2021).	<p>Terra - The sustainability Pavilion is designed by UK-based Architectural firm, Grimshaw Architects. The Pavilion is located in Dubai, United Arab Emirates. They have designed this Pavilion intended to meet the highest available accreditation for sustainable architecture, through the building having zero net energy and zero net water. This was challenging due to the environment where the Pavilion is located, in the desert biome.</p> <p>On the top of the Pavilion, there are over a thousand solar panels to form a giant solar canopy as well as 18 solar trees which rotate to follow the path of the sun. These trees are located in the garden of the Pavilion.</p> <p>Further technology has been used in order to collect water in the air as well as a grey water system which aims to reduce water usage by 75%.</p> 
Safety	How are pavilions made to be safe? How to safely disassemble a pavilion?	5	Brendan Bilston, Discussion on the 8th of March.	The biggest safety consideration with Pavilions is ensuring that structure is securely fixed to the ground. This is important with changing weather conditions. Another safety consideration is durability of the materials used to make the Pavilion. The materials must be able to withstand rain and wind.

4. Design Parameters

Constraints

There are a few constraints to the project, this includes being designed for disassembly, a scale of 1:50, the pavilion must be designed for Canberra Grammar School, a component of the model is to be laser cut and a pavilion which promotes and incorporates belonging.

Criteria For Successes

Design Factor	Why is it important?	Evaluative Question and How will I evaluate it?
Need	Needs of a project are important as understanding what needs to be achieved in a project is crucial to the overall success of achieving that need. Understanding the need in a Design Brief is an important part of coming up with a solution for the need.	<p>Does the Pavilion meet the Design Brief which includes the idea of belonging?</p> <p>To evaluate this question I could conduct feedback from peers and staff to see if they believe the Pavilion meets the needs in the Design Brief.</p>
Aesthetic	Aesthetics are a major part of any Design as people judge the look of something very quickly. Even if a product was the best performing unless it is aesthetically pleasing the product will not be used or purchased.	<p>Is the Pavilion that I have designed and constructed, aesthetically pleasing to the target audience?</p> <p>This can be evaluated by conducting a survey of the target audience and them giving feedback on the Pavilion.</p>
Environment	Over the past years, Environmental and sustainable practises of design have become more important. It is crucial to include these considerations in Design and the final product as consumers are more aware of the damaging effects that impact the environment.	<p>When Designing and Producing my Pavilion have I considered environmentally sustainable materials?</p> <p>To evaluate this I can look at my portfolio, evaluations and Justified Preferred Option in order to work out if environmentally friendly materials were considered as well as used in the end product.</p>
Safety	Safety is one of, if not the most important factor to be considered in any design. If a	Will the Pavilion be a safe environment and what practises

	product is not safe it will not be produced, purchased or used.	are put in place for the safety of students? Conduct a variety of tests on the pavilion to see if it can withstand different conditions.
Quality	Quality is an important part of Design as the quality of materials is related to the amount of time a product can be used for and work efficiently.	Will the Pavilion be able to withstand weather conditions and constant use by people? This can be evaluated by conduction research into durable/weatherproof materials. I will also evaluate whether the pavilion is ideal to be used as a communal space.
Ergonomics	The Design factor of ergonomics is important to design as it assesses how humans interact with a product. If the product is not designed with the intention of being ergonomic, the product will not be used to its full potential.	How well does the Pavilion interact with people? Conduct an evaluation on the interaction the Pavilion has with people and how it is built for Disassembly.

5. Design Brief

In this project, I have been tasked with designing and producing a Portfolio and Scale model of a Pavilion for Canberra Grammar School. The Pavilion must be designed for disassembly and will need to incorporate and explore the concept of belonging. The pavilion is aimed at Canberra Grammar Students in the Senior School. The target audience is wide as it must accommodate students in year 7-12 and ages, teachers and the wider community. The age difference between the students and a variety of users will need to be considered for their varying needs as well as how to make all students feel that they belong. To achieve this project I will begin by conducting research into Pavilions, what it means by design for disassembly and belonging. After doing so I will have a deeper understanding of the topic and will then begin developing ideas, including sketches, brainstorm, prototypes and use of computer programs including Adobe Illustrator or Photoshop. After selecting a final idea I will then produce a scale model and final evaluations. The scale model must be to a scale of 1:30 and the pavilion must be disassemblable. I have been given 13 weeks to complete the entirety of the project.


The three main ideas which are seen in my moodboard are Canberra Grammar School, Students and the Senior Houses. The moodboard features some potential locations for the pavilion around the school as well as the CGS logo. I used these images as they are significant to where the pavilion may go as well as the fact that it is benign designed with the target market of CGS students, staff and wider community. The biggest part of the moodboard is the 10 different Senior Houses. These houses are Garnsey, Sheafe, Edwards, Middleton, Jones, Eddison, Hay, Garran, Blaxland and Burgmann. A variety of different photos express the different houses. These forms include: the house animal or logo, plarks of the houses, house colours and the house names.

Target Market



My target market for this Pavilion are Canberra Grammar Senior Students and other CGS members such as teachers, parents and wider community. The pictures above show some senior students at CGS. Senior School students ages range from year 7 to year 12 students. However, the pavilion must also appeal to a range of adults including staff and the community, and their needs. The Pavilion will be placed in an open space which will need to be functional and aesthetically pleasing. This will be achieved through the use of bright colours and a multipurpose space which can be used for shelter, shade, a place for people to eat at, outdoor education space and house activities (i.e House meetings). The Pavilion must be able to accommodate these needs and requirements as well as be designed for disassembly and create belonging. As the pavilion is for student use mainly it must be engaging, bright and inclusive.

7. Research into Pavillion Designs (PMI Chart)

Photo	Plus	Minus	Interesting
	<p>A positive of the pavilion is the use of natural materials, i.e the wood to make the roof, base and sides.</p> <p>I also think the individual pieces of wood to make up the roof and sides of the pavilion are aesthetically pleasing.</p>	<p>From the image of the Pavilion it can be seen that there are pains of glass in the pavilion. I feel that this is not very practical and could be very problematic when disassembling and assembling the pavilion.</p>	<p>I find the shape of the roof very interesting as it curves around to make two of the sides. I find the construction of the roof/sides interesting as they slot into a solid rounded piece of wood.</p>



Positives of this pavilion included the large scale pavilion which can fit many people. The advantage of seating under the pavilion is also a positive. The carving in the wood on the inside which lights appear through, is another aesthetically pleasing element of the pavilion design.

Whilst a pavilion being open is good, it also comes with some disadvantages. For example, weather considerations like wind and rain will mean people under the pavilion will still be affected by the weather.

I find the pattern an interesting contrast to the shape of the pavilion with many hexagon shapes displayed on the top. It would be interesting to find out why and how this was done and to have an understanding of the designers inspiration and motive.



Positives of the pavilion include providing a large space which provides shelter and is still open to the surrounding environment. The wood is a natural material which is fitting to the environment the pavilion is situated in.

The negative of this pavilion is the lack of walls. Whilst it is nice that it is so open, when it is windy and or rainy it may become less useful to the target market.

It is interesting that the design is so simplistic using posts to hold the pitched roof up, however, it is also complex in the small details of the structure, such as the archers and posts.



Something that I found positive in this pavilion is the integration of lighting and seating into the pavilion structure. The lights add a secondary function to the pavilion as a place which can be used at night or at darker times as the lights illuminate the area of the pavilion.

Whilst lighting being incorporated into the pavilion is a positive many considerations would need to be put in place. This includes assembling and disassembling of electricals, safety, connecting power to the pavilion itself and the lights being safe in regards to weather conditions such as rain.

Something that I found interesting about the Pavilion is the appealing shape that the pavilion makes. Along with the shape, the fascinating pattern across sides and top and the cut out circle make for an interesting structure.



A huge positive factor of this pavilion is that the structure is made of plastic water bottles found in New York City. This pavilion is environmentally conscious and makes a point about the amount of plastic waste produced from water bottles alone. It is environmentally friendly in the use of recycling and giving the containers a second use.

I believe that this pavilion has no negative features. Everything was well thought out and considered. The structure was made from recycled material, served a functional purpose for users and also challenged and made the public question the amount of plastic water bottles that are thrown away. For these reasons it is understandable that the pavilion won the 2013 City of Dreams Pavilion contest in New York City.

Interestingly, the plastic water containers have varying colours and masses of water in the bottles. The Architect of this project used the varying masses of water in the container to demonstrate the waste of water which is left on plastic water bottles.

Another interesting fact about the pavilion is that it is made to resemble a cloud shape, a visual metaphor for the cycles of consumption.



Positively, about this pavilion is the aesthetic appeal through the use of material for the top as well as the sides. The material is brightly coloured which appeals to their intended target market.

There are two main negatives of this pavilion, firstly the size and secondly the durability. The size of the pavilion is significantly smaller as it is intended for around 3-4 children to play in and is not suited to adult use. The durability of the material of the pavilion is another area of concern as the material looks to be cotton and which is not weather proof.

I found the simplistic idea of the structure to be interesting as it is approximately 6-7 poles which support the top part of the pavilion. Although the structure is a simpler design it is still an aesthetically pleasing and functional pavilion.



Positives of this pavilion is that the materials are natural and suit the environment where the pavilion has been placed. A further positive of the design is that the structure is accommodating of both adults as well as students.

A negative of this pavilion is the 'fence' like framework around 5 of the 6 sides of the pavilion. I feel that this limits the space and would be more open and inclusive if the 'fence' was not included in the structure.

I think it is interesting that only wood materials were used for the Pavilion. I feel that the Pavilion could have been painted to incorporate more colour. This would make the Pavilion more aesthetically pleasing and engaging for people to use.

Part 2. Developing Ideas

8. Designer/Architect Profile

Es Devlin

Esmerelda or 'Es' Devlin 49 years old (2020) and currently lives in The United Kingdom and has 2 children. She began by studying English Literature at Bristol University which was then followed by a Foundational course in Fine Art where she attended Central St. Martins, a tertiary Art school. Devlin is well known for being an artist and stage designer, this included her range of media, mapping light and projected film sculptural forms. She also went to Motley Theatre Design Course as well as Bristol University.



Defining moments in Devlin's career include the announcement that Devlin would design the UK Pavilion at the 2020 World Expo in Dubai, announced in September of 2018. This was a very important event as Devlin was the first woman to be commissioned by the UK since the beginning of the exposition in 1851. Devlin is also well known for her large-scale touring stage sculptures for many world renowned celebrities, including: Beyonce, Adele, Kanye West, Lorde, U2, the Royal Opera House in London and The Weeknd. She also designed the London Olympic Closing Ceremony in 2012 as well as the 2016 Rio Olympic Games, Opening Ceremony. Devlin's work has received three Olivier Awards. In late 2018, Devlin was elected as the Royal Designer for Industry for Theatre Design.



The two images seen above are both of Es Devlin's works. On the left is the set for Adele's 2015, Live in New York performance which took place on the 15 of November. The second image below is the London Olympics Closing Ceremony stage in 2012 created by Devlin.

In the early stages of Devlin's career she began in narrative theatre and experimental opera. After her career in design sets and experimental theatres she then moved into a role working for Lond's Bush Theatre at the National Theatre in 1998, when she was 27 years old. During this time Trevor Nunn, a British Theatre Director asked her to design the set for the revival of Harlod Pinte's, Betrayal.

Devlin is well known for her light and film productions using lights and film for opera, dance, film, theatre, runway shows and concerts. In my research, however, I did not find a specific designer or group which has been inspired by Devlin. Although I do believe from my research that she has had many forward thinking and creative designs. She has changed the way film, lighting and production designs have been produced.

9. Research

Vulcan Pavilion

The Vulcan was designed by lead architects Yu Lei and Xu Feng in 2015 and was presented as a part of the 2015 Beijing Design Week. Vulcan was displaced at Parkview Green, one of Beijing's prominent retail destinations. The Pavilion is rightfully named after the latin word for volcano and the God of Fire in Roman Mythology. The name symbolises fear and respect for the unpredictable forces of nature, while also symbolising the fragility and courage of human civilisation. The project has been awarded Beijing's Laboratory for Creative Design as well as the Guinness World Record for the world's largest





3D printed architectural Pavilion. Vulcan is made from 1023 individual 3D printed parts and is 8.08 meters long and 2.88 meters tall. Lei and Feng designed the Pavilion in the shape of a mushroom cloud which forms during a volcanic eruption.

As the Pavilion is entirely 3D printed the pavilion is very environmentally sustainable. 3D Printing has become a more sustainable form of manufacturing as it reduces wastes. Additionally, the manufacturing style also reuses plastic wastes by converting the plastic into the printing

filaments which is then used to create new products. Vulcan is also very aesthetically pleasing in form that it takes as well as the individual pieces that make up the structure. Each layer of the 3D printing can be seen when observed up close, demonstrating the intricacy of the pavilion.

Upcycling Pavilion

Created by architects BNKR, the Upcycling Pavilion was made in Mexico for an Exhibition. Through repurposing old Coca Cola crates the Pavilion is very environmentally sustainable. This pavilion is also disassemblable as all the crates sit on top of each other in order to create the walls. No glue, screws, bolts or any other form of attachments were used to assemble the pavilion. This meant that after the exhibition was complete the 5,000 crates were sent back to Coca Cola to be used once again for their main primary function of transporting cans of Coke. Although the use of no attachments meant the crates could be reused this does pose a safety concern. As there was nothing connecting the structure together, if someone were to knock, hit or kick the structure it would easily collapse on top of viewers.

The main function of the Upcycling pavilion was to create and display an upcycling exhibition by turning the cafeteria space into a display. The Pavilion was created by laying the crates on the floor and building upwards to create different 'wall' structures. Colour plays a key role in the aesthetic appeal of the pavilion. The classic red with Coca Cola, white, writing make the pavilion look classic to Coke. The red carpet as well as the silver chairs tie in with the theme of



Coca-Cola. The aesthetic appeal is further greatered by the subtle small green plants.

Spanish Pavilion



The Spanish Pavilion at Floriade 2012 was designed by Pulgon Diseño for the Acción Cultural Española. The Pavilion was located in Venlo in The Netherlands and was designed with the intention of highlighting the importance of Natural richness, organic product and diversity. One large component of this pavilion was the materials and resources used to construct the pavilion. Some of the materials used were planks and wood form building works, demolition beams, sleepers and wood from fruit boxes. Further materials used to build the pavilion were trunks from burnt forests and agricultural products such as nut shells. These materials were used as supporting and as coating and paving materials.

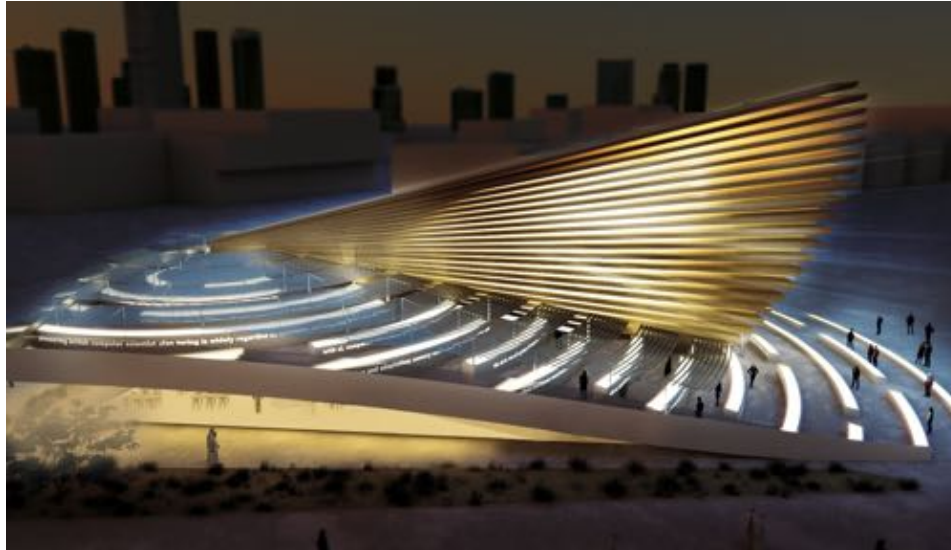
The Pavilions main function was to showcase Spain's most progressive horticultural accomplishments. This exhibition promoted natural diversity and richness and incorporated the spirit of cradle to cradle design into each new project. Aesthetically the pavilion uses the incorporation of natural materials in order to blend into the environment. The temporary pavilions shape and use of gentle rounded pitch accommodate the idea of a Cradle to Cradle Design. Line is further used to demonstrate the different parts of the structure. The bright colour along with neutral colours of the wood create a cozy and light feeling place. Safety concerns of Pavilion are minimal with all areas safe for children as well as adults. The stairs at the front of the pavilion have railing to accommodate safety requirements. Similar to this, other safety concerns are met in the pavilion in order for it to be a safe building.



Poem Pavilion

Es Devlin was chosen to create the UK Pavilion for the 2020 Dubai Expo. Devlin's idea was to design a performance place and use artificial intelligence to write poems. The cone-shaped pavilion was designed with numerous rows of protruding slats that extend outwards from one central point to form a circular facade. It was Devlin's intention to have the AI technology to be able to project the poems in numerous languages in order to have a variety of people from all

backgrounds and cultures. Some of these languages include English, French, Chinese and Arabic. The pavilion was built in order to unify all people from around the world and have a sense of togetherness. When discussing the idea of the Poem Pavilion Es Devlin explains, "Poetry brings order to language, and machine-learning is a way to weave our voices together without prejudice while following the rhythms of centuries of poetic thought in a range of diverse cultures".



The Pavilion was designed in order to serve the function of displaying a variety of Poems in many different languages, using AI technology. The Pavilion's cone-like shape and use of line to meet at the point end of the cone make for an appealing design. The aesthetics of the pavilion are further through the use of LED lighting and wood carvings which light the Pavilion up creating interesting patterns on the inside. Other lighting features on the outside of the pavilion play a key role in the appeal. Lights illuminating the steps as well as seating and the inside of the pavilion make it an

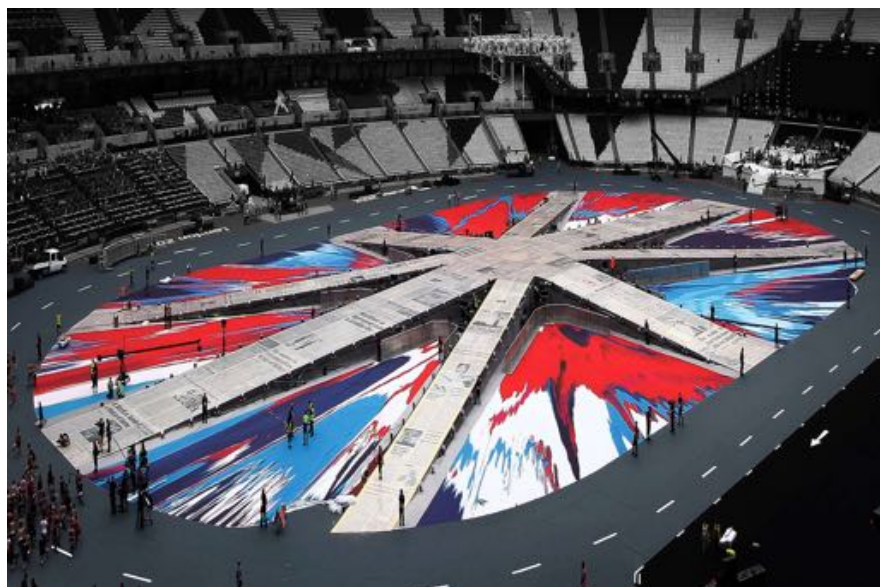
engaging space. From a safety point of view, a concern I have is with the path way up to the main viewing area seen in the image to the left. It appears to be clear, however, due to the angle of the slope people may slip or trip when approaching or descending the viewing space. The materials for the project were not specified nor were there any mention of environmental steps being taken as the Pavilion has not been built.

London 2012 Closing Ceremony



Another Design by Es Devlin was the staging at the London Olympics Closing Ceremony in 2012. Es Devlin was in charge of the design of the stage where the closing ceremony would be held. Devlin said that she was delighted to be part of the "greatest show on earth". The stage was made to display the Union Flag as well as monuments in London. This included London landmarks such as the London Eye, Big Ben, Battersea Power Station and the Gherkin. On both the stage and vehicles appeared newspaper cutouts sought to show a "day in the life of London", with words from British literary figures such as William Shakespeare, J. R. R. Tolkien and Poet Laureate Carol Ann Duffy. The staging was one of Devlin's biggest successes as well as most well known staging accomplishments. Devlin said after the ceremony that the creators had happily indulged in the chance to "visually draw on everything" that British imagination can offer.

The Staging was made to be able to host the Closing Ceremony and then be disassembled afterwards as the stage was temporary for the ceremony. Construction of the stage was made to be very safe as there were a number of actors, singers, athletes and other significant people on the staging and props.



Nawa Pavilion



The Nawa Pavilion was designed by Polish designer Oskar Zieta for a public space in Western Poland in Wrocław which is located on the Oder River. Once the pavilion was put together, the arches create an easily accessible space. The Pavilion is used for more aesthetic purposes as a sculpture, however, the structure is also used as a walkway and more recently has been known as a landmark of Wrocław. The bionic form and highly polished surface, which reflects the surroundings, create the effect of a naturally growing sculpture. Nawa's look changes constantly throughout the day and which gives off light at any time giving it aesthetic appeal.

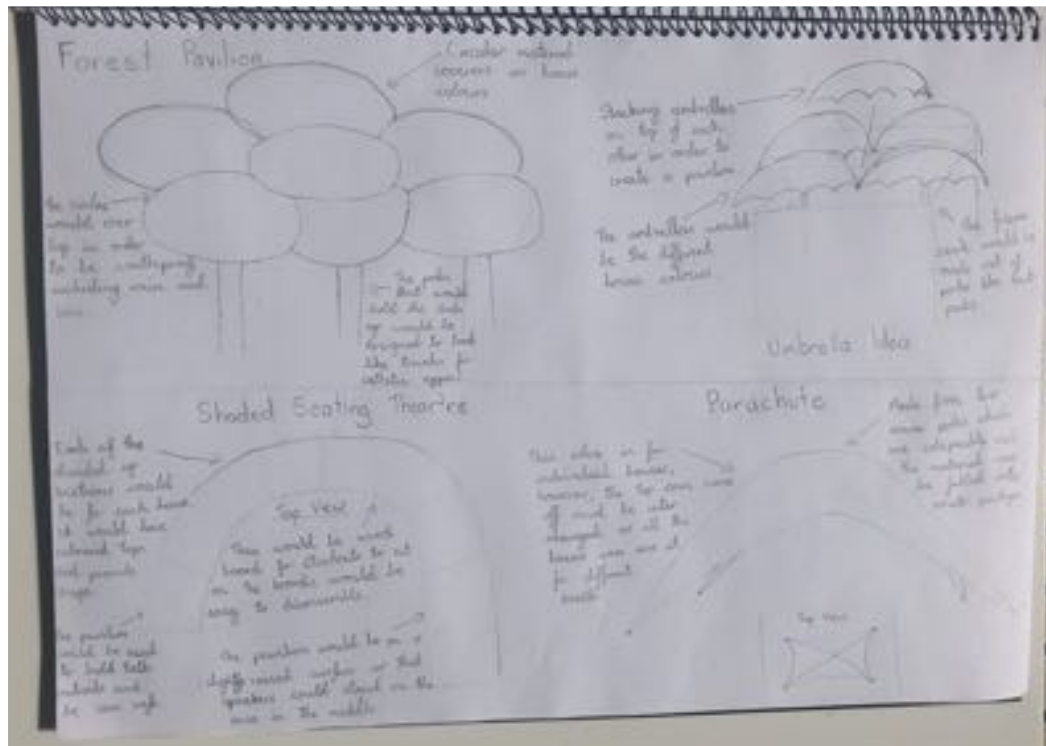


The Pavilion is composed of 35 durable construction made up of 35 FiDU steel arches which combined to make the framework out of the reflective metal. The structure is made by using an inflated steel technique and stands 7.5 meter high. The Pavilion is a very safe structure as the steel arches are securely placed into the ground and will not be altered by weather.



10. Generate Ideas

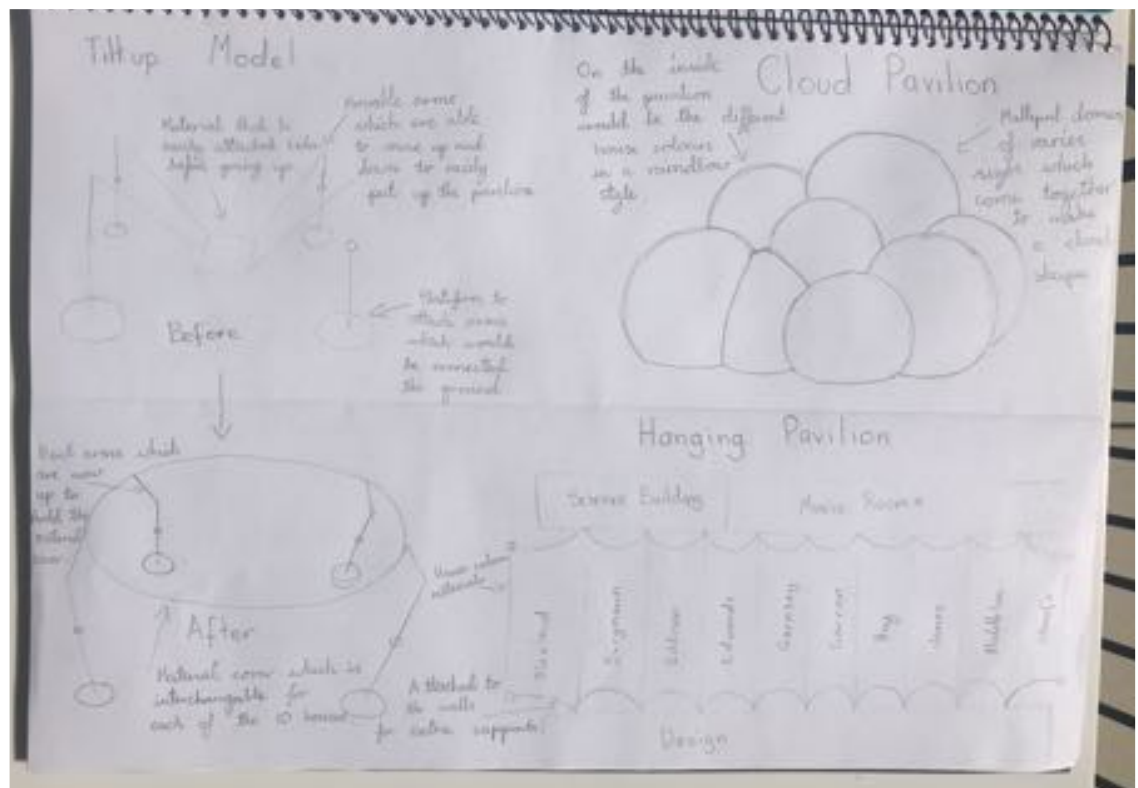
Original thumbnails



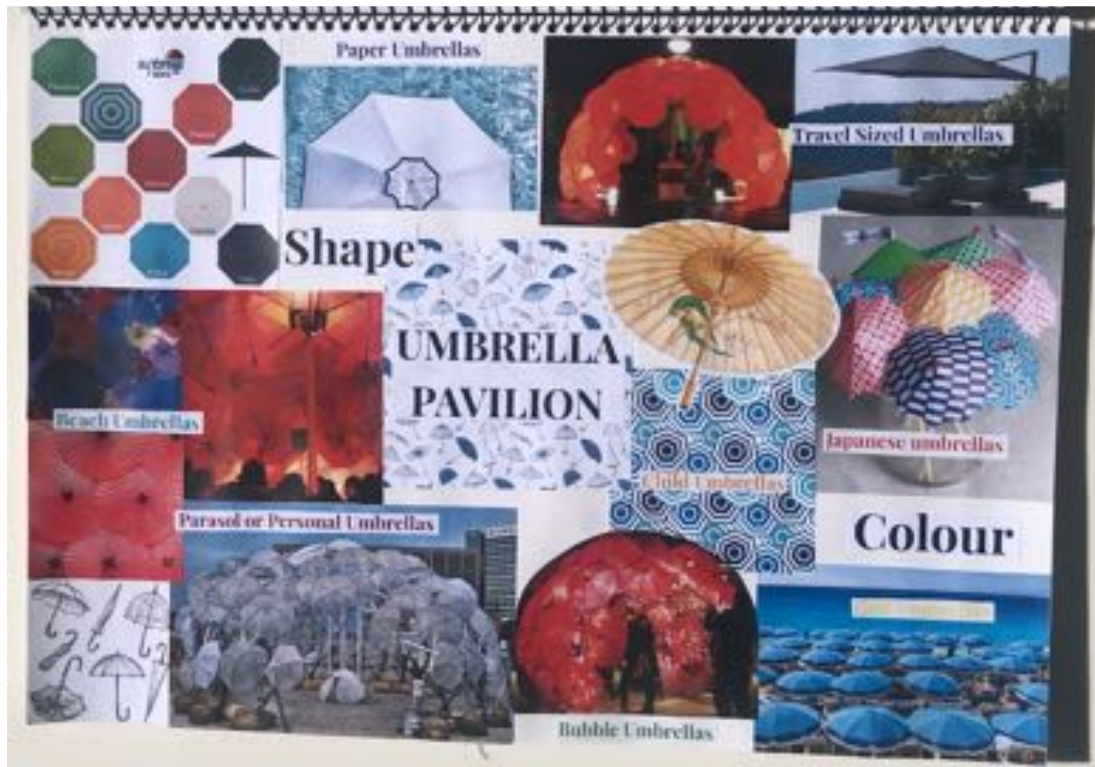
These sketches show my original ideas for the pavilion project. This included using a variety of shape ideas as well as places for the pavilion. However, the main idea of being a place for all Houses to use remained the same.

The 4 Pavilions seen on the left show a variety of shapes to make the pavilion. This includes circles/disc shapes to create a forest idea. Umbrellas, a Horse shoe shape for seating and a parachute idea to provide shade.

To the right can be seen the second page of Thumbnail sketches along with detailed annotations. The page shows 3 more design ideas each different. This includes a cloud pavilion, a pavilion which can be tilted up to open a shade and the final design is a hanging pavilion for the walkway between the Design Centre and Science/Music centre.



Umbrella Pavilion Concept Board



To begin the process of generating design ideas for a pavilion I began by creating Mind map umbrellas as that was one of the original sketches that I wanted to further explore. Some elements that are seen on the page were pictures of structures made from umbrellas as well as different umbrella materials and shapes. Phrases, words and ideas are also evident on the page as they were my first thoughts about making an umbrella pavilion.

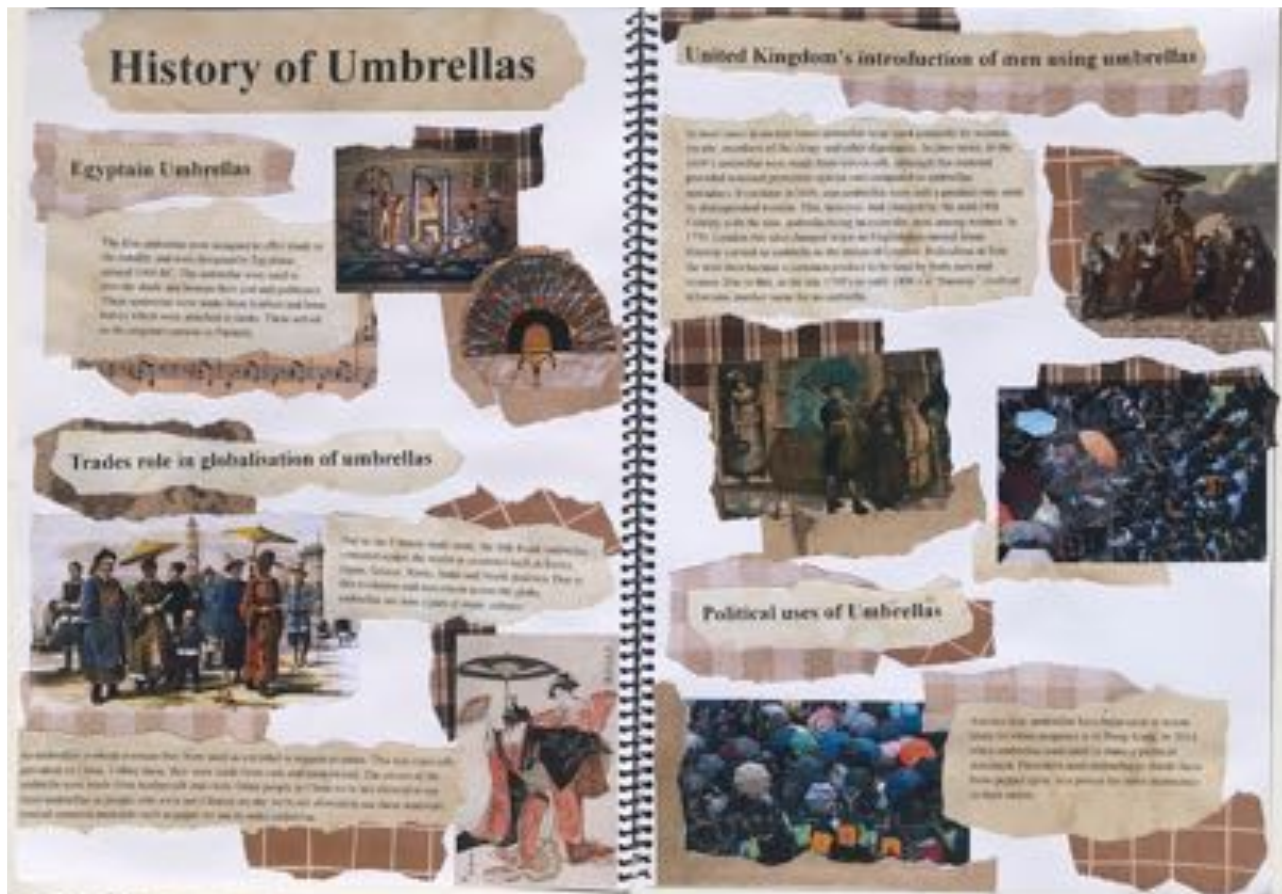
Dome or Cloud Pavilion Concept Board

My second idea that I wanted to explore was the idea of a cloud shape made up of domes. To begin generating my ideas for this I looked into domes and different dome shapes as well as The Dream Pavilion which I researched early in my portfolio which was made up of recycled plastic water bottles. I also used words to show my original thoughts and ideas. There are also images of cloud objects and ideas of how spheres work to fit together in order to create the 3 Dimensional shape.

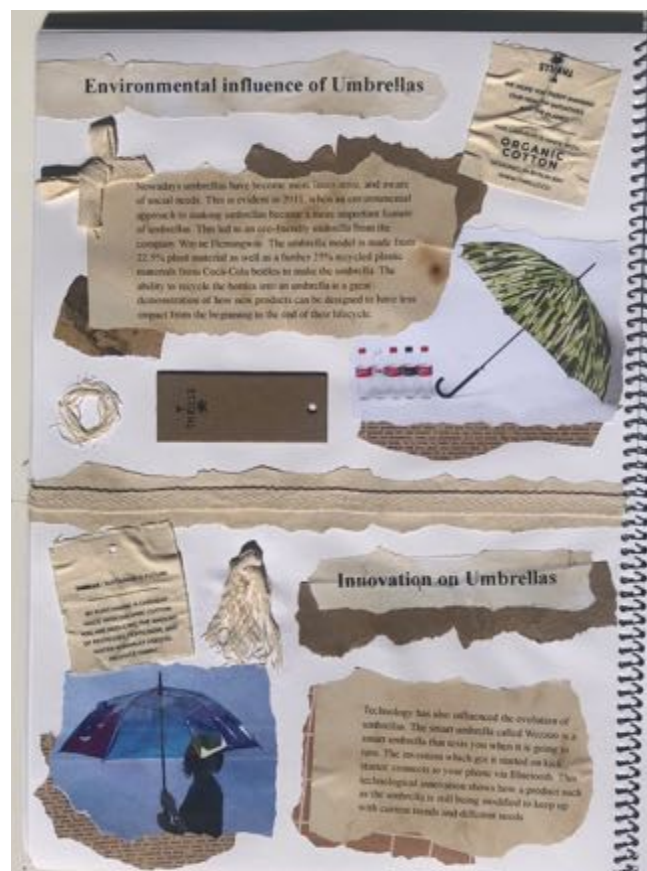


11. Developing Ideas

History of the Umbrella



As a part of research I completed an in-depth investigation into the history of the umbrella and how umbrellas changed over time through different parts of the world as well as societal changes involving umbrellas. Societal norms and cultural uses of umbrellas were very interesting to understand as well as how umbrellas evolved at different times in different parts of the world. Through this research I also came to understand the different materials that were used to construct umbrellas and the change of material over time. Innovations and environmental issues have also been demonstrated in the advances of the modern umbrella. Through looking at how umbrellas can be made environmentally friendly, I had the idea of how I could incorporate this into my Pavilion by making the umbrellas out of environmentally friendly materials, for example recycling.



Umbrella Collage



I created an Umbrella Collage to visually show the different shapes, colours and sizes of different umbrellas. As the collage is a double page it shows the granger and variety of the different umbrellas available. I created the collage by sourcing a large sample of umbrellas, sorting them into colour groups and then arranging them on the page in an appealing way. Finally, I stuck the umbrellas to the page for the final product which is seen above.

12. Documentation of the Making Process of Prototype

Day 1

To begin my construction of my prototype I began by tracing a variety of circles using a protractor. I tried a number of different sizes before working out an arrangement for the circles to fit together. I began glueing the circles together to form the top shade.

I then began constructing the posts of the prototype. To do this I ruled 3 rectangles per pole and cut them out.



Day 2



I repeated this process of ruling and cutting the poles so that I had enough poles for the structure. After cutting all the rectangles I used hot glue to make the pole. After completing the poles I attached the poles to the circles of the top shade of the Pavilion. To finish I added glue to the bottom of the Model so that it would not tip over.

13. Second Prototype and Documenting process

Day 1



For my first day of making my prototype I began by opening all the umbrellas up. Upon doing this I found that the umbrellas did not stay up the full way. To solve this issue I placed glue onto the spine and runner of the umbrella in order to hold the canopy up at full extension. Secondly I began to arrange the umbrellas in a pattern which I liked using styrofoam to hold the umbrellas in place. After I was happy with the arrangement I began hot gluing the umbrellas together.

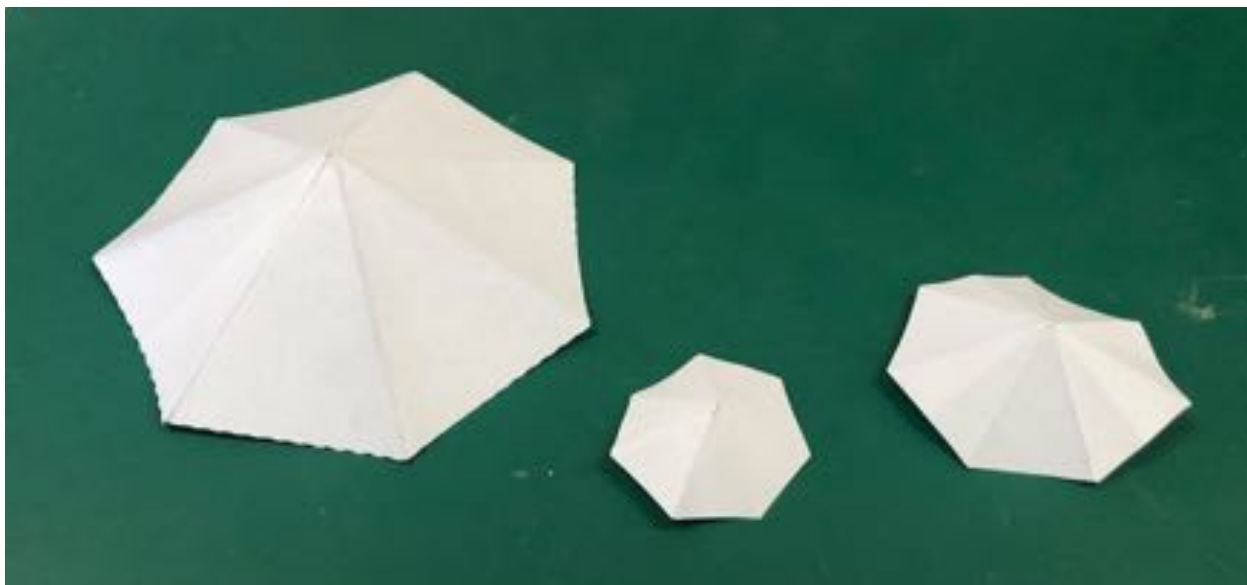


Day 2

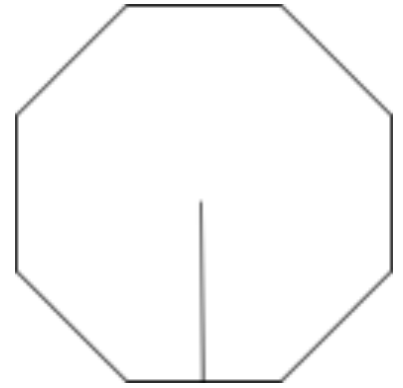


To finish the prototype I spray painted the umbrellas and base. This would mean that when uploading pictures of the prototype into photoshop I could add colour over the white. Due to lack of colour choice I began spray painting black, however, I then discovered a white colour which I much prefer. I spray painted 2 coats of the white and after drying the prototype was complete.

Experimentations with Paper Umbrellas

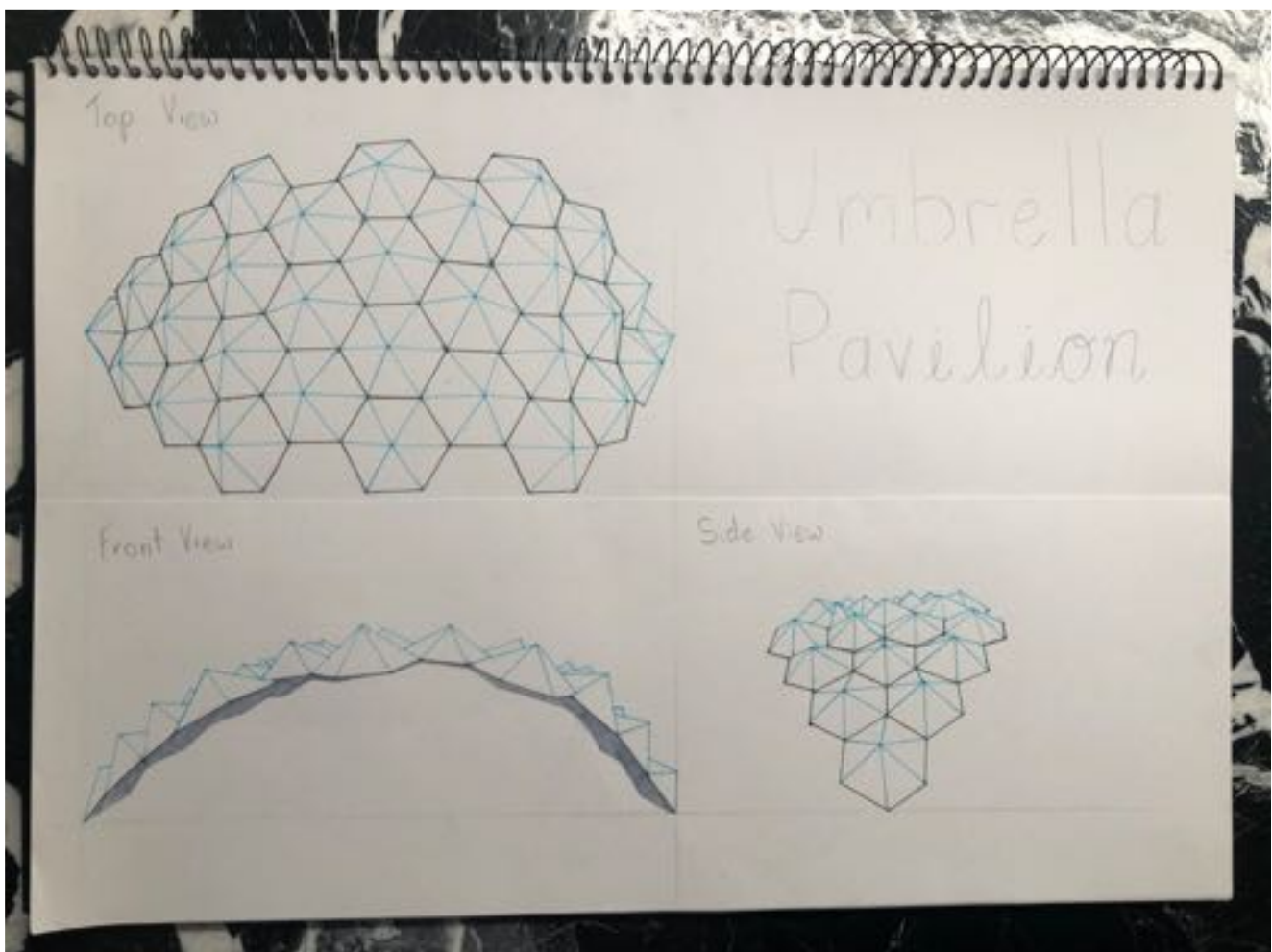


As a part of my experimentation process, I tried using paper in order to make the umbrella shapes. To do this I cut out a range of different sized Octagons and then cut a slit in the middle of a side to half way, as seen in the diagram to the right. I then began folding all the sides. Due to the octagon folded in of itself creating the umbrella shape. I then glued down the overlapping side and repeated this for the other sized octagons. Although this was a good experiment the umbrella ended up having 7 sides and creating a Heptagon rather than Hexagon and I felt that the paper was not strong enough.

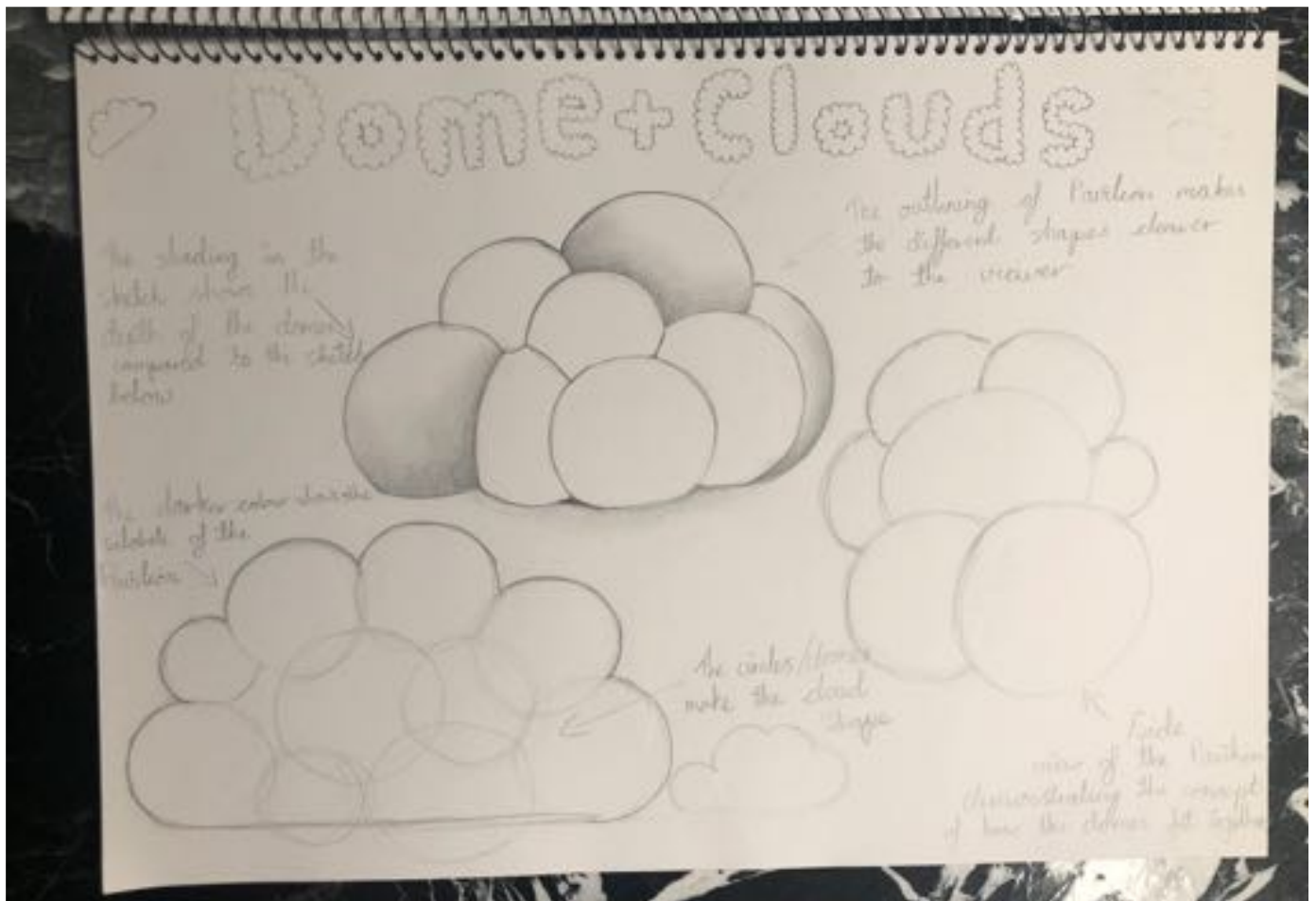


14. Production Drawings

Idea 1 - Umbrella Pavilion



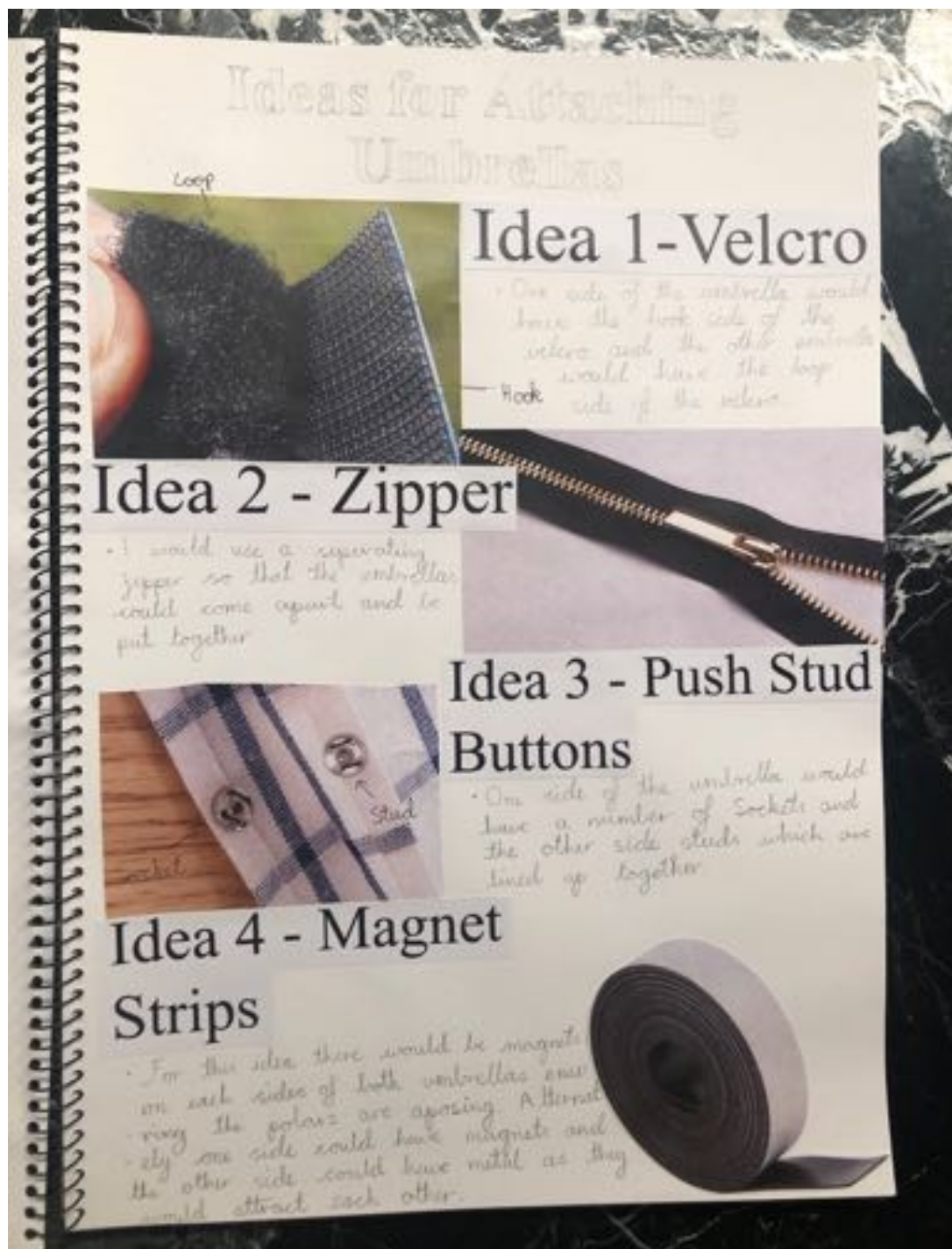
Idea 2 - Cloud Pavilion



15. Justify the Preferred Option

After completing the process of Generating ideas, sketching and prototyping I have decided to make The Umbrellas Pavilion which would use Umbrellas to make the pavilion structure. However, unlike my prototype, which used circular umbrellas, for my model I will be using hexagonal umbrellas as the sides fit together in a more structured way compared to the circular umbrellas which overlapped. For my model I will be using balsa wood to make the umbrellas and I will be dyeing fabric to be each of the 10 different House Colours. The different colours are not only symbolic, they will also be very aesthetically pleasing as the light shines through the umbrellas. The Umbrellas Pavilion is my preferred option as a key component of the assignment is for the Pavilion to be assembled and disassembled and I feel that the umbrella Pavilion meets that criteria better than my original ideas and the Dome Pavilion. As well as this a key area which I identified in my Criteria for Success is the importance of environmentally sustainable materials. As I discovered in my research into the History of Umbrellas, Umbrellas can be made out of recycled materials in order to be environmentally conscious. Therefore, due to a number of factors I feel that the Umbrella Pavilion is my preferred design.

16. Connection Options for Umbrellas



Part 3. Creating the Solution

Making, Modify and Evaluate

17. Documenting Steps of the Making Process

Step 1 - Dyeing the Fabric

After much consideration on how to build my model I decided on making the individual umbrellas out of balsa wood and fabric. To begin this, I began dyeing the fabric of the umbrellas the 10 different House colours. Using scrap white, cotton drill fabric found in the Design Building I began cutting big enough squares for 4 umbrellas per House. The use of scrap fabric is environmentally friendly. I thought that with trial and error in the production of the model it was safer to have more fabric than not enough. I not only cut enough fabric for the umbrellas squares, I also cut a number of squares for practice dyeing samples to ensure that the colour was right for each House.



To begin dyeing I layed out 2 tarps onto the tables so that the dyes did not stain the wood table and placed on plastic gloves before touching any of the dyeing equipment then I got the rest of the equipment for dyeing out which was in a box prepared prior to the lesson and placed it on the table. A photo of the box is seen above. The box's contents included pipets to move the dye from container to the fabric (seen in the image furthest to the left below), sample containers to mix colours (seen in the middle image below) and dyeing containers with the dye (seen in the right image below).



I began by wetting the fabric swatches of one house under the sink and placed them on the tarp. I spread out each piece of the fabric to make sure the dye spread across evenly. I selected the colour dye of the House and first tested on the test square to ensure that the colour was the ideal colour for the House I was dyeing. I then began a process of using the pipet to place the dye with one hand and spread the dye evenly with the other hand. If the dye began to be too dark in a certain area I would add water to dilute the dye. If the dye was too light I would add more dye.

After I was happy with the dye I compressed the material pieces lightly to get any excess water out of the fabric. I put the ball into the middle of the tarp out of the way of cleaning and the next dyeing. At the end of this process I had to move the fabrics to a separate area as the workshop room was being used.



Once completing the dyeing I began to clean down the tarp so that I could begin dyeing the next colour. When cleaning I had to ensure that there was no dye of the previous colour left otherwise this would mix with the new colour and affect the dyeing. I wiped the tarp down with a paper towel and then cleaned my gloves so no dye remained. I then began the dyeing process again.

Some of the House colours I had to mix together myself in order to get the right shade or colour in general. I had to create Edwards' colour, Burgundy/Maroon. I combined a 1:3 ratio of blue to red. Resulting in the desired 'Edwards' colour. I created Blaxlands colour by

adding a bit of yellow to the red to make the colour a more orangey red. Finally, due to there only being one blue colour to make Garnsey light blue I simply added the blue colour into a different container and added water until the colour was the right shade of blue.

Step 2 - Drying the Fabric



To move the fabrics to my home I used plastic bags which I got from the Design Department. I placed each individual colour into a separate bag so no colours mixed and ensured that the bags were all sealed so that no dye leaked into my school bag. Once I was home I used gloves again to place the fabrics on the clothes outside in order to dry them. Each time I hung a different House colour I had to wash the gloves so that no dye transferred onto the other fabrics.



Step 3 - Buying Materials

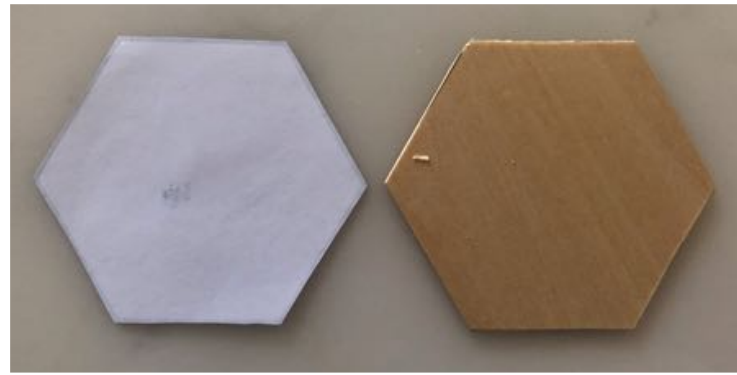


The next step in the production of my model was working out what further materials I would need to build my model. I wrote a list of materials at which time I went to Eckersley's to buy the materials. As seen in the image above. The materials I bought included PVA glue which is perfect to be used for wood and fabric (seen in the image below to the left), 2 Posca pens in white and black to write the House names on the fabric (seen in the second row below), An alphabet stencil to experiment with (seen in the image to the right) and Balsa wood 1.5mm×150mm× 915mm (As seen in the image below to the right). Unfortunately, I found it difficult to write with the pens onto the fabric and found that it would be difficult to work out how to curve the names once the fabric was wrapped around the umbrella structure.



Step 4 - Cutting Hexagons

For the model I decided to use a hexagonal base that I could then place balsa wood cut into triangles in order to make the umbrella shape. To cut the hexagons I printed out a variety of size templates on a piece of paper. I picked the one that was the right size and cut it out. This template is seen to the right.



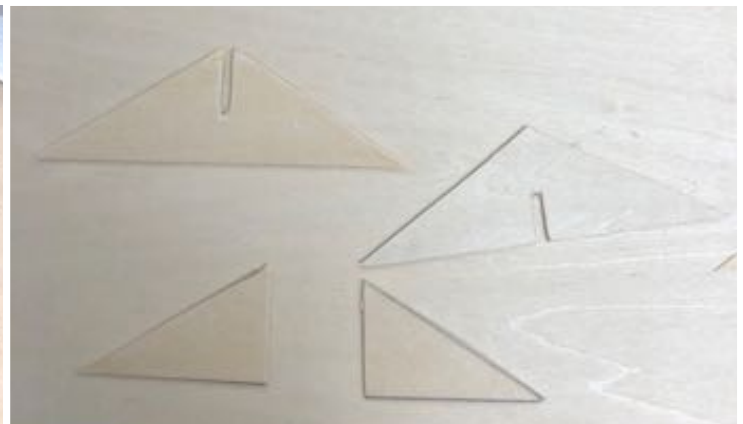
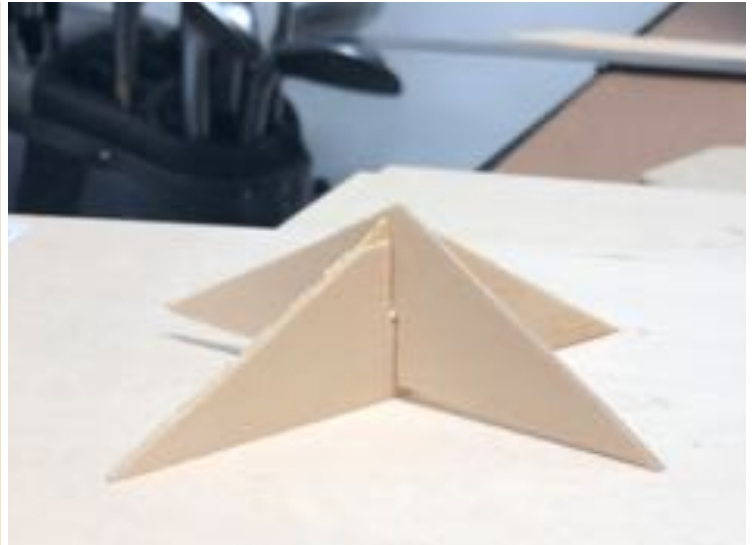
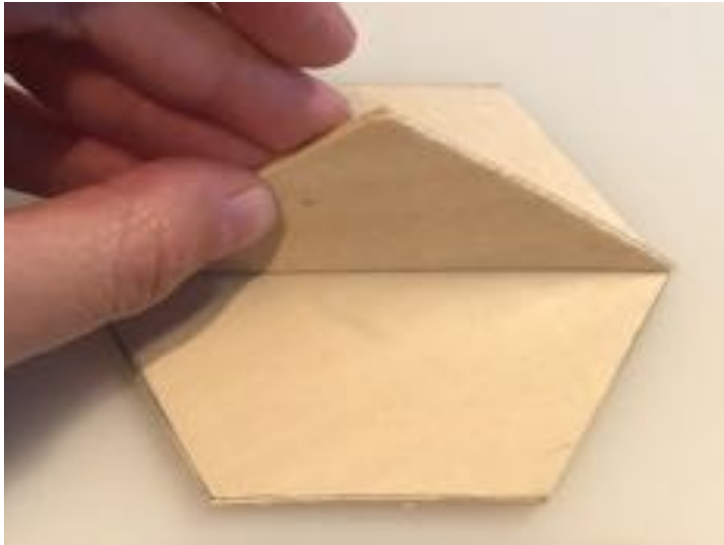
To begin tracing the hexagons onto the balsa wood, I placed the template onto the balsa wood and traced the shape using a ruler to ensure the lines were straight. I then continued tracing hexagons across the balsa wood.



I then began cutting the balsa wood using scissors. Originally I was planning to use a Stanley Knife and ruler to cut the hexagons, however, I discovered that I could cut the wood using scissors because of how thin the wood was. Some of the Hexagons are seen below.



Step 5 - Umbrella Frame



After the idea to use a Hexagon base I came up with a framework that would give the umbrella shape whilst also being supportive and would not collapse. For example I was planning to use metal to create the arch shape, however, after some consideration I decided not to as it may be hard to bend and not as reliable as balsa wood. I then came up with the idea to make two triangles made from balsa wood that could slot into each other and then add smaller triangles for the missing points of the hexagon.

To begin I measured the diameter of the hexagon from one point to the opposite. Following this I worked out how high I wanted the umbrellas to be and used these measurements to make three triangles (seen in the image above, to the left). Once these were cut I cut a gap in one triangle at the top and in the base of another triangle. This enabled me to slot them together to form part of the structure of the umbrella. The third triangle was then cut in half for the other point.



Using the triangle measurements I then measured and traced the triangles onto the balsa wood and began cutting them out using scissors. In order to not waste balsa wood and because of their shape the triangles were drawn in an alternating pattern, which is seen in the image above. I then used scissors to cut the slots in two out of the three triangles. After all the triangles were cut I placed them on the hexagons to ensure I had cut enough of each piece, seen in the image below.

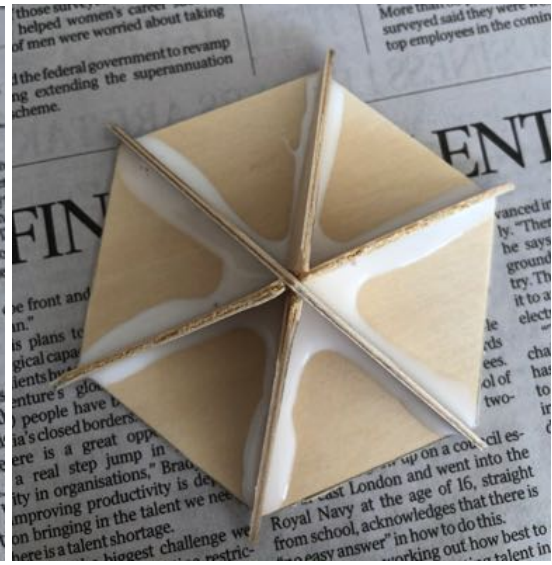
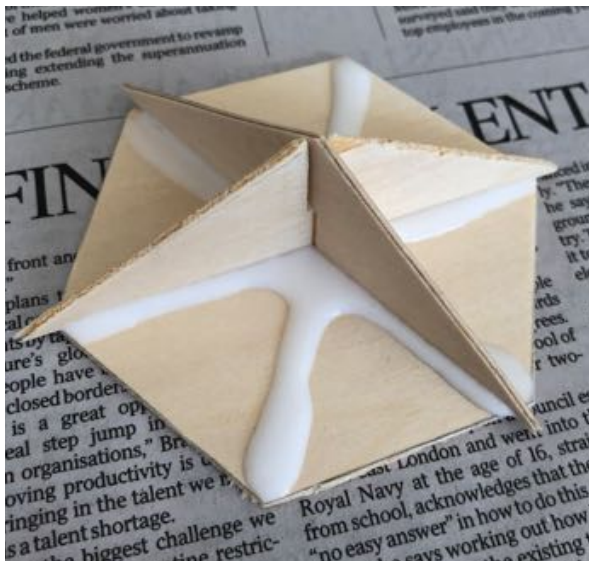


Step 6 - Glueing the Triangles to Base

To commence the glueing of the umbrella structures I began by glueing lines from each point of the Hexagon in a snowflake pattern. The first piece I placed was the triangle with the slot at the top, followed by the triangle with the slot at the bottom by slotting the pieces into each other. I then placed the two smaller triangles on the remaining line of glue. To ensure that the pieces did not move I held them in place until the glue had begun to dry and the pieces would not slip. I repeated this process until all the umbrellas structures were glued.

This process is documented in the images below. Using this process provided a lot of stability to the built hexagon.



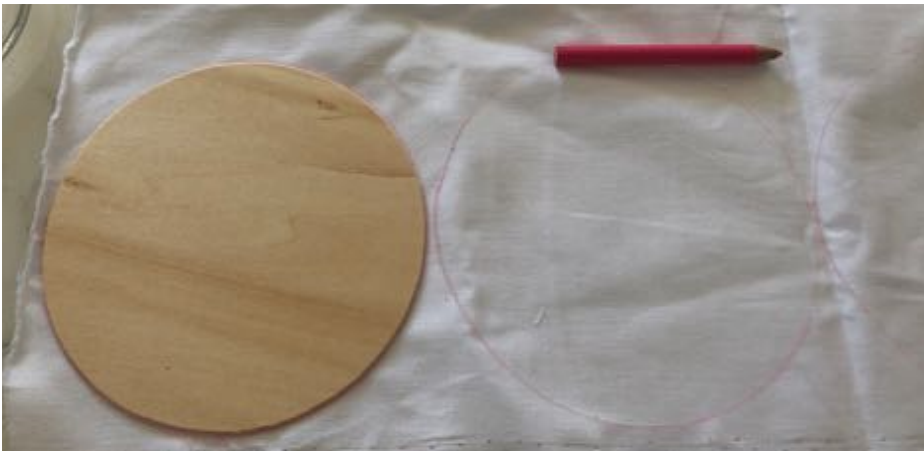


Step 7 - Ironing Fabric



Once the fabric was fully dry I took it off the line and brought it inside. I then began ironing the fabric, using an old tea towel underneath in case the dye leaked onto the ironing board. I ironed each piece of fabric and placed it in a pile ready to be cut for the umbrellas.

Step 8 - Tracing and Cutting Fabric



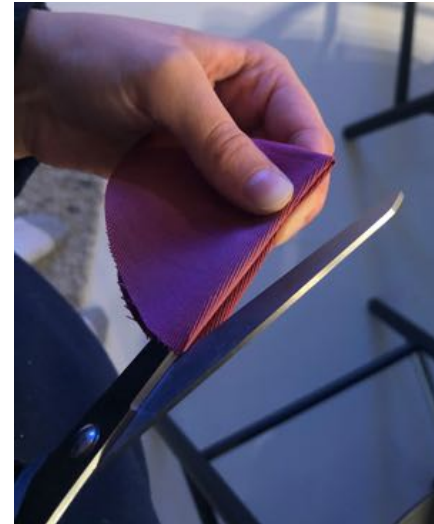
Through a process of trial and error using scrap fabric I came up with a template to cut my fabric. This template was the diameter plus 3cm each side. I made the balsa wood circle as this was functional for tracing and cutting the fabric to the same size.

Using the balsa wood template I traced the template onto the fabric using a chalk pencil which would rub off easily. I traced all three of the circles before beginning to cut them out using Fabric Scissors.



Step 10 - Glueing Fabric to the Balsa Wood Umbrella Model

To begin glueing the fabric to the balsa wood frame I folded the circle into quarters and then cut a slit in the fabric. I unfolded the circle and glued the left hand side of the slit, right side facing up. I put a layer of glue on one side of the frame and placed down the fabric. After glueing the first side of the frame to the fabric I began placing glue along the other sides of the frame and firmly placing the fabric down. I ensured that the fabric was pulled tight before placing the fabric at the next frame point to make the umbrella shape. Once I had glued all the sides down, I found that by stopping the glueing at the original side, it looked unclean. However, by glueing the fabric over onto the 2nd frame, it looked more clean and aesthetically pleasing. Before glueing this final side down I had to line up and cut the excess fabric off. After completing the first umbrella I placed it out of the way to dry and repeated this process for the other umbrellas.



After the umbrella was dry I could begin to glue the fabric down to the underside of the umbrella. I first cut the piece of fabric which had overlapped (which was underneath the overlapping piece). I then placed glue on the base and placed down the first flap. I then moved onto the second flap placing glue not only on the balsa wood but also on top of the fabric which had just been placed down. I repeated this process until all of the flaps were stuck down. I made sure that they were pulled tight and placed upside down so that they would not get stuck to the newspaper. I repeated this process for the remaining umbrellas.

Step 11 - Arranging Umbrellas

As the umbrellas were complete I began to arrange them in a variety of different ways before gluing them down so that the Pavilion was aesthetically pleasing. I began by arranging them in no particular order, spacing the different colours out. However, this did not look as aesthetically pleasing as I thought it would be, so I began re-arranging them in clusters by House. This worked much better although it took some rearranging to ensure that colours of the same tone were not close to each other. This included placing Eddison and Hay on opposite ends as they are both darker colours, Jones and Middleton as they are greens, Garnsey and Sheafe as they are lighter colours, Garran and Edwards are similar in tone and Blaxland and Burgmann as they were the brightest colours.



Step 12 - Glueing Umbrellas to Plastic

As apart of the construction process I had to consider a number of different solutions to the problem of how to create the arch in the Pavilion. The original idea was to use metal to hold the arch shape. However, with some discussion it was decided that I could stick the umbrellas flat to a piece of plastic so that the umbrellas were all together before placing the metal structure underneath. To begin this process I went out to buy a large enough sheet of plastic for the model, however, the largest size I could find was A2. This meant that the final umbrellas at either side could not fit. This was not a large issue as it meant that I could attach them afterwards.



To stick the umbrellas down I began by using PVA glue and making the hexagon shape and then spreading glue within the hexagon. I then placed the umbrellas down and ensured that they were stuck before moving to the next umbrella. I begin glueing the umbrellas down at one end, completing one row at a time before moving to the next row. Once all the umbrellas were glued together I placed glue between each joining point of the umbrellas. After the glue had set overnight I began to make the arch by placing a towel underneath and stacks of books either side to force the plastic and umbrellas to bend. I then cut the plastic out to the shape of the umbrellas.



Unfortunately, as seen in the image the PVA glue did stick, however, lifted off the plastic. Luckily the umbrellas had stuck together although I felt that without the plastic underneath the structure may collapse.



Step 13 - Glueing End points to plastic

To support the final umbrella at each end I cut a piece of plastic which could be glued at one end to the umbrella structure and the other end to the single umbrella. I began by cutting a wide enough piece of fabric into a rectangle. I then used PVA glue to attach the end umbrella to the plastic and once this had set I attached the plastic underneath the umbrella model and plastic (as seen in the image). I added this to the structure so that all the single umbrellas were attached together and supported by a frame.



Step 14 - 2nd Attempt at Glueing Umbrella to plastic

Due to the PVA glue peeling off the plastic I needed to find another glue that would stick plastic to balsa wood and fabric. From past school projects I had used a glue called Fast Grip. When looking at the tin of Fast Grip, I found that the glue would indeed stick plastic to the wood and fabric. Following the instructions I painted the glue onto the back of the umbrellas with a brush. After the surface was covered I placed the plastic on top. To push down the plastic to the umbrellas overnight, I placed a towel over the Pavilion and then used soil bags to weigh the plastic down. Once this was dry I reinforced the arch shape with a towel and books at either end. This was the same process I used before to make the arch.



Step 15 - Glueing Fake Grass to Base

When putting my model together I decided that the addition of fake grass would add to the aesthetic of the model as it would allow the viewer to better picture the model being used. Firstly, I collected my base wood piece from school and then began glueing the fake grass to the wood. Using the same glue, Fast Grip, I used a brush to paint on the glue to the board. After the glue was painted all over ensuring the sides and corners were covered I flipped the board onto the fake grass at a corner. To set the glue to the base I stood on the wood to weigh the corners down. Once the glue had set using scissors I cut the two remaining sides of the fake grass.



Step 16 - Cutting End Point Bracket

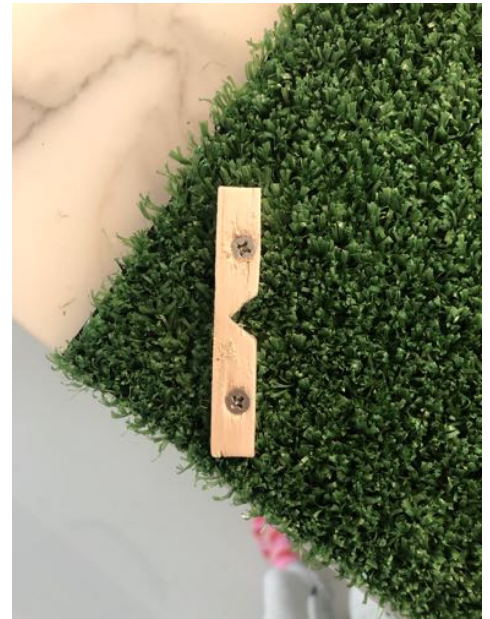
In order to make the Pavilion's arch shape I worked out that I would need supports on the base which would act to push the Pavilion in the arch shape. To make the bracket I would need to use 8mm by 8mm balsa wood. I worked out that to make these base pieces I would need to cut a triangle out, which the tips of the umbrella could then slot into. Through using the umbrella point as a guide I cut out the triangle using a stanley knife. After the first end bracket was a success I used that exact model and process to make the second bracket.



Step 17 - Screwing End Point Brackets to base

As the Umbrella Pavilion itself was too long I needed to angle the Pavilion on the board diagonally across the board. Once figuring out where the brackets would be placed I began screwing the balsa wood into the board. I used 18mm flaps head screws and a drill to screw

either side to the base. I began by drilling the hole then using a screwdriver and I screwed in the screw. I repeated this process for the remaining screws.



Step 18 - Attaching Person to Base

An issue that arose after glueing the fake grass how I would attach the person to my model. After some thought I decided to attach the person using balsa wood and screws. To begin I cut 8mm by 8mm balsa wood in a large enough piece so that the piece would be large enough to fit the person as well as a screw on either side. I found that the balsa wood was too high and looked irregular on my model, so using a Stanley knife I cut the balsa wood in half. Using a Stanley knife I cut slits in the wood at the same spots and the person's foot and then placed the feet at these points. Finally, I placed the balsa wood and person onto the fake grass and began drilling holes and then screwing in the screws.



Step 19 - Attaching Umbrella Structure onto Base



The final step in my model was attaching the umbrella section to the base making it more functional and durable. The end brackets worked, however, the model was unstable and often tilted to the side which could lead to the umbrella section falling. The solution to this problem was screwing in screws on either side to keep the model straight and connected to the base. I began by drilling a hole on an angle and then screwing in a screw on either side to hold the umbrella section in place. I repeated this for each side of the points.

18. Final Product



Part 4. Evaluating

19. Criteria for Success

Design Factor	Evaluative Question and How will I evaluate it?	Evaluation
Need	<p>Does the Pavilion meet the Design Brief which includes the idea of belonging?</p> <p>To evaluate this question I could conduct feedback from peers and staff to see if they believe the Pavilion meets the needs in the Design Brief.</p>	<p>Upon Self reflection as well as conversations with peers I have determined that my Pavilion does indeed meet the Design Brief Criteria. I have created a scale model at a scale of 1:30 which was identified in Brief. My model has been thoroughly thought through in order to engage and prompt the sense of belonging as well as how it could be disassembled and reassembled. The Pavilion is also accessible and designed to accommodate every year level, teachers and wider CGS community. The use of the Canberra Grammar Senior Houses makes it unique for the target market.</p>
Aesthetic	<p>Is the Pavilion that I have designed and constructed, aesthetically pleasing to the target audience?</p> <p>This can be evaluated by conducting a survey of the target audience and them giving feedback on the Pavilion.</p>	<p>I feel that my Final model is aesthetically pleasing to my target audience as it incorporates each House's colour and ideally would incorporate the House names as well as House mascots. This links to the idea of belonging and inclusion within the Pavilion.</p> <p>I conducted a verbal survey with peers in my class as they are my target audience to see if they found the Pavilion aesthetically pleasing.</p> <p>The responses that I received was that the colours and shape fit well together to create a welcoming space which promotes belonging and inclusion.</p>
Environment	<p>When Designing and Producing my Pavilion have I considered environmentally sustainable materials?</p>	<p>In my model I used leftover fabric to create the coverings for my umbrellas and balsa wood for the structure of the umbrellas. Balsa wood is a sustainable</p>

	<p>To evaluate this I can look at my portfolio, evaluations and Justified Preferred Option in order to work out if environmentally friendly materials were considered as well as used in the end product.</p>	<p>material which is durable and lightweighting making it ideal for my project.</p> <p>Instead of cotton, for the real Pavilion I would use affordable eco friendly materials such as Regenerated Nylon or Recycled Polyester. For the framework of the umbrella I would take a similar approach as Coca-Cola and use recycled material (For example, how Coca-Cola recycled bottles to make umbrellas.)</p>
Safety	<p>Will the Pavilion be a safe environment and what practises are put in place for the safety of students?</p> <p>Conduct a variety of tests on the pavilion to see if it can withstand different conditions.</p>	<p>I believe that the structure would be safe for students as the Pavilion would effectively be held together. It would protect students from weather conditions including rain and sun. There is no high risk of injury given the openness of the pavilion and not sharp corners or trip hazards.</p> <p>Unfortunately due to the material involved for the model I could not conduct tests on the model due to water based dyes and other facts.</p>
Quality	<p>Will the Pavilion be able to withstand weather conditions and constant use by people?</p> <p>This can be evaluated by conduction research into durable/weatherproof materials. I will also evaluate whether the pavilion is ideal to be used as a communal space.</p>	<p>I have designed my Pavilion with the intention of being able to withstand weather conditions as well as constant use. The water proof material of the umbrellas will make the pavilion withstand rain and wind. The assembly of the umbrellas to make the pavilion have also been designed so that when attached the material will overlap to ensure water can not get inside.</p>
Ergonomics	<p>How well does the Pavilion interact with people?</p> <p>Conduct an evaluation on the interaction the Pavilion has with people and how is built for Disassmbley.</p>	<p>My Pavilion has been designed with the intention of being adaptable to many locations around school including school ovals and the Quad. Although I have not explicitly outlined the final design fo rhow hte Umbrellas would be attached I have given a number of plausible attachments systems. These include, zips, velcro,</p>

		press studs and magnets. These have been identified as options as they are easy to use for the user. The ergonomics can not accurately measured as I have built a model which does not disassemble which is a crucial factor to ergonomics of the Pavilion.
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20. Individual, Society and Environment

Individual

As the Pavilion provides a space for Houses to come together, not only as individuals but as cominded Houses. This leads to an improved sense of community and belonging within the society. It benefits students, teachers and the wider CGS community at an individual level. Other than promoting belonging the Pavilion also acts as a space for individual study and a place to come together with friends. A negative of this Pavilion space is that if a student would like to use it individually they may not be able to as other people may be using the space.

Society

My Pavilion positively impacts society as it provides a space for all Houses within Canberra Grammar School to come together and use. Further impacts of the Pavilion includes providing shelter and creates a positive atmosphere which promotes belonging within the Pavilion. This is through House activities as well as joint House events. Inter House events include House meetings, activity afternoons, tutor groups or mentor group activities. Collaborative House events include Cross Country, Athletics Carnival and Captain Cup events. However, a negative of the Pavilion is that it can only provide space for a certain number of people and thus a smaller number of Houses at a time.

Environment

My Pavilion has been designed with the intention of being environmentally friendly. The material choice for the umbrellas would be eco friendly for example the use of Regenerated Nylon or recycled polyester. The structure of the umbrellas underneath would be partially made out of recycle plastics like Coca-Cola has done in the past. A way to improve on the Pavilions environmental impact is through finding matearils to attach the umbrelals together which are eco-friendly.

21. Final Product Evaluation

Overall, I am delighted with my Final Product. The model is aesthetically pleasing with the bright colours of the Umbrellas and the connection each colour has to a Senior House. The

House colours combined unite the 10 School Houses and promotes a sense of belonging not only within each house but as a whole community. The bright fake grass underneath the model also brings brightness to the model. The function of the model works as it provides shade and protection. Whilst making the model I found that if the Pavilion was to be made in real life the end points could tilt so that the dome shape can move to provide ultimate shade as it could move depending on the time of day.

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