



# Criteria 3

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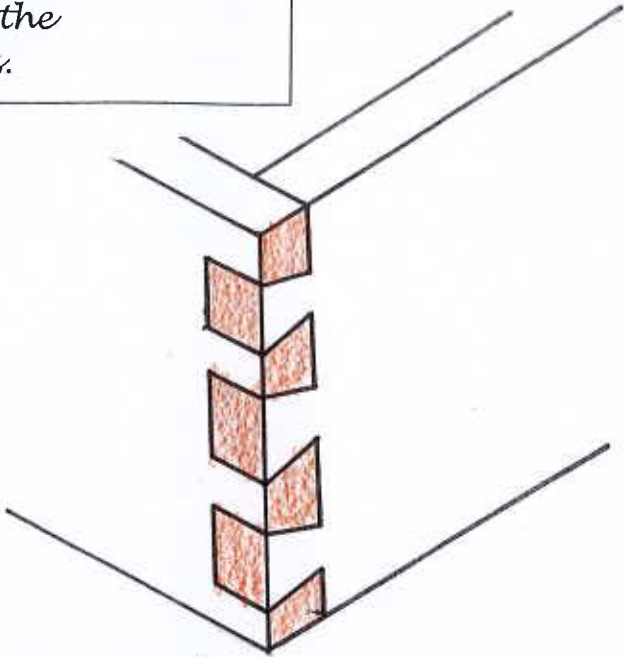
Valentino T'Blaxill



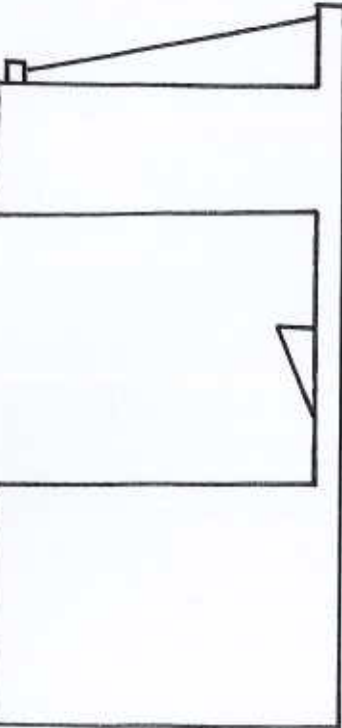
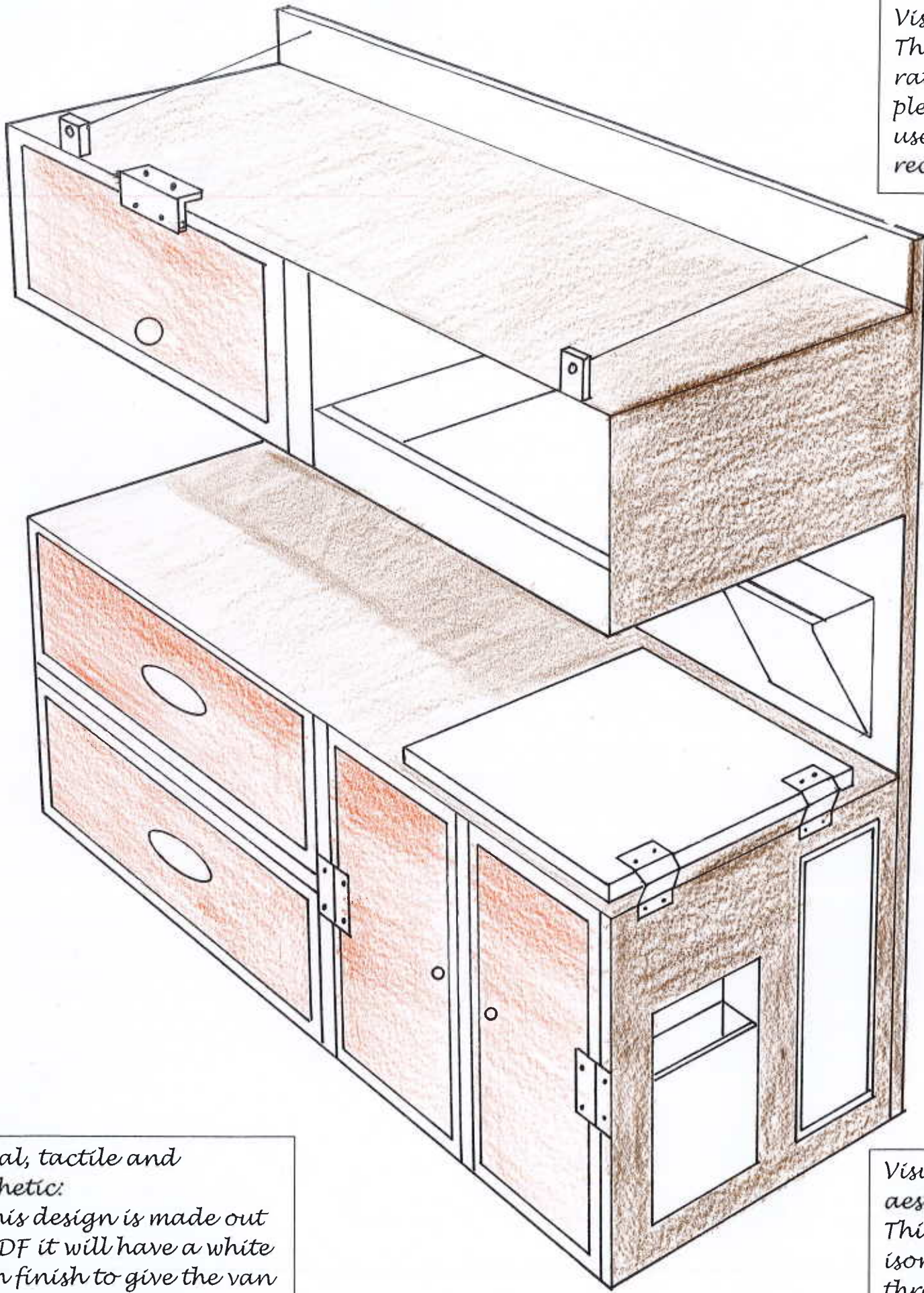
**DESIGN OPTION 1**

*Innovation and creativity:  
Manufacturing method-This design will be mainly produced through the use of a CNC router. Each main flat section will be cut out using this process, this will ensure accuracy and will make it time effect whilst also being sustainable as the CNC router minimises waste of material. This emerging technologies will be very helpful in the product of this*

*Visual, tactile and aesthetic:  
This design uses Fibonacci's golden ratio to create the most aesthetically pleasing dimensions. These ratios are used in the creation of the rectangular draw faces.*



*Construction method:  
A dovetail joint is a very strong because of the way the "tails" and "pins" are shaped. This makes it difficult to pull apart when glue is added. This is ideal as the product must be strong and durable as it will be used in harsh environments. This joint gives a very impressive appearance as you can see the grain of the wood used. However this joint is very time consuming and require a high level of skill.*



*Visual, tactile and aesthetic:  
As this design is made out of MDF it will have a white wash finish to give the van a spacious appearance and to bounce light around inside which will keep the inside light.*

*Visual, tactile and aesthetic:  
This design embodies isometric design through the use of symmetrical lines. Furthermore this is also supported through the use of the designs straight form.*

*Purpose, function and context:  
This designs primary function is to maximise storage space in a small space. This is required as it will be located inside a van with limited space and must give the user the most possible storage space. Its secondary function is to hold a 25l water tank as this is a requirement of my end user. As this design is very simple it will remain very reliable which adds to its reliability.*  
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**Material:**  
 Medium-density fibreboard is tough, strong, stiff and dense which makes it ideal for this application as the cupboard will be used regularly and won't be treated carefully. However MDF is heavy and when cut dust can be hazardous to your health.



PDF'S:	Criteria	Score out of 5	User feedback
<b>Purpose, function and context:</b>	<ul style="list-style-type: none"> <li>- Is this cupboard suitable for holding kitchen essentials and a water tank safely and securely?</li> <li>- Does the product has primary and secondary functions?</li> </ul>	5	"the design of this cupboard fills the brief well, and contains all of the requested necessities. Plus a few clever and functional shut away compartments. I really like the fold out table and tuck away bin. The design fills both primary and secondary functions."
<b>Visual, tactile and aesthetics:</b>	<ul style="list-style-type: none"> <li>- Is this product a unique design and fit for its purpose, as well as minimalistic and compact?</li> <li>- Is the product an example of a modern contemporary design style?</li> </ul>	3	"the design is unique and purpose built to fit and fill the space. Has all the functions required with clean and tidy lines, looks modern and functional."
<b>Materials:</b>	<ul style="list-style-type: none"> <li>- Is this product made of durable and light materials?</li> </ul>	5	"structural MDF is both durable and has good strength to weight ratio, furthermore responds well to CNC cutting. The proposed joins should hold up well to the bumps and pressures of van life. MDF is not the lightest product but good cost to quality and fits budget."
<b>Legal responsibilities: Safety:</b>	<ul style="list-style-type: none"> <li>- Does the product have necessary attachment point to ensure that the cupboard and its contents are secure and cannot cause injury?</li> </ul>	4	"I am sure you will be able to find solid attachment points to achieve a score of 5/5. This is important and must be achieved"
<b>User-centred design</b>	<ul style="list-style-type: none"> <li>- Does the product have easy access to the plates and cutlery?</li> <li>- Does the product offer the user easy access and operation of the water tank?</li> </ul>	4	"The proposed design appears to have an easy access to all of the required items. If this is the final design to be settled on it looks functional and easy to use and live with on the road."

Total = 21/25

**Overall user comment:**

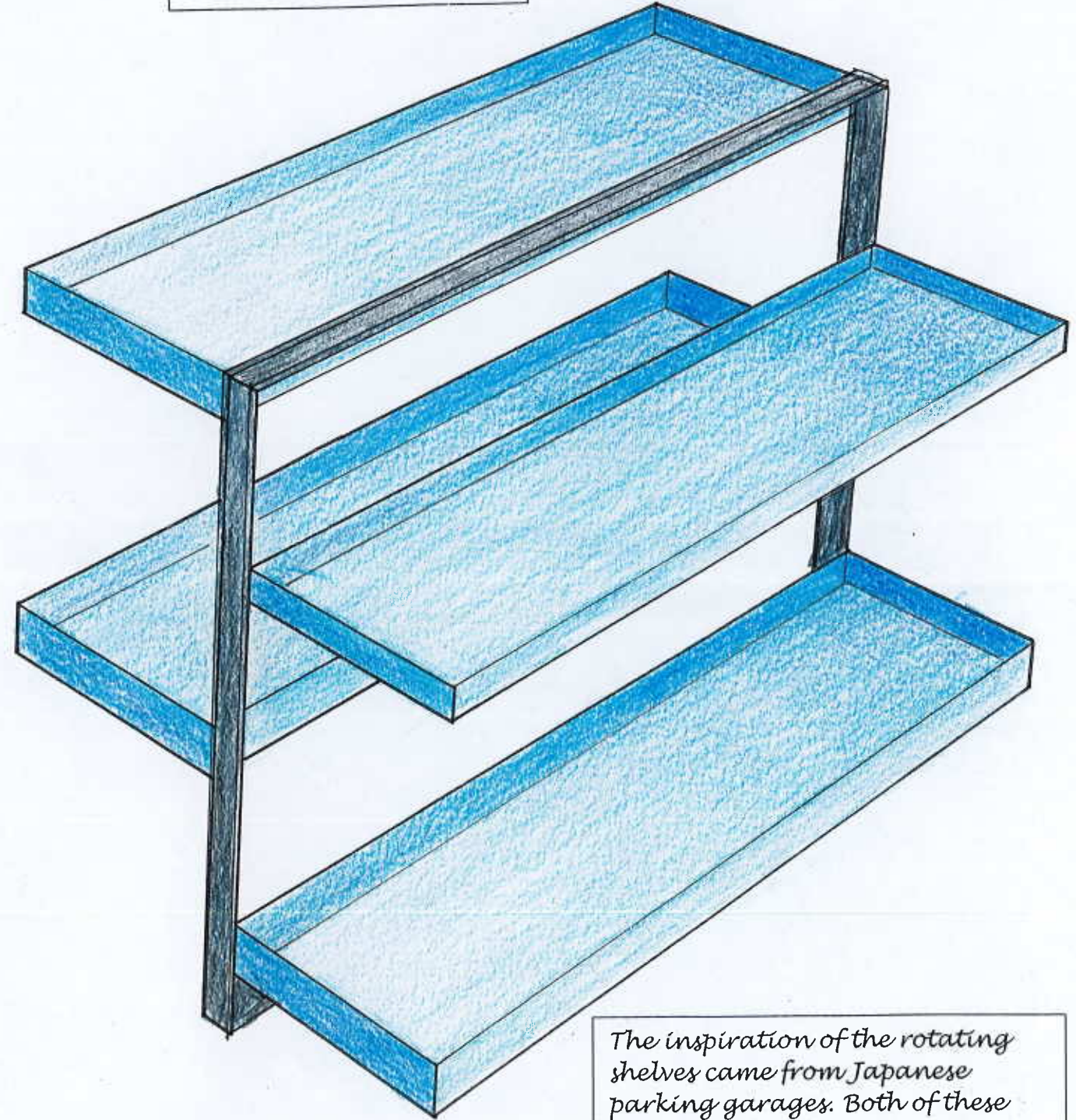
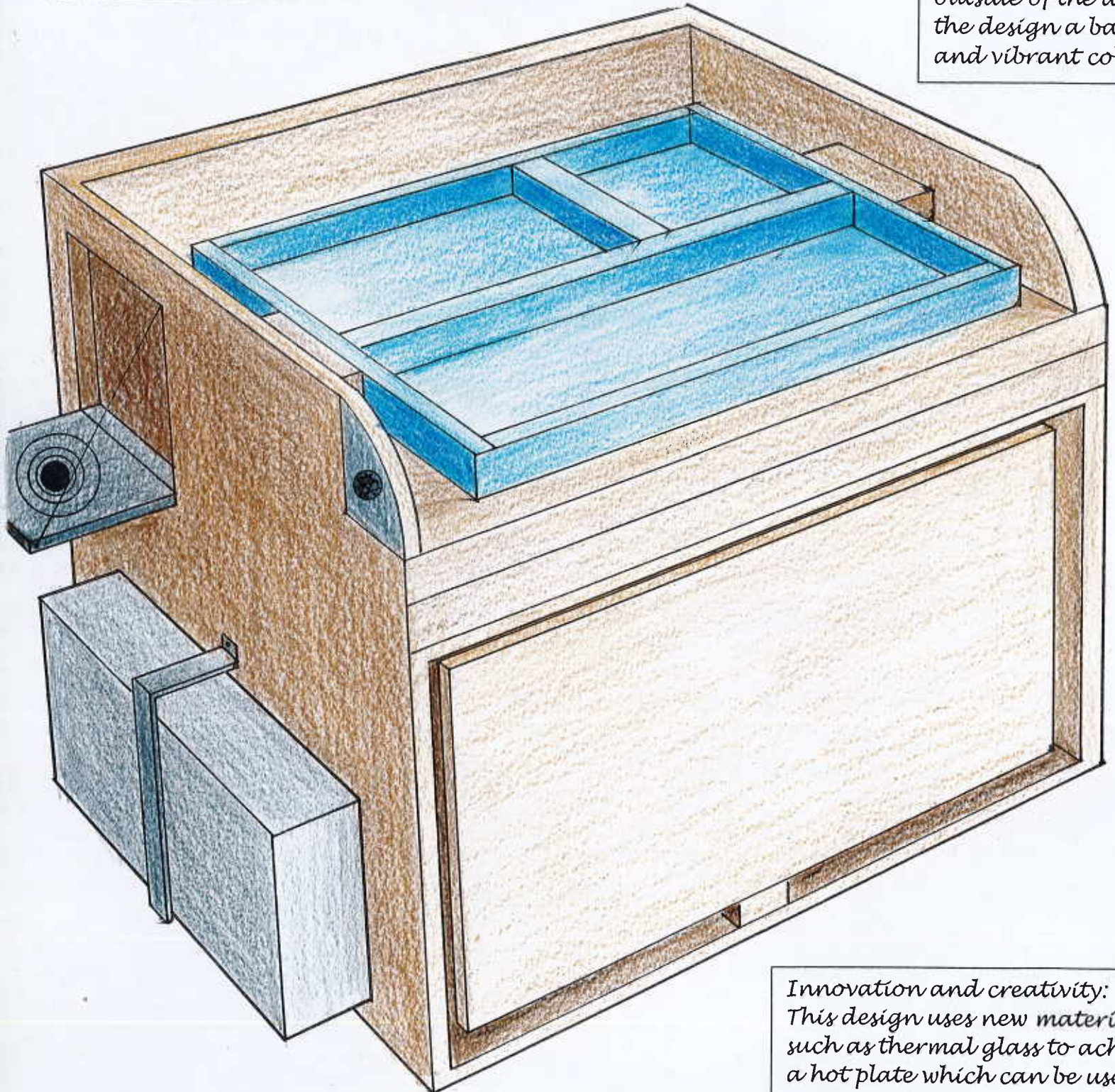
" overall I really like the functionality of this design and could see it working in the van. However I think that the top cupboard part might not work that well as towards the roof of the van the side wall tappers away leaving not much room, but this design has promising features that aid in organisation and storage."

*Purpose, function and context:*  
This products primary function is to securely hold a varied range of household items including kitchen utensils. It has an easy operation as the rotating shelves are run by small electric motors and controlled by the users voice.

*Visual, tactile and aesthetic:*  
This design features an anodized aluminium shelf which gives it a vibrant colour whilst making the material more durable. This vibrant colour contrasts with the natural wood colour of the outside of the design. This gives the design a balance of natural and vibrant colours.

*Innovation and creativity:*  
This design features a voice control system similar to google home which allows the user to select the draw tray that they would like to access. This also operates and controls the touch screen TV. This is an example of an improved solution to an existing problem.

**DESIGN OPTION 2**



*Visual, tactile and aesthetic:*  
This design has a sleek appearance whilst remaining functional. This is achieved through the use of a hidden rotating shelves.

*Innovation and creativity:*  
This design uses new materials such as thermal glass to achieve a hot plate which can be used to warm and cook food on. This is ran of solar energy from the solar panel on the roof of the van which increase the environmental sustainability of this product by using a renewable energy source.

*The inspiration of the rotating shelves came from Japanese parking garages. Both of these are examples of compact storage solutions.*

**Material:**  
 Aluminium is lightweight, corrosion resistant, strong and easily machined which make it more sustainable than other metals such as mild steel as it is easier to work with therefore requiring less energy to work with this is in line with my end users sustainability statement.



PDF'S:	Criteria	Score out of 5	User feedback
<b>Purpose, function and context:</b>	<ul style="list-style-type: none"> <li>- Is this cupboard suitable for holding kitchen essentials and a water tank safely and securely?</li> <li>- Does the product has primary and secondary functions?</li> </ul>	3	"the design of this cupboard fills the brief well, it has an external water tank mount which I like as it gives easy access. The design has a few hidden functions like the hot plate that folds away when not in use. I really like the rotating shelf system. The design fills both primary and secondary functions."
<b>Visual, tactile and aesthetics:</b>	<ul style="list-style-type: none"> <li>- Is this product a unique design and fit for its purpose, as well as minimalistic and compact?</li> <li>- Is the product an example of a modern contemporary design style?</li> </ul>	4	"the design is unique and uses modern technology. It achieves the purpose and gives uses the most of the space. It has all the functions required with clean and tidy lines, looks modern and functional."
<b>Materials:</b>	<ul style="list-style-type: none"> <li>- Is this product made of durable and light materials?</li> </ul>	5	"aluminium is lightweight and strong it is also easily machined which means there are many production methods. I think this material is suitable to regular use and being exposed to harsh environments, however it is more expensive and if not secure can rattle"
<b>Legal responsibilities: Safety:</b>	<ul style="list-style-type: none"> <li>- Does the product have necessary attachment point to ensure that the cupboard and its contents are secure and cannot cause injury?</li> </ul>	4	"I am sure you will be able to find solid attachment points to achieve a score of 5/5. This is important and must be achieved"
<b>User-centred design</b>	<ul style="list-style-type: none"> <li>- Does the product have easy access to the plates and cutlery?</li> <li>- Does the product offer the user easy access and operation of the water tank?</li> </ul>	3	"The proposed design appears to have an easy access to all of the required items. The use of different shelves will make it easy to organise and group items"

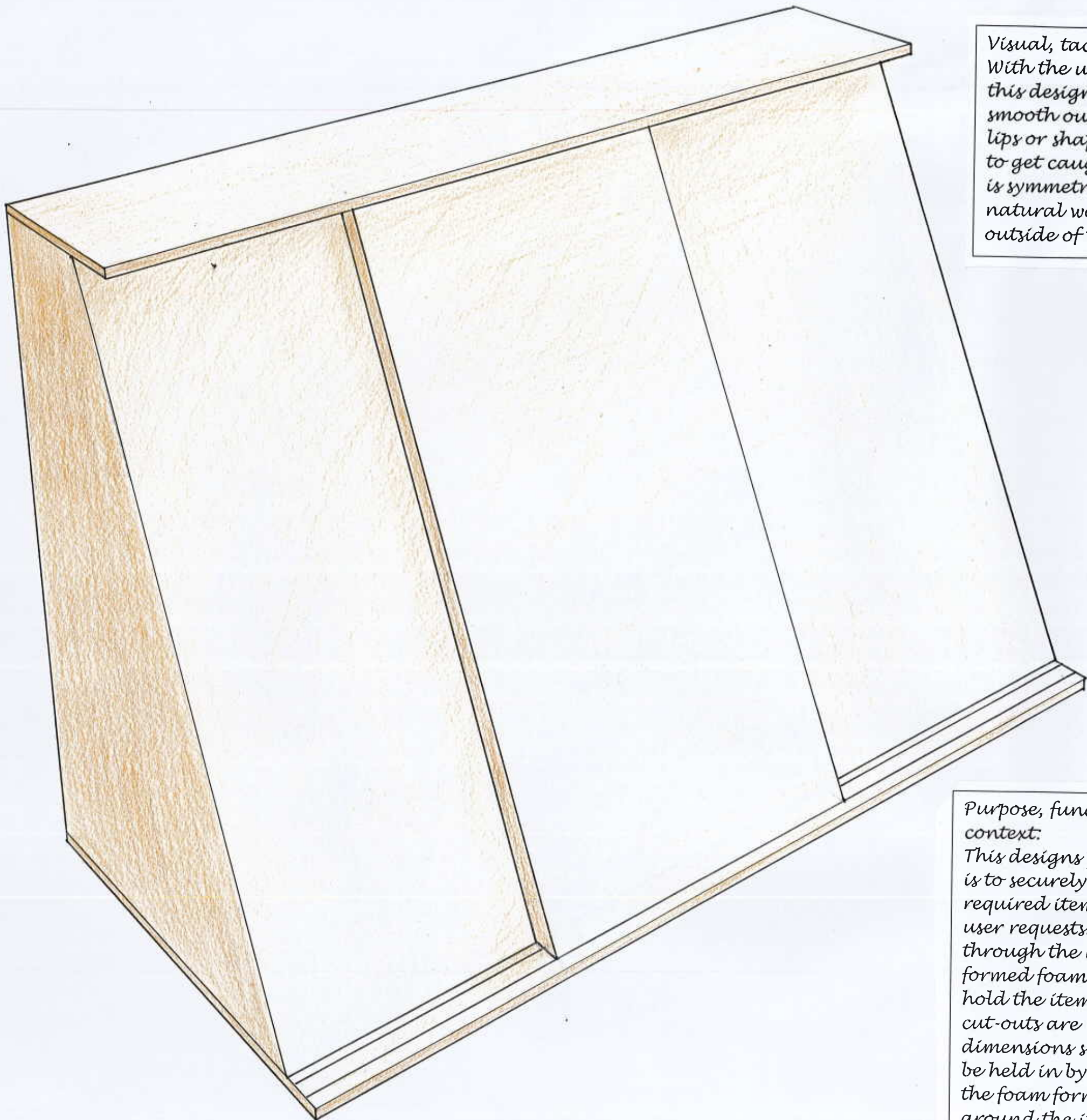
Total = 19/25

**Construction method:**  
 These draw trays will be TIG welded together which is suitable for welding thin sections and produces a very strong bond with little porosity in the weld.



**Overall user comment:**  
 "I like how this design works and its innovative approach to the problem however I am a bit concerned with the reliability of this design as it has quite a complicated rotating system which might break or not stand up to regular use. It also is a bit time consuming to change between draws and might become annoying. I like the concept it just might not be practical enough for its intended use."

**DESIGN OPTION 3**

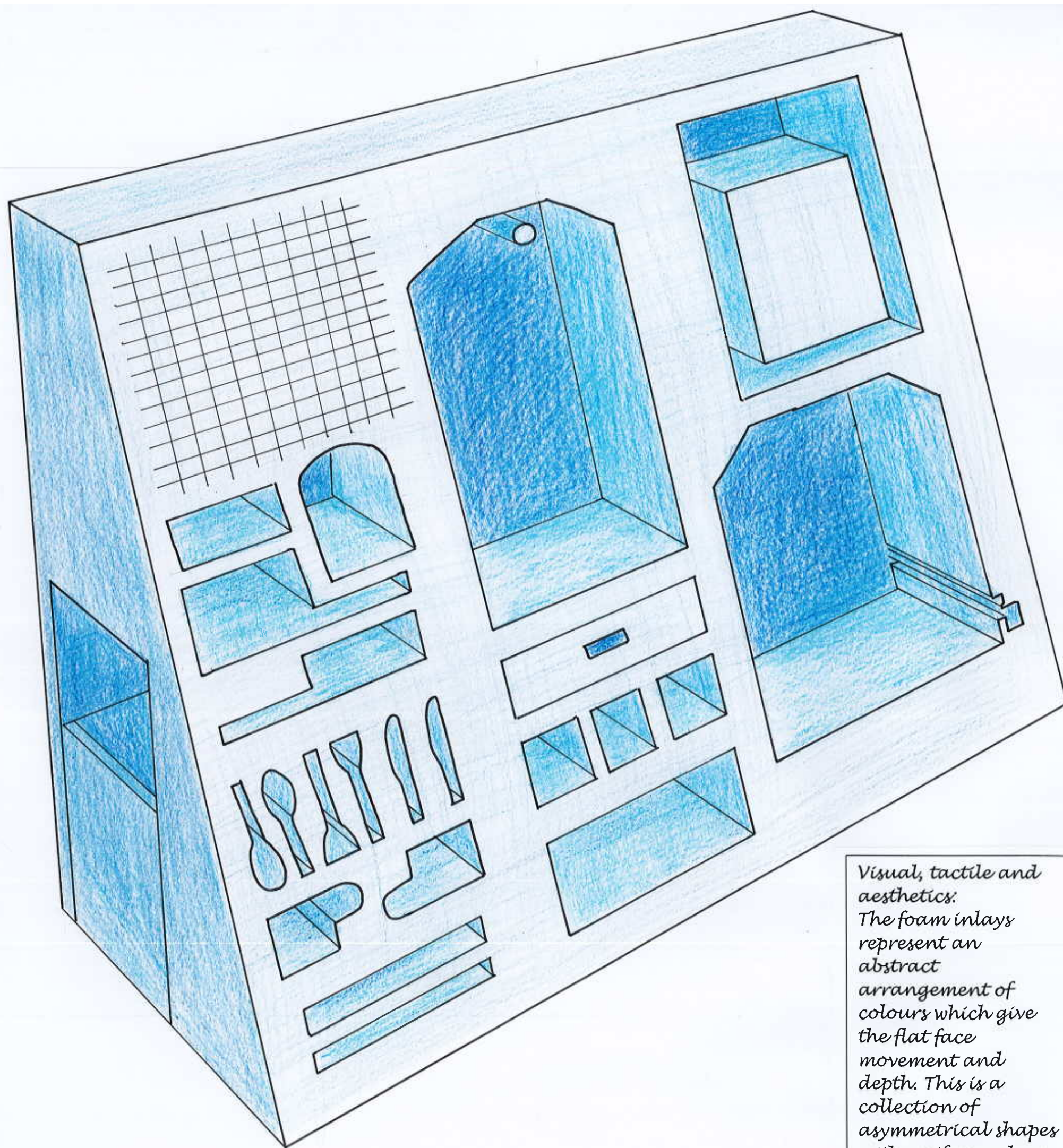


*Visual, tactile and aesthetic:*  
With the use of the roller doors this design will have a very smooth outside profile with no lips or shape edges for clothing to get caught up on. This design is symmetrical and has a natural wood texture on the outside of the sliding doors.

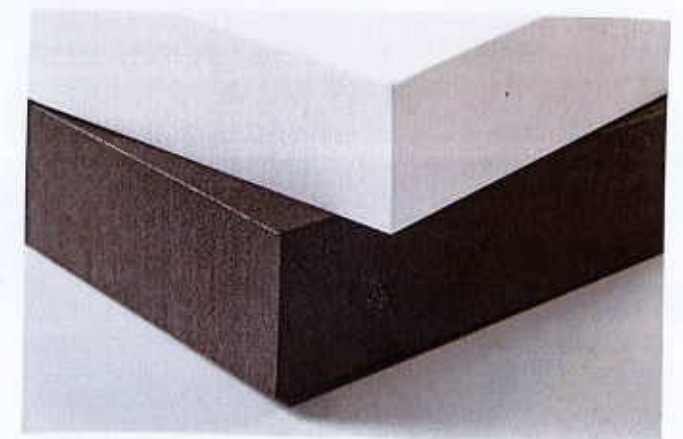
*Innovation and creativity:*  
This design features the use of a new material which is not typically used in this style of application. By using this process and material it is pushing the boundaries in modern storage solutions. This idea stemmed from my end users feedback on prior secondary research photo where he said he would like "the implication of foam could offer a solution to security of the items and the amount that it rattles whilst in transit."

*Purpose, function and context:*  
This designs primary function is to securely hold the required items that the end user requests. It does this through the use of a custom formed foam inlay to securely hold the items in place. These cut-outs are made the exact dimensions so the items will be held in by the pressure of the foam forming a snug fit around the item.

*Construction method:*  
These foam inlays will be constructed through the process of thermoforming to create the imprints of the items that will be held in this cupboard. This will be achieved by making a mold of the items and then using a compression molding process to form these specific shapes. The use of the CNC laser will also help to cut out of the overall shape of the foam. This will ensure that each item fits flush and securely into the form inlay. This is important as the cupboard will be exposed to rough roads and normal driving conditions. 1719959512



**Material:**  
 The inlays on this design will be made out of high density polyethylene foam which absorbs impacts and vibration as well as being weather and chemical resistance which is important as it will be used in a variety of environments and might get chemicals spilt on it. PF is also very light weight, holds its shape (stiff) and easily cut and formed through the process of thermoforming. It can be made in a variety of different colours, you can order it in a range of thickness and sizes and is easy and affordable to custom order.



**Visual, tactile and aesthetics:**  
 The foam inlays represent an abstract arrangement of colours which give the flat face movement and depth. This is a collection of asymmetrical shapes with uniform edges.

PDF'S:	Criteria	Score out of 5	User feedback
Purpose, function and context:	<ul style="list-style-type: none"> <li>- Is this cupboard suitable for holding kitchen essentials and a water tank safely and securely?</li> <li>- Does the product has primary and secondary functions?</li> </ul>	5	"the design of this cupboard fills the brief very well. It holds all of the list of requirements in a neat and logical arrangement. The hidden bin on the side which keeps it tidy. The profile is slim and slick. This design fills both primary and secondary functions."
Visual, tactile and aesthetics:	<ul style="list-style-type: none"> <li>- Is this product a unique design and fit for its purpose, as well as minimalistic and compact?</li> <li>- Is the product an example of a modern contemporary design style?</li> </ul>	4	"the design is fully custom built and 100% unique for its task. No waste in this design as it maximises the available space and is minimalist and compact. It has a modern contemporary style."
Materials:	<ul style="list-style-type: none"> <li>- Is this product made of durable and light materials?</li> </ul>	3	"the combination of the use of the CNC laser and thermomoulding that can be used on high density foam will be light weight and durable with a slick wood veneer outer shell which will be easy to clean."
Legal responsibilities: Safety:	<ul style="list-style-type: none"> <li>- Does the product have necessary attachment point to ensure that the cupboard and its contents are secure and cannot cause injury?</li> </ul>	4	"the rear of the cupboard will have good anchor points with a very secure holding of things inside due to the foam inlay."
User-centred design	<ul style="list-style-type: none"> <li>- Does the product have easy access to the plates and cutlery?</li> <li>- Does the product offer the user easy access and operation of the water tank?</li> </ul>	4	" the proposed design is slick, looks easy to use and very solid. The only down side is there would be little to no flexibility of contents if new or different things where needed"

**Overall user comment:**  
 " I really like the sleek and smooth outside out line that this design has as well as the foam inlay which would hold the items really securely. However it will be almost to custom as it does not easily allow for the storage of other items which might be a problem down the line. "

Construction Method:



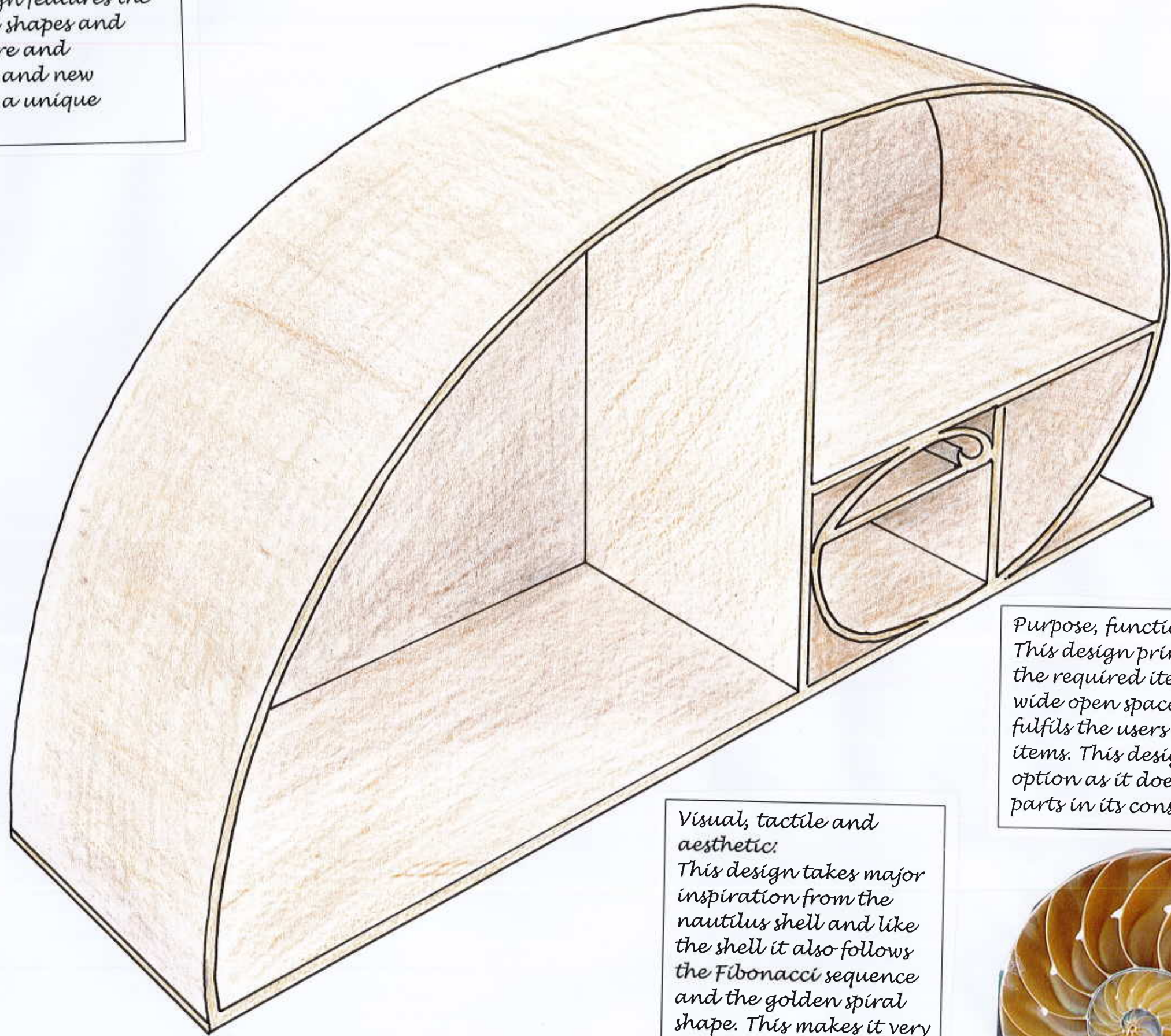
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*Innovation and creativity:  
This design shows a creative approach to a storage solutions and take inspiration from the nautilus shell. This design features the experimentation of natural shapes and items being used in furniture and redeveloped using different and new materials which gives them a unique appearance.*

*Visual, tactile and aesthetic:  
This design has a very natural appearance with its smooth curved lines and natural colour. It follows the golden ratio pattern which ensures that its proportions are current and it appeals to the eye and doesn't look out of balance.*



*Purpose, function and context:  
This design primary function is to hold the required item it does this by having wide open spaces to store the items. It fulfils the users need for the storage of items. This design offers a very reliable option as it does not use any moving parts in its construction.*

*Visual, tactile and aesthetic:  
This design takes major inspiration from the nautilus shell and like the shell it also follows the Fibonacci sequence and the golden spiral shape. This makes it very appealing to the eye and gives it a unique look.*

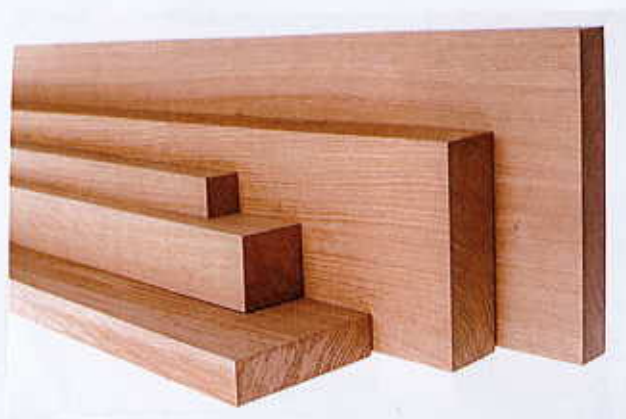


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PDF'S:	Criteria	Score out of 5	User feedback
<b>Purpose, function and context:</b>	<ul style="list-style-type: none"> <li>- Is this cupboard suitable for holding kitchen essentials and a water tank safely and securely?</li> <li>- Does the product has primary and secondary functions?</li> </ul>	2	"this proposed design could not hold the required items but not very well. There is no way to hold the items securely and is a difficult shape to fill. It also does not have a designated area for the water tank to fit securely. I cannot say that this design option fills the primary or secondary function."
<b>Visual, tactile and aesthetics:</b>	<ul style="list-style-type: none"> <li>- Is this product a unique design and fit for its purpose, as well as minimalistic and compact?</li> <li>- Is the product an example of a modern contemporary design style?</li> </ul>	5	"Although the cupboard is unique in its design and very beautiful, it is not minimalistic or compact. Aesthetics are there in a big way and its very tactile with its bent wood grains."
<b>Materials:</b>	<ul style="list-style-type: none"> <li>- Is this product made of durable and light materials?</li> </ul>	4	"the proposed design is made from high quality wood with a beautiful appearance. Although not modern in its construction it is an example of beautiful craftsmanship."
<b>Legal responsibilities: Safety:</b>	<ul style="list-style-type: none"> <li>- Does the product have necessary attachment point to ensure that the cupboard and its contents are secure and cannot cause injury?</li> </ul>	2	" the cupboard would be a solid construction and easy to find strong contact points. Although no security for the contents and would fail in its ability to hold contents. It would be dangerous as a cupboard for a van."
<b>User-centred design</b>	<ul style="list-style-type: none"> <li>- Does the product have easy access to the plates and cutlery?</li> <li>- Does the product offer the user easy access and operation of the water tank?</li> </ul>	4	"the proposed design has easy access to contents but would be hopeless is its ability to fulfil its role as a cupboard to organise and hold contents to simplify the van."

**Material:**

This design will be made out of white oak which is a mostly straight grained, is a hard and durable wood whilst having a low stiffness which makes it ideal for this type of construction method. White oak is ideal for steam bending and is an ideal structural timber.



**Construction method:**

The curves in this design will be produced using steam bending of material. Steam bending is a woodworking technique where strips of wood are steam heated using a steam box. The applied heat and moisture makes the wood malleable enough to easily bend around a former to create a specific shape.



**Overall user comment:**

" as a whole I like the appearance of the cupboard but I am concerned with its practicality especially how it would handle in the van. As it has no front face to the shelves I suspect that the items placed there would fall out very easily especially when in motion. This is a big design flaw as it must hold the item securely so I will have to say no to this one."

Total = 17/25

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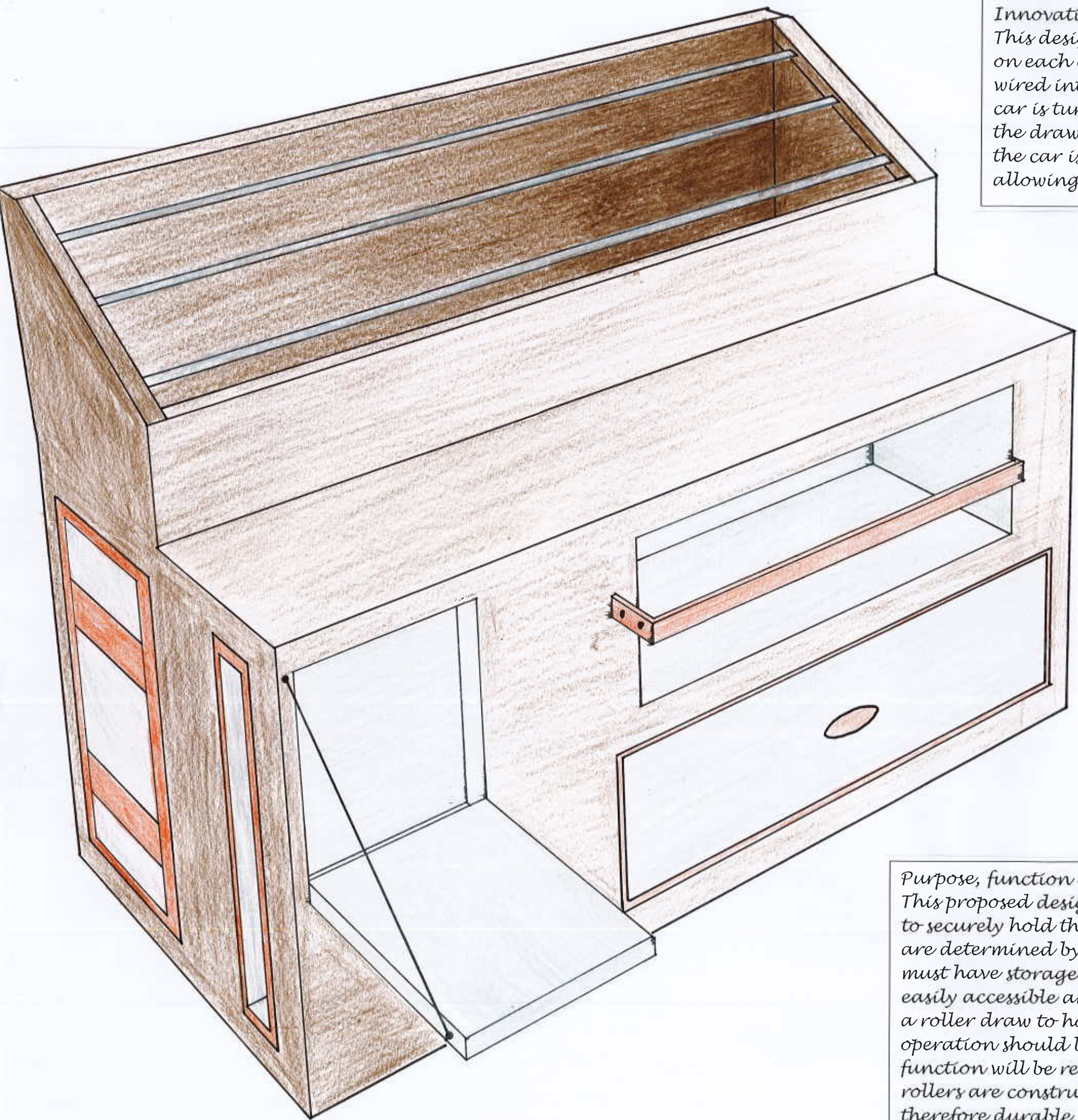
**DESIGN OPTION 5**

*Innovation and creativity:*  
This design will feature small electromagnets on each of the insides of the draws that will be wired into the cars ignition system so when the car is turned on the magnets engage and keep the draws from opening whilst drive and when the car is turned off the magnets will release allowing the end user to access the draws.

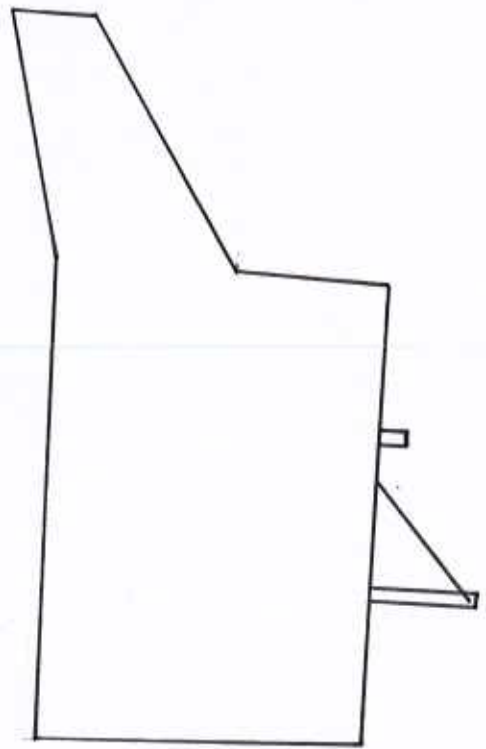
*Visual, tactile and aesthetic:*  
This design has straight and symmetrical lines with no curves which give the design a very functional and contemporary look whilst also maximising the available space. This use of straight sharp edges contrast with the curves of the inside of the van and makes the product stand out in the space.

*Visual, tactile and aesthetic:*  
This design has utilise the natural colour of the material to match with the existing furniture in the user van. The outside of the design will have a smooth texture due to the high quality finish of the material.

*Purpose, function and context:*  
This proposed designs primary function is to securely hold the required item which are determined by the end user. It also must have storage for a water tank in an easily accessible area. As this design has a roller draw to house the water tank its operation should be smooth and the function will be reliability as theses rollers are constructed from metal and therefore durable.

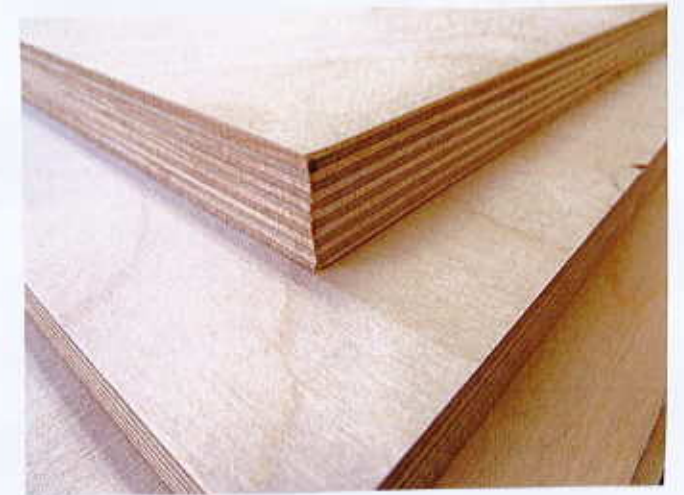


Side view:

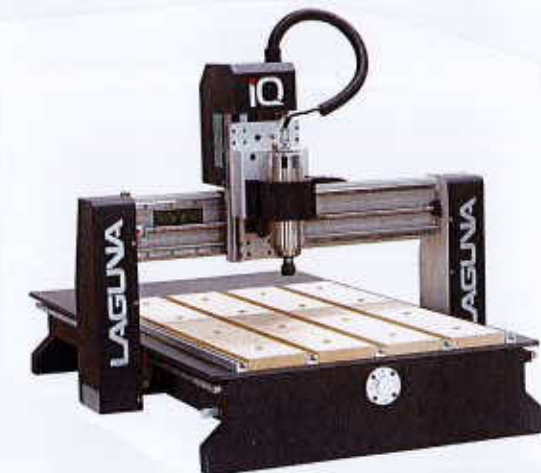


PDF'S:	Criteria	Score out of 5	User feedback
<b>Purpose, function and context:</b>	<ul style="list-style-type: none"> <li>- Is this cupboard suitable for holding kitchen essentials and a water tank safely and securely?</li> <li>- Does the product has primary and secondary functions?</li> </ul>	5	"The design of this cupboard fulfils the brief well. It seems to have ample room for the required items to be stored. The fold out table makes great use of the available space and makes room when not in use. I like how easy the water tank will be to use wont even have to take it out of its cradle."
<b>Visual, tactile and aesthetics:</b>	<ul style="list-style-type: none"> <li>- Is this product a unique design and fit for its purpose, as well as minimalistic and compact?</li> <li>- Is the product an example of a modern contemporary design style?</li> </ul>	4	"This design is unique as it is purpose built for my van and will maximise the available space. This design is very compact and will tuck tightly into the side of the van"
<b>Materials:</b>	<ul style="list-style-type: none"> <li>- Is this product made of durable and light materials?</li> </ul>	5	"I really like the use of the marine plywood as it will give the product an overall high quality finish and will be very durable which will be good as it will see a lot of action. Plywood is also very light which will aid the van when going up hills"
<b>Legal responsibilities: Safety:</b>	<ul style="list-style-type: none"> <li>- Does the product have necessary attachment point to ensure that the cupboard and its contents are secure and cannot cause injury?</li> </ul>	5	"This design looks to have necessary securing points and as it tapers like the side of the van it should stay really secure whist driving."
<b>User-centred design</b>	<ul style="list-style-type: none"> <li>- Does the product have easy access to the plates and cutlery?</li> <li>- Does the product offer the user easy access and operation of the water tank?</li> </ul>	4	"This design has a big open draw which will allow for easy access which I like and the water tank will be really easy to use."

**Material:**  
 Marine plywood has a high grade face that will ensure a high quality finish and will also increase its impact resistance and minimise water penetration other standard structural plywood. Whilst marine plywood is slightly more expensive it will fulfil the requirements of this cupboard and will withstand the strenuous use. Marine plywood it also easy to cut and use as it comes in specific sizes and thickness. It can also be easily cut on the CNC router making the manufacturing process time efficient and precise. Marine plywood is very strong and durable and has a high strength to weight ratio making it ideal for the proposed design.



**Construction method:**  
 This designs outside walls will be cut out using a CNC router. This computer controlled cutting machine will insure that all of the cuts are as precise as possible and will give the end product an exact look with straight lines and no gaps. It will also help with time management as this process is very time efficient and you can be working on other things as it cuts out the shapes. This is an example of a new technology that makes the production more streamlined and easily repeatable which enables easy mass production if needed.



**Overall user comment:**  
 "I really like this design and it has brought all the aspects of the others that I liked and collated them in the one design. I especially like the easy access clothing storage/ stuff area at the top of the design and can really see this being useful. My only concern is how far it come out into the van and if it has a small width how effective/ functional that table top area just under the stuff area. This is my preferred design option and can't wait to see the design progression and finished product."

Total = 23/25

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### Criteria 3: Justification for Preferred design

My end user has decided design option 5 as his preferred design. The design option has a score of 23/25 which was the highest rating design option. This design is a clean functional solution to my end users problem of storage in his van. This design has a large amount of storage for the area available and has many useful functions to make the experience more pleasant and easy to use. This design is purpose built to suit the site that it will be located an example of this is the open storage at the top which will use the pop out panel area to maximise the possible storage and act as an easy quick storage location.

One of my users constraints include the secure storage of a water tank, this need is addressed through the simple and sleek idea of making a cradle for the water tank that is on rollers which the water tank sits in and is pushed back into the frame of the design when not in use this keeps the outside clean and means that there are no items for the user to get caught on which is important as it is such a small space and you will end up brushing past the cupboard.

My end user likes the fold out table portrayed in the design option and how it makes a functional desk area but when not in use it folds up leaving more space between the cupboard and existing bed frame which helps when moving around inside the van. This is important as the van is very small and does not have much space so the more functions that fold out or pull out the better.

He also likes the chosen material, marine plywood as it fulfils the needs and requirements of this cupboard perfectly. The material used in this design is a critical point and must be spot on as it will be used a lot and must not show signs of wear or break meaning the material must be very durable whilst also being aesthetically pleasing and light as there is a weight requirement of it must be as light as possible and reasonable inexpensive. When I did the research for the material I learnt that it is quite hard to find a material that fulfils these constraints however I believe marine grade plywood is the best option.

My end user believes that this design will make the use of the van easy and pleasurable thus the van will be used more as intended and will certainly solve the organisation and storage issues he had in its current form without this new instalment. One of the major design goals when designing this was a focus on accessibility as the easier/ more practical it is to use the more it will be used which is why I included a big deep pull out draw in the design option which gives storage to a wide range of items which makes it universal and will not limit my users storage options in the future. My end user agrees with this and believes that it is a very simple solution to a complex problem. The fact that this storage is universal is very important because for example if my user wanted to take his van on a ski trip and after that mountain biking both of these activities require very different clothing and items so making the storage applicable to both is a major advantage. This design option fits the brief very well and my end user is extremely excited to see the end product in his van and go and take it on a trip.

Evaluation criteria:	Score out of 5	Design option 1	Design option 2	Design option 3	Design option 4	Design option 5
- Is this cupboard suitable for holding kitchen essentials and a water tank safely and securely?	/5	5	3	5	2	5
- Does the product has primary and secondary functions?	/5	3	4	4	5	4
- Is this product a unique design and fit for its purpose, as well as minimalistic and compact?	/5	5	5	3	4	5
- Is the product an example of a modern contemporary design style?	/5	4	4	4	2	5
- Does the product have necessary attachment point to ensure that the cupboard and its contents are secure and cannot cause injury?	/5	4	3	4	4	4
- Does the product offer the user easy access and operation of the water tank?	/5	4	3	4	4	4
<b>Total for each design option</b>	/25	21/25	19/25	20/25	17/25	23/25

