

# Product Design

## Tech folio

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# UNDERSTANDING THE END-USERS

## Interview questions

### **1. Can you tell me about yourself?**

The end-users are a family living in Highton, they consist of a two boys one which is 10 who goes to Bellaire primary school and is completing year 5 and the other who is 17, he goes to Geelong college and is finishing his last year, the mother is 44 working a full time at NDIS helping disabled people through hardships and providing support as a project manager while the father is 46 working self-employed and running his own commercial and private cleaning business and a grandfather who is 83 and previously working as a teacher he migrated between Australia and India pre-pandemic with his wife who recently passed. As they are planning to move houses soon because they are getting another one built, they want some sort of centre piece for the living room which will contrast with the rest of the room.

### **2. What are your goals relating with work and lifestyle?**

They are wishing to be able to set up a self-sustaining business which will provide a high enough revenue allowing for an early retirement, this is why they are currently looking into being property developers and owners, currently owning 3-4 properties including empty plots on which they plan to build residential housing. They would like the early retirement so they can spend more time with their family and enjoy life to the fullest without being constrained to a 9-5 job.

### **3. What leisure activities or interests do you enjoy in your free time?**

The family has a variety of hobbies with each member having individual preferences to what they do in their free time, the youngest child loves to play games on his iPad and going out to bounce around on the trampoline, they oldest child loves to play basketball which is a common interest between him and the grandfather, he is usually out until 9pm practicing for basketball season. They all love to watch sports on the tv including Basketball, cricket, footy and wrestling. Similarly, they also enjoy watching movies which is why they have a movie room built in their house, when the family have free time, they occasionally watch movies or shows based on but not limited to the comedy, action, sports, or sci-fi genres.

### **4. Are there specific colours or combination of colours you prefer?**

The family has a keen eye for design and an appreciation for both light and dark colour palettes. They stated that they prefer the soothing and classic tones of light colours such as white and grey and fancy the lighter colours as they are visually expanding and allow for the room to seem bigger than it truly is, similarly to this they find lighter colours versatile especially because they can easily fit into the contemporary, minimalist, and bohemian design they prefer. additionally, the family is drawn to the boldness, contrast and depth that is brought to a room, they say it helps to differentiate the design elements and allow for them items or features to stand out.

### **5. Are there any specific textural qualities you prefer?**

The end-users prefer a smooth finish as it will prevent splintering and the grain of the wood splitting, they have specifically stated that they prefer product which have been properly finished and sanded so they don't cause any injuries, yet they don't like a matt finish and would rather have some shine as it helps products to pop out.

# UNDERSTANDING THE END-USERS

## Interview questions

### **6. Are there any materials you fancy if so, what do you like about them and why are they preferred over other materials?**

The end-user has expressed their admiration for the qualities of timber particularly its durability and ability to withstand the effects of time while still being pliable to handle daily use. They appreciate the natural beauty that timber showcases when oiled or stained and believe it would complement other items and accessories in their living room. Additionally, the family finds the use of timber to provide a warm and inviting atmosphere, contributing to the overall comfort and spaciousness of their living space. The family has also shown an interest in metals, particularly steel or brass, because they have rust-resistant properties and lightweight properties especially because steel has a sleek and modern aesthetic that can bring a unique and sophisticated touch to any living space.

### **7. How do you assess the quality of a product, and how important is it to you?**

The family have stated the quality of any product is highly important to them as it is more satisfying to know what you have is adequately built, they state major aspects of quality for them includes the finishing of a product, how durable it is, and the materials used for construction. They stated that these were the primary factors when determining quality in their terms as these features will be acting in everyday use as they must. They have stated that they would prefer the finishing and materials to be of higher condition as it will last longer meaning there will be less contribute to landfills assisting with sustainability. It was found they look for products which are not too hefty as they are easy to move around and shift.

### **8. What is your budget range for this product or service?**

After consolidation they have decided to have a budget around \$500 as if they went lower to around \$200 it is too cheap that low grade materials will have to be used meaning the final products aren't of adequate quality and are not as durable and strong or aesthetically appealing as if the products bought was bought at a higher price.

### **9. Would you rather purchase 10 items for 10\$ or 1 item for 100\$, does the quality of the product effect your purchasing decisions?**

The family has stated they would much prefer the 1 item for 100\$ as it provides a higher quality and would yield better to the effects of time, similarly they had stated that they would not have to go out again and again replacing the item if it were built correctly and with high grade materials, furthermore the appearance is usually of a better build and is built with enough strength so it can withstand everyday tasks as the more expensive products are usually more durable, they decided that the expensive product would likely be higher value for money as they wouldn't have to go through the hassle of replacement or clean-up when the cheaper product eventually break.

# UNDERSTANDING THE END-USERS

## Interview questions

### **10. How do you feel about sustainability and is it important in your life?**

Sustainability plays a major rule in the family's life as they deeply believe in recycling and reusing, this is why they are constantly donating and recycling items. They actively try to watch their carbon footprint and avoid buying single use items, they have a garden of their own where they grow some foods and plan on installing solar panels.

### **11. What are your favourite products or brands that you use regularly and why?**

The family have searched and found products they like at a variety store including Furniture galore, Focus on, Temple and webster and Adders. They look for quality in the products as well as its aesthetics so they can fit it into the house, as they stated before the construction of the product is extremely important so that it can last and not get damaged.

### **12. Do you have any ideal design style which you find favourable, if so, what aspects are there that make you like the style so much?**

The end-user design preferences are very broad and wide rang as they encompass a vast range of styles, with a special fondness for the minimalist and functional aesthetics of the Scandinavian style. They appreciate its tones and simplistic designs which still look great, they have a special appreciation for the quirky vibe of retro un and the glamour and sophisticated setup of Hollywood glam. Even though they like the minimalistic designs they also love the free-spirited and eclectic nature of bohemian beauty and the charm of modern Hamptons. Some of the family prefer a more traditional design they all seem to be able to agree on a contemporary country vibe.

### **13. Are there any visual item/ aspects or parts in a product which you prefer in products, furniture, or designs?**

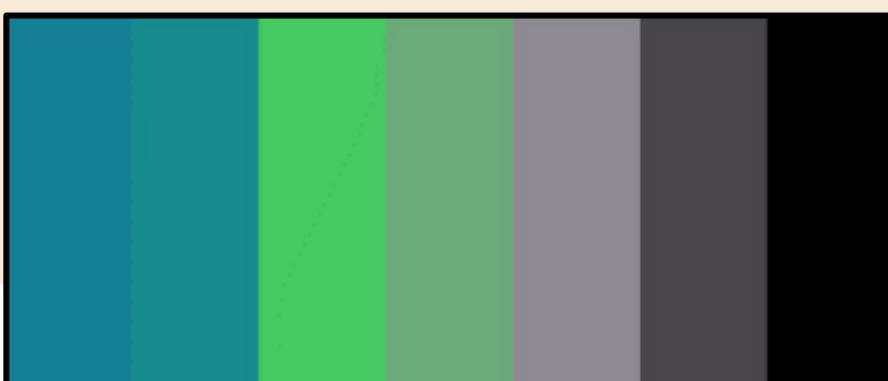
The family have a decerning eye for the quality when it comes to products purchase for their house, they place very high value on the comfort and style, often seeking something that will offer a supportive and enjoyable experience when used. Furthermore, they prioritise style making it highly considered when purchasing, as they prefer pieces which will elevate the overall appearance of their living space, additionally the family understand how important durability which is why they go out of their way to look for something which can withstand the test of time. Lastly, they seek a product which is versatile and has several functions.



# UNDERSTANDING THE END-USERS

## End-users profile

The end-users are currently living in a spacious two-story house located within Highton. They are planning on moving to their new house which should be completed by the end of this year. The family consists of a full-time mother who works as project manager at NDIS helping rehabilitate people who have disabilities. She is 44-year-old. The father, Harcharanjit, is 46 years old and manages a successful commercial cleaning company which operates around Geelong, while also engaging in other strategies to increase his income, such as flipping homes. They have two kids one who is a 10-year-old attending year 5 at Bellaire primary school and another who is 17 years old going to The Geelong college, the whole family love sports and both of the kids are playing basketball, the younger one used to do footy and the older child has done swimming, diving, athletics, baseball, soccer, hockey and archery, even making it to the stingrays rep team in 2017. They are also taking care of the grandfather, who is approaching 84 and was once a high school teacher in India. Sadly, his wife passed away last year at the age of 79.



The family expresses a fondness for the impact that bold hues, striking contrast, and rich depth bring to a space. They believe that these elements help to distinguish the various design components and make individual pieces or features more prominent. They love the modernistic style and their preferred design styles are contemporary, minimalist, and bohemian, each offering a unique



aesthetic and vibe. The family prioritise the quality and



costing of a product as very important.

The end-user family are planning to move houses soon as they are getting a new one built, this means they will need to purchase new items and furniture to decorate the interior. They like the natural look of timber contrasted with the modern style of steel. The end-users like the colours silver, grey, blue, and green. But in terms of furniture, they prefer a more modern and simplistic design.





# DESIGN BREIF

## Outline of Context

The end-user, who is soon to move into a newly built house, seeks to elevate their interior decor with a coffee table that seamlessly blends in with the overall aesthetic while simultaneously serving as a captivating centrepiece. They need it to match well with the rest of the aesthetic and environment and act as a centre piece, this means the Coffee table must have something which is different and eye-catching built in. As the table will be used as a regular table when there are people over it must be able to handle everyday wear-and-tear without being damaged, it must be robust and resilient. The end-users have suggested adding a glass top as it will provide visual appeal and also fit into the modern contemporary design the rest of the house possess, additionally the glass top will be extremely helpful in preventing unsightly stains and preserving its pristine appearance. To fully realize their vision, the end-users has set their sights on a unique, modern-shaped coffee table crafted from high-quality timber. They specified they needed it to be functional in all circumstances including parties, small gatherings, or just normal days, they want the table to have ample storage for easy storage of items.

## Specifications

The final creation will be comprised of resilient hard woods, robust metals, and sleek glass. Carefully crafted to be 1300mm in length, 750mm in width, and 500mm in high, ideally striking a perfect balance between aesthetics, portability, durability, and functionality. The top will be made to holster a large segment full of sand which can be moved around by a steel bearing to create artworks and intricate patterns, it will all be encased in a large glass sheet which will act as a shield against contaminations, spillages and the sand falling out. The table is going to consist of a modern aesthetic which will beautifully juxtapose against the surrounding environment and furnishings. The table will have a rectangular shape as it offers optimal coverage and compatibility with the overall design and layout of the house. Additionally, there will be ample storage for stowing away items to add more functionality to the table, and it will be coated in an exquisite finish to enhance the overall beauty and aesthetics of the table. There will be an intricate construction process which will show exceptional attention to detail resulting in a stunning and refined product made to be superior in quality to its retail counterparts.



# DESIGN BRIEF

## Constraints & Considerations

### ***Constraints:***

- Must be sized to fit the designated space.
- Must be made of a durable, easy to clean material.
- Must have a shape that complements the surrounding furniture and décor.
- Must be of an appropriate height.
- Must include an engaging and interactive element.
- Must match the overall style and aesthetics of the room.
- Must be functional for its intended purpose.
- Must be sturdy and well balanced.
- Must be of high quality with minor imperfections.
- Must be environmentally friendly and sustainable in its material and manufacturing.

### ***Considerations:***

- Should incorporate a well-designed handle for opening the shelves/ drawers to allow ease of use.
  - May contain a castor for wheeling around the table and making it easy to move around.
- The finish could have some level of weather resistant, so it won't get damaged by water or sunlight.
- Should have a base larger than the top to allow it to be sturdier and more capable of handling weight and decreasing the chance of it tipping.
  - Might incorporate layered wood as an aesthetic feature such as a light wood sandwiched between.
- Should incorporate hidden screws and joints to allow for a smoother finish texture and more aesthetic appeal.
  - The final product should be able to look clean everywhere.
  - Should have at most a ±1mm difference in height to ensure a flat tabletop.

# DESIGN BRIEF

## Design Priority & Quality Statement

### ***Design Priority:***

- Must look and complement the other furniture and in the room it is placed alongside.

The primary constraint when designing and constructing the coffee table is based on the aesthetics. The table needs to look more aesthetically pleasing than its predecessor and be able to fit in with the surroundings or work as an act alone centre piece that still compliments the existing space and furniture.

### ***Quality Statement:***

#### **Timber segments:**

As there will be movable and removable parts it may require some loose-fitting parts, such as the drawers, but the other joints will be secure, sturdy, and precise for optimal stability. As the budget allows it, the timber will be chosen and strengthened to reduce or even stop the warping and minimize the number of knots and faults in the timber. The Coffee table will be designed in an ergonomic manner to allow use for extended periods, easy sitting and allowing plenty of space to move around it. All structural joints will be made extremely secure using glue and nails/ screws, all the gaps will be under  $\pm 1\text{mm}$ . The aesthetic external joints will be mostly held with glue to be kept clean and have a maximum gap of  $\pm 1\text{mm}$ . all the parts will be square and level. It will need to have slightly rounded fillet on its corners and edges which will be kept to a constant radius around the whole perimeter of the table. Furthermore, it will be fully sanded to at least 200 grits for a smooth quality finish.

#### **3D printed segments:**

Due to the layered printing style of 3D printing the external shells of the printed parts will need to be thoroughly sanded to a flat surface with minimal extrusions. The parts will have movement as they will form a gantry system so they will need to have tolerances of  $\pm 0.5\text{mm}$ , furthermore it will have a dense infill which will promote strength and allow for the parts to be screwed together while also joining with glue.

#### **Glass segments:**

The glass will be trimmed to fit the precise size with a tolerance of  $\pm 0.5\text{mm}$ , it will have a chamfer on the edges. The glass purchased will have all impurities removed making it fully clear and have no tinting.

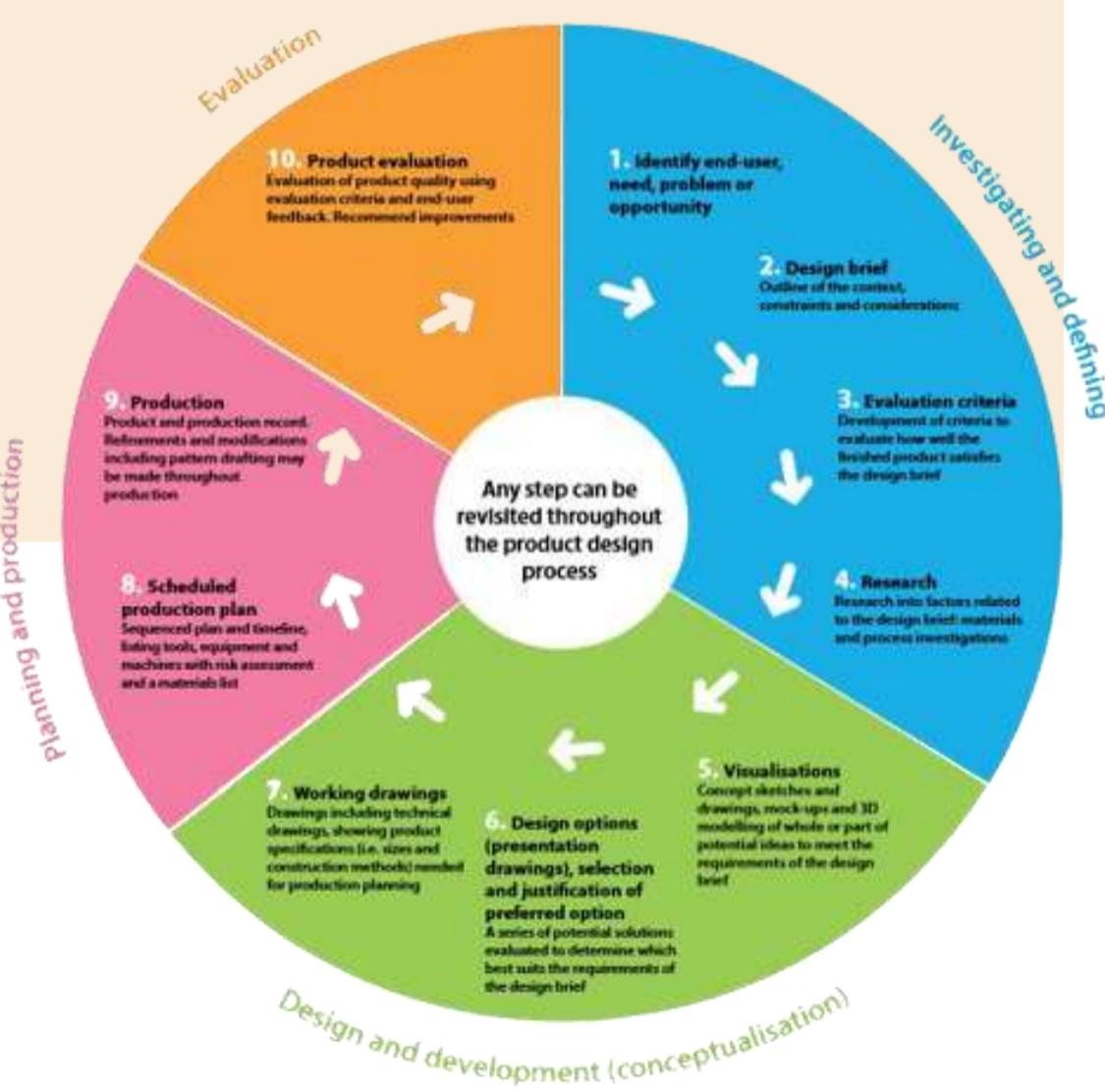


# DESIGN BRIEF

## Product Design Factors

Product design factors	Parameters
Purpose, Function, Context	The end-users require the coffee table because it will provide a flat surface for placing coffee cups or other dishes, newspapers and magazine or any other knick-knacks. In terms of environmental context, it will be placed in the guest living room which is near the entry of the house, meaning it will be one of the first things seen so it will need to be visually appealing. The table will need to be made to the highest quality with minimal imperfections and near perfect joints. As well as looking good it needs to survive an extended period of at least 4 years, hence why durability and longevity is a key point in the construction. Furthermore, as it won't have many moving parts it will be extremely reliable. Any kinetic parts will be further refined and supported to insure endurance. In terms of primary function, the coffee table must be a strong and ridged surface which can be used to place items on. The secondary functions supporting the primary function are legs, which make the table sturdy, raise its height, a set of drawers which can be used to store the knick-knacks and items, a flat and level surface to prevent spillages. As quality has utmost value in the eyes of the end-user, it will massively influence how that table will be constructed and what materials will be used. Other items to be considered include the design, aesthetics, construction methods and finishing.
User-centred design	The table will be designed to account for a wide range of ages from toddlers to elders. In order to prevent injuries, it will incorporate a wide range of features. The table will have some premium additions such as a high-grade finish and high-quality materials including but not limited to wood, glues or joining materials, hinges, and drawer slides. Ergonomics will highly contribute to the design of the product as the anthropometry (body proportions and sizes) of the user will decide on the table height and size
Innovation and Creativity	In terms of innovation & creativity the table will have a glass top and inbuilt lights so the table can stand out. Furthermore, it will be power by a battery instead of a power cable as this will allow for it to be portable and movable as well as light weight.
Visual, Tactile and Aesthetic, (Design principles and elements)	Because the coffee table is required to be visually appealing, it will use a large range of design elements and principles. There will be patterns made using lines created by joints and have a smooth texture. The table will incorporate a variety of design principles this includes proportion, balance, and symmetry. Due to the table needing to be used and seen everyday, it will use a 3:5 ratio in terms of width to length as it is aesthetically pleasing, work well with other furniture and is seen as the golden ratio for design. Furthermore, it will be designed in a symmetrical fashion with an even layout of drawers for storage as well as attractive.
Sustainability	As the Coffee table is intended to be constructed in an environmentally friendly and sustainable manner, the 3 pillars of sustainability: social, environmental, and economical will need to be factored. The construction will account for the safety and health in all those workers involved, sourcing wood from an environmentally friendly certified business as well as reducing wastage from cut offs and ensuring there is positive economic growth and legal sourcing. This will factor in the supply chain making sure its materials are ethically sourced and preferred closed loop
Economics	Economics include budget, materials, labour, and time. The main constricting factor is the budget as that will decide on the quality of the whole product, which will affect the value given to the end user. Furthermore, the budget effects the materials and time. As the coffee table is a school project there is no cost for labour, machinery, or facilities.

Legal Responsibilities	The Table will meet the Australian standards. These include safety, reliability, consistency, and quality, it will also be following the international standards. During construction and use by the end-user the table must be fully safe, meaning the product will comply to the OH&S (Occupational Health & Safety) and WHS (Work Health and Safety) rules to have safe premises, machinery, and materials. As there is going to be electrical aspects, all components will meet regulations and be certified by experts.
Materials	As the product is made to last the materials must be capable of surviving extended periods of time, which will further assist with the sustainable nature of the chosen material. The top structure will be ridged, not bend or warp, be waterproof and will not get scratched by minor inflictions or dented to prolong longevity. Due to a constant temperature, there won't be much need for factoring in expansion and contraction. As the room is light coloured it would be preferred to have some contrast, meaning possibly using a mix of dark and light material. to help with the aesthetics and feel. Furthermore, the materials will be smooth and won't splinter when sealed. They will be more appealing to look at and to resist damage to the wood there will be a high-quality finish.
Technologies	As the table will be constructed in a proper workshop there are a variety of tools which can be used for optimal construction quality, therefore there will be plenty of power tools used to speed up the process of construction and to a higher quality. Similarly, all factors will be considered when picking materials to choose the best form. A range of professionals will convert the raw materials into a usable state, removing moisture, followed by suitable construction methods.

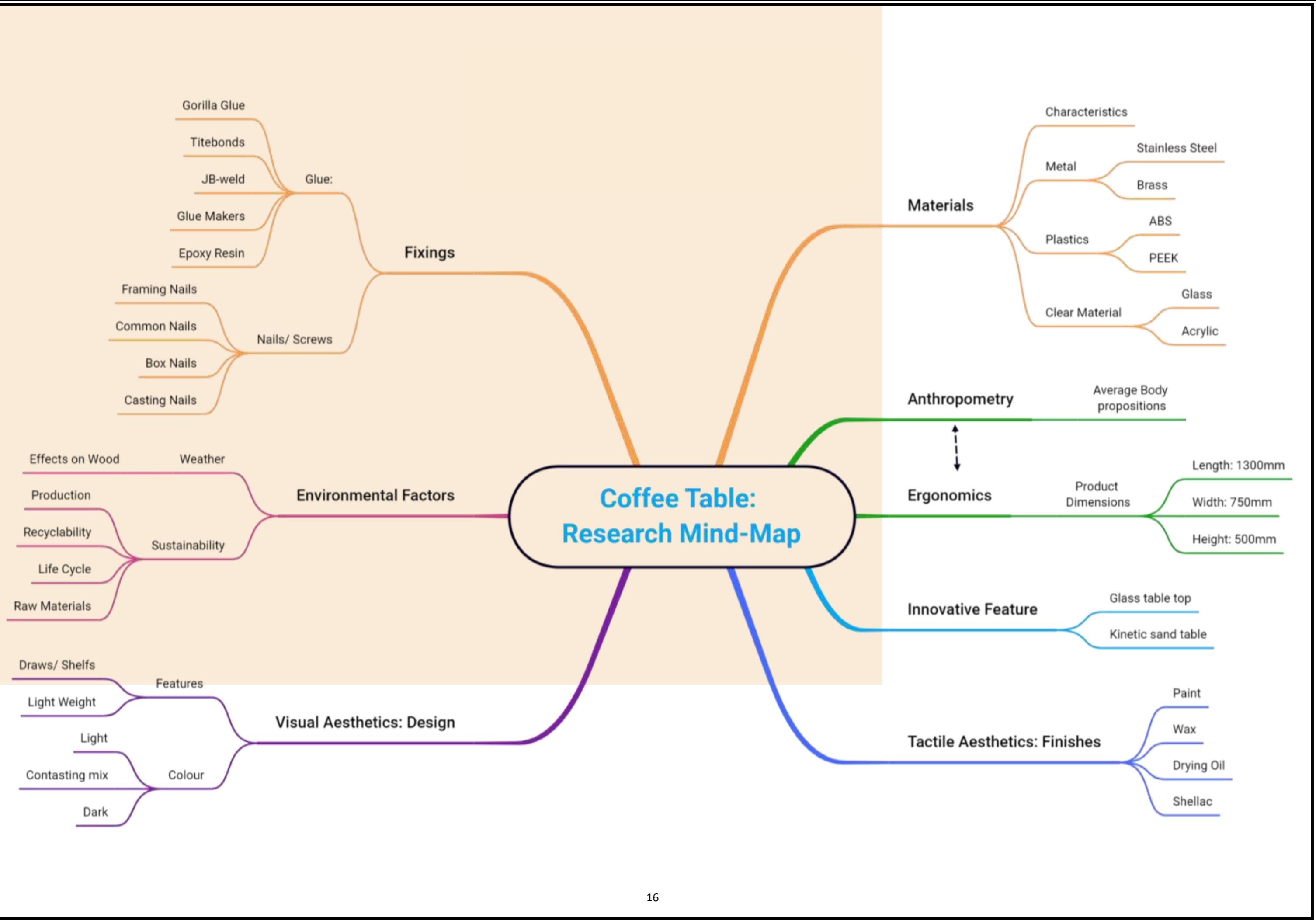


# DESIGN BRIEF

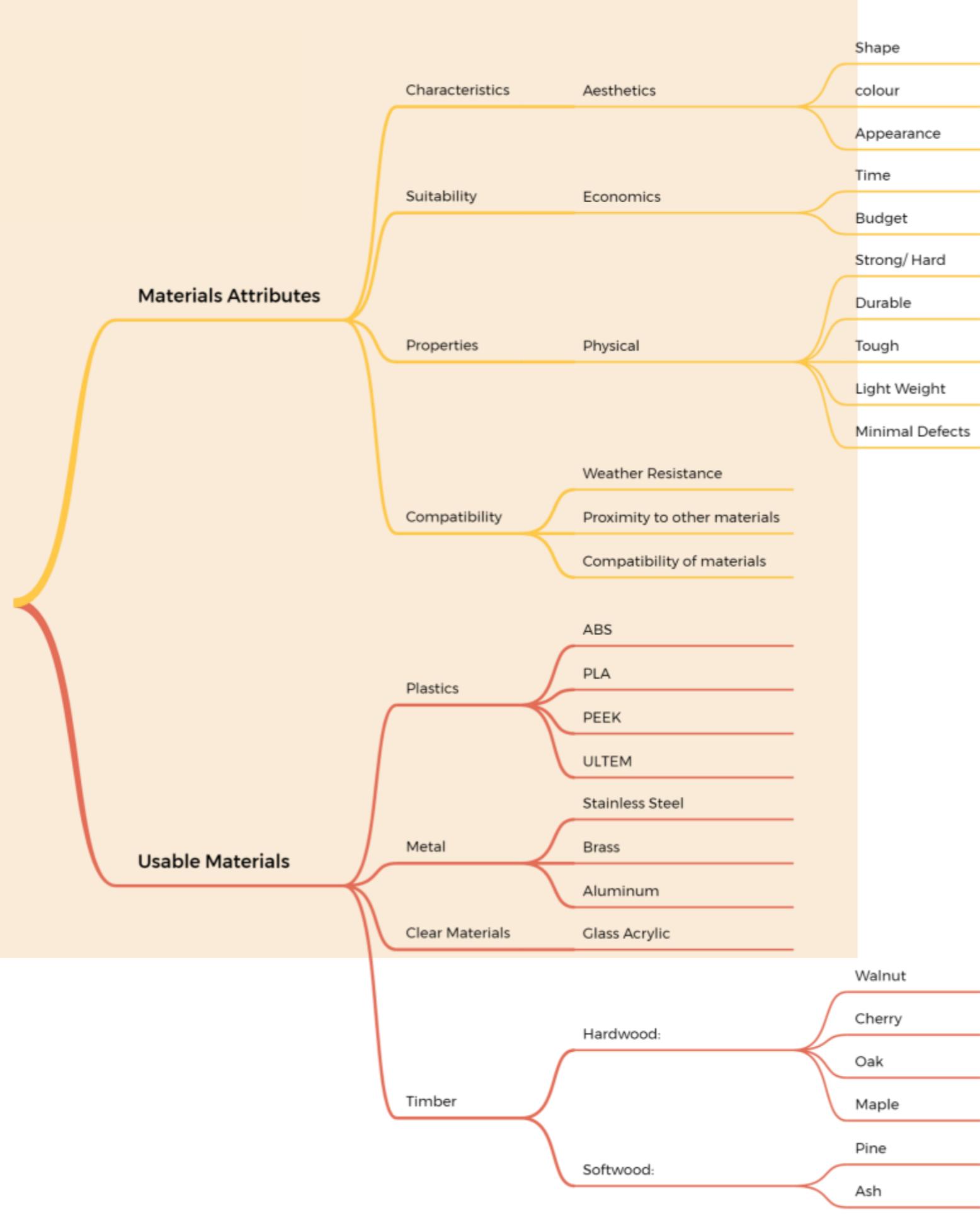
## Evaluation Criteria

No.	Evaluation criteria	Justification/ relevance to the brief	Ways to Achieve this	Checking Method on Finished Product
1	Is the Coffee table appropriately sized to fit the designated space?	There is limited space in the room, If the product is too large it would have to be placed somewhere else meaning it won't be the centrepiece.	I will carefully measure the available space and factor in how much walking space is required. I will research table ideas for small spaces	- Measure it up. - Fit and try. - Try it out and ensure it fits.
2	Is the table be made of a durable, easy to clean material?	The final product must last an extended period to reduce waste and improve quality.	I will test several woods and finishes. I will research what materials are durable and repel moisture	- Spilling stuff onto the table and then removing it - Scrub and ensued no damage. - Run trials on the materials. - Test product under simulated use conditions
3	Does the table have a shape that complements the surrounding furniture and décor?	As the table will be a centrepiece it must contrast to provide a better ambiance and improve general aesthetics	I will explore several designs ideas.	- Have a discussion with the end-user and get feedback. - Show others and gain feedback
4	Is the table of an appropriate height?	To ensure comfortable sitting and ergonomics, if the product is not comfortable to sit around it will lose one of the key purposes.	I will ensure the table factors in ergonomics and body anthropometry	- Have people sit around and use the table. - Run trials in which the end user uses the product then analyse the data
5	How does the table include an engaging and interactive element.	As the table is a centrepiece to the room it must be visually pleasing and appealing to see when coming into the given area.	This will be done by fully understanding what is engaging as satisfying to watch and seeing if I can replicate the feeling.	- Showing others and seeing their response - Showing the client - Seeing if it gets boring after a while
6	Does the product match the overall style and aesthetics of the room?	They want an aesthetically pleasing design, if it doesn't look great the end-user may not be willing to purchase it.	I will create extensive design options for the end-user to choose from This will also include testing the materials in the room.	- Show others and get their recommendations and feedback.
7	Is the table functional for its intended purpose?	If the table does not fit its main purpose, then there isn't much point of keeping it as it would only be there for looks.	I will check the flatness and balance of the top	- ensuring the table is level. - placing items and making sure nothing falls
8	Is the product sturdy and well balanced?	If the table isn't strong and balanced it won't be able to hold items as it might break or make them fall	I will make sure to measure. I will test several timbers for strength	- Testing top level with a flat edge and a level - Pushing it over and seeing if it falls
9	Is the table made to the upmost quality with limited imperfections	As the table is a centrepiece item it must have the best quality and craftsmanship in construction	I will heavily sand the table. I will ensure to accurately measure without parallax	- Inspect joints for quality. - Use a tape measure and square to ensure proper joining.
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	There are limited supplies in the world, if the table is not sustainable then eventually all materials will run out	I will carefully research for a sustainable and certified produced to purchase from	- Ensure seller certification. - Confirm the seller is sustainable.

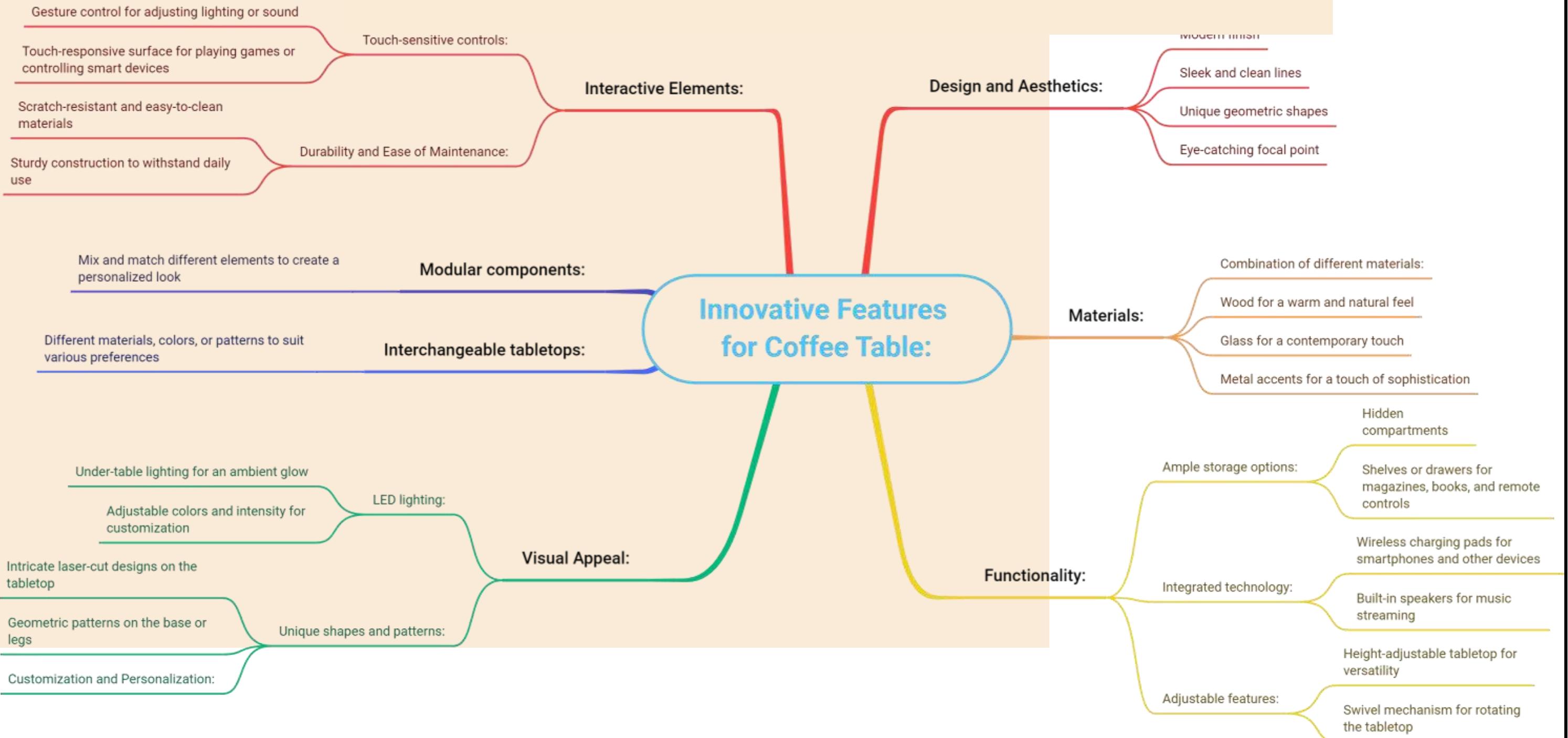
# RESEARCH & VISUALISATIONS

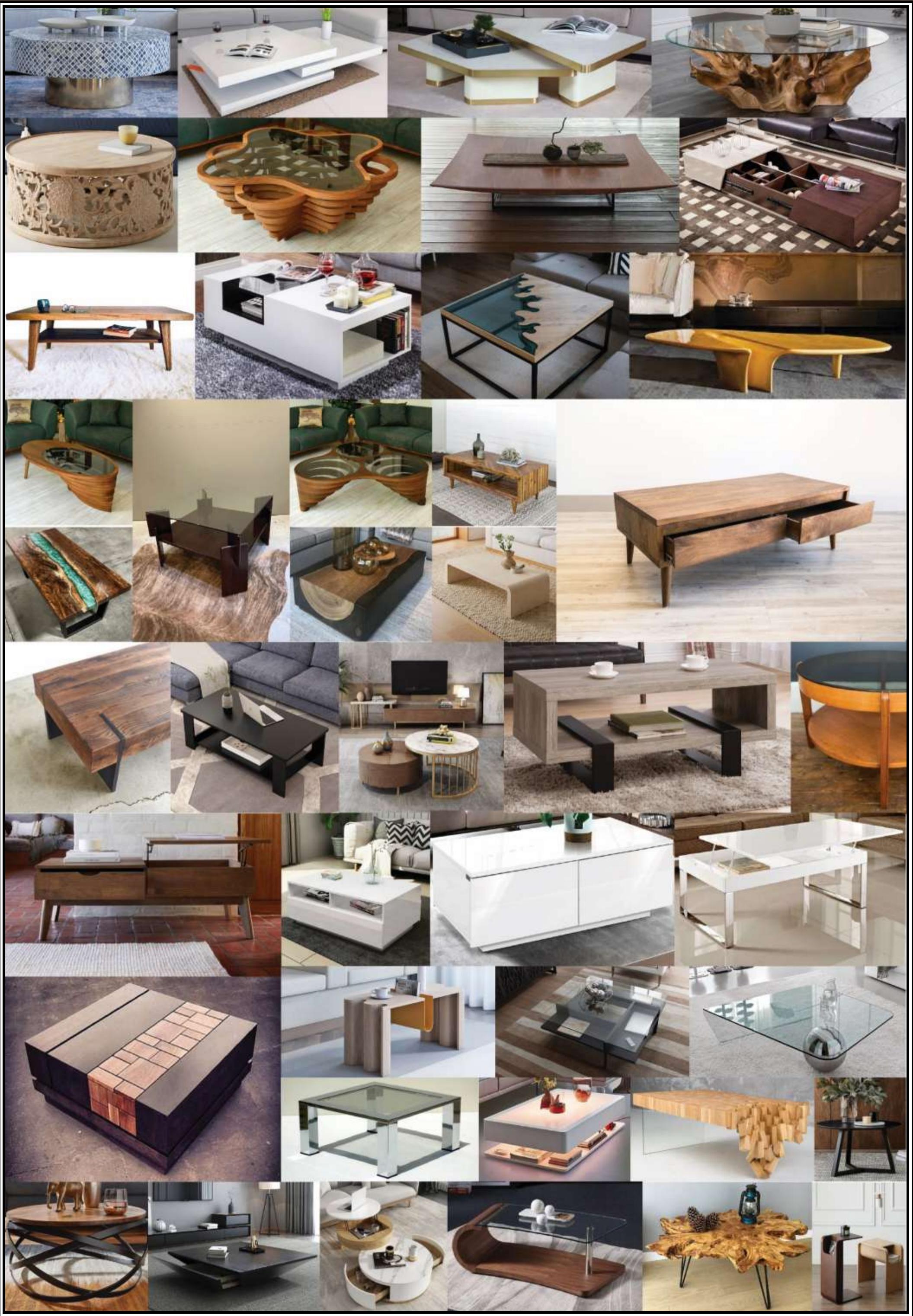


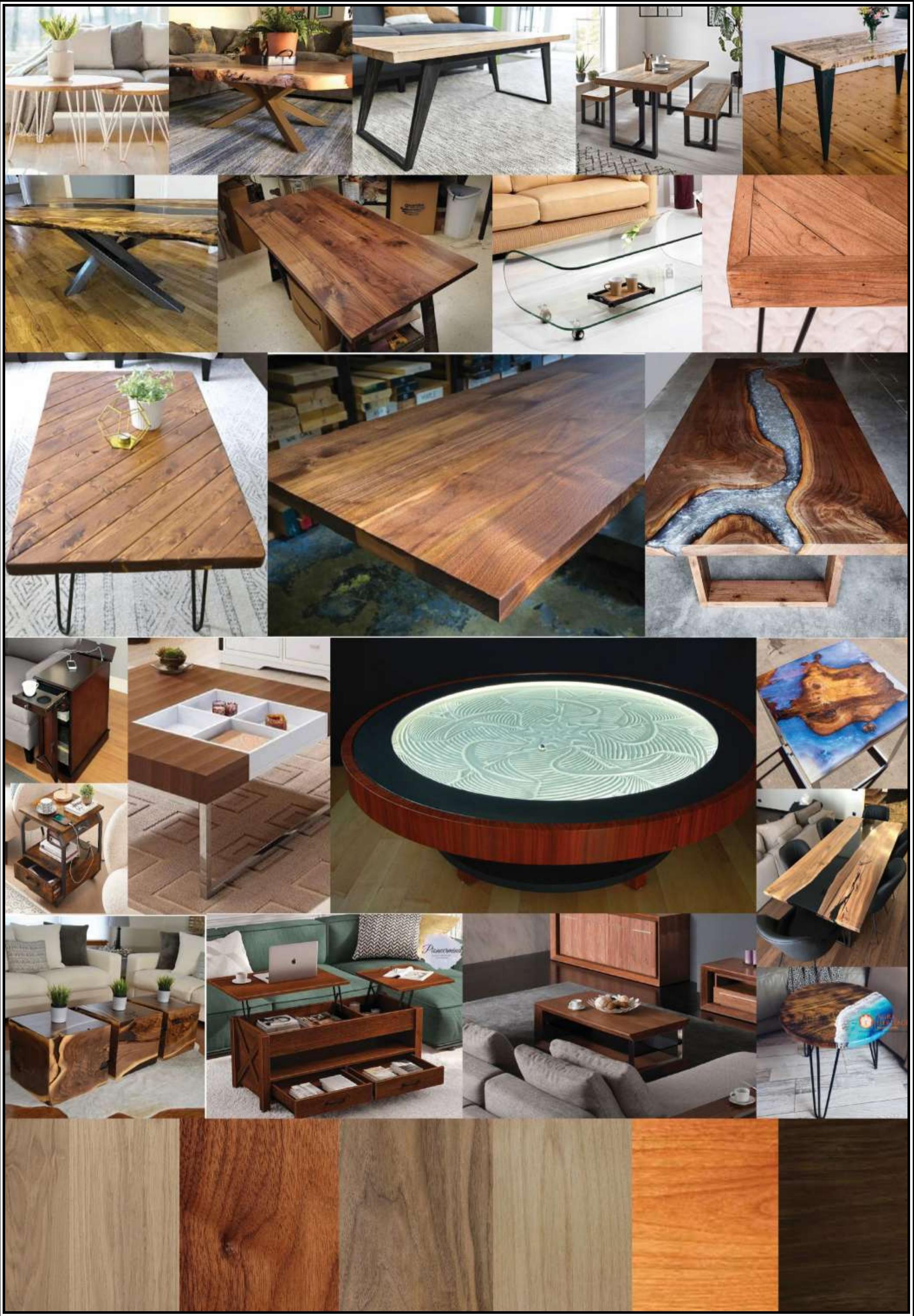
## Coffee Table: Materials Mind-Map

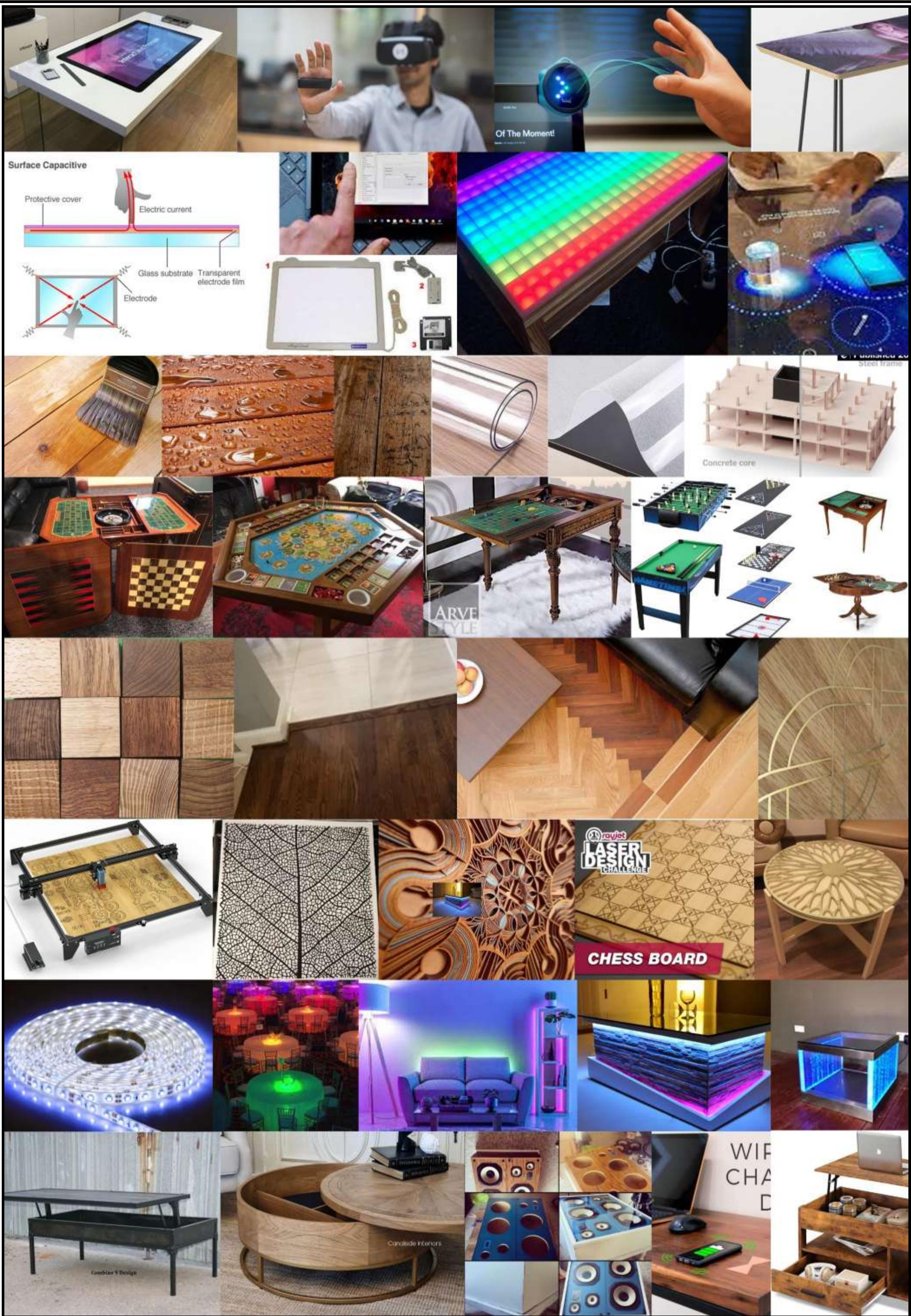


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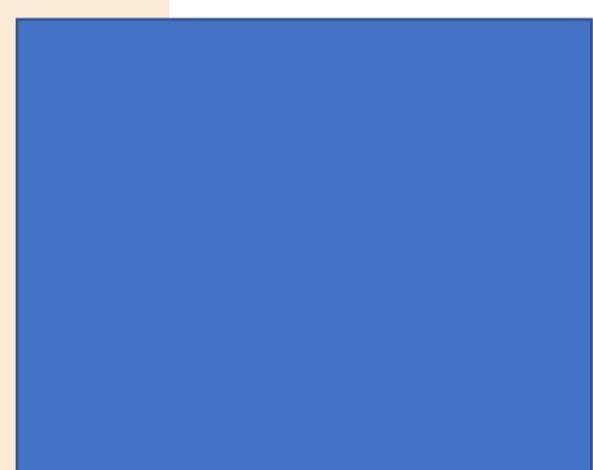
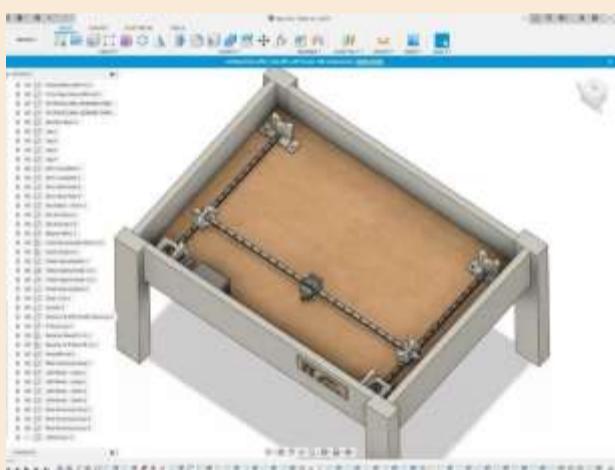
# RESEARCH

## Innovation & Design Component

The innovative design component will be a kinetic sand sculptor. It will consist of a small metal ball which will be pulled around through sand leaving a long continuous trail, this trail will be used to create patterns and art through the sand while being visually pleasing both while running and while turned off. It can be scaled in any direction to fit any table top. The purpose for this specific feature is to provide visual interest by having movement and texture. As the product is being designed for visual interest it will not need to serve any specific purpose other than being visually appealing to see and be able to catch the eye of a viewer.



There wasn't an excessive amount of research in order to develop the idea of kinetic sand sculptor, the end user was offered a variation of choices and they found this would best suit their home. In terms of research for the actual construction process I had to look into elements such as finding a suitable mechanism for moving the gantry, testing the viability and best material choice for the medium the ball would slide through, and some basic prototyping from cardboard. Some refinements made include the material the mounts will be made of, the type of movement setup, and the magnets strength.



It will consist of a mix of technical, software and hardware elements working in conjunction to offer smooth separation and seamless design, in terms of software there will be a mix of Computer Numerical Control (CNC) and position controlling elements to position the ball on the table, when it comes to hardware there will be 3D printed motor houses, button mounts, free wheels, drive belt and many others, these will all need to be tested to ensure everything will work correctly together, the CNC software will control the location of the gantry using motors which will shift the positioning of a belt drive. Through this a magnet will move which will have the metal bearing attached. As it can be scaled to any size it will be quite easy to implement into the table and around any other components.

The main feature/ highlight of the innovative feature is to provide visual contrast with a table, as it provides a modern and more fleshed out look. It adds and increased usability as it can work as a centre piece of a room and a statement article. In terms of added issues it will need to be powered therefore requiring batteries which will last a extended period of time, furthermore it may make it around 5 kg heavier, to solve these issues I can use high capacity batteries and use a light material such as acrylic for the top, but will most likely keep it glass because of the premium finish.

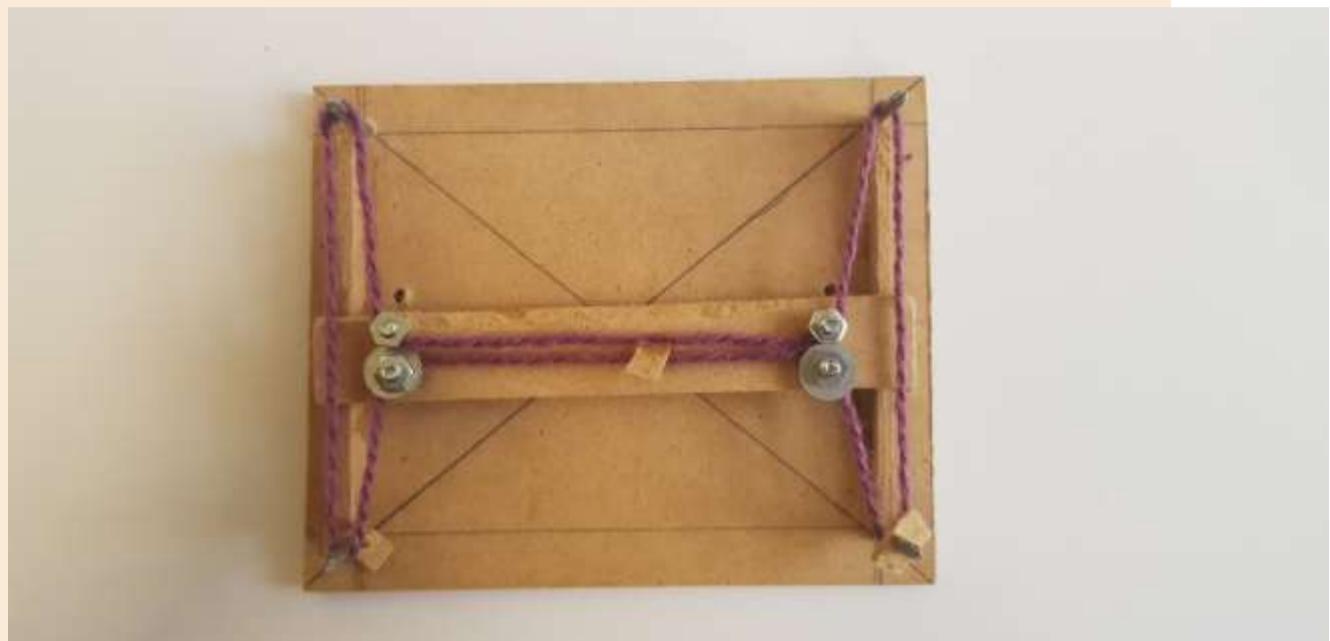
The kinetic sand sculptor would be a great addition to a coffee table for several reasons. Firstly, it adds an innovative and visually dynamic element to the table, which can make it more interesting and engaging to viewers. The movement and texture created by the kinetic sand sculptor can draw the eye and create a unique visual experience that is not found in most traditional coffee tables. Secondly, the kinetic sand sculptor can serve as a statement piece and add a sense of modernity and sophistication to the overall aesthetic of the coffee table. It can create a focal point for the room and elevate the look and feel of the space. Furthermore, the kinetic sand sculptor can also provide a creative outlet for the user to express themselves and create unique patterns and designs through the sand. This can be a fun and interactive way to engage with the coffee table and add a personal touch to the space. Overall, the impact of the innovative feature on the coffee table will depend on the preferences of the end user and their desired aesthetic for the piece. As they are for a unique and visually dynamic piece of furniture, the kinetic sand sculptor feature will be a great addition.

# RESEARCH

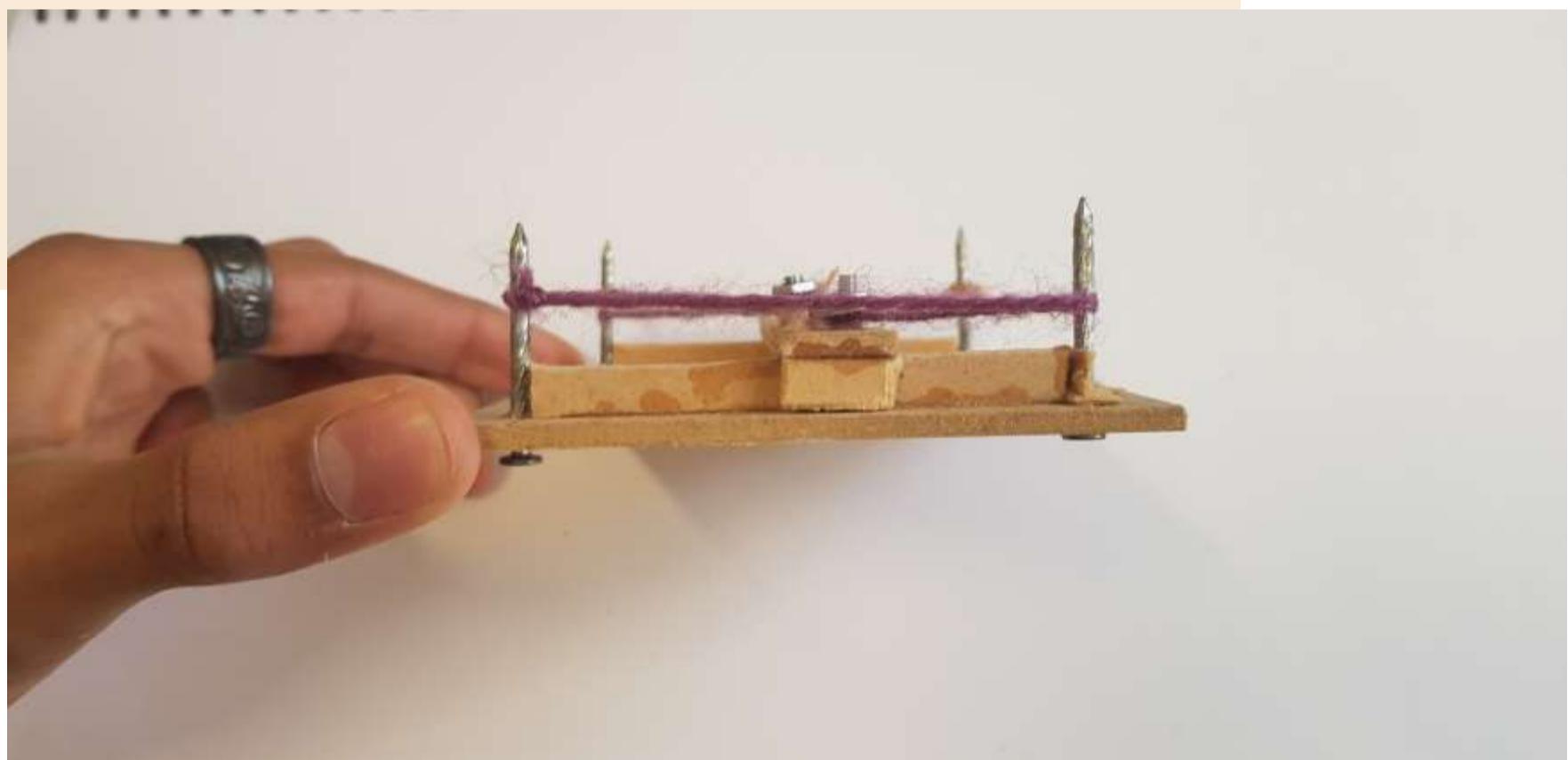
## Primary Research - Materials

# RESEARCH

## Primary Research -gantry



The provided image offers an overview of the operational concept of the gantry setup, highlighting its dual-directional movement utilizing only two models. I have personally developed and prototyped these models, rigorously ensuring their functionality and confirming their viability and suitability for the designated task.



# RESEARCH

## Secondary Research - Materials

Product Name:	Appearance:	Benefits and Disadvantages: Price per (in mm):	Image & Description	Suitability /10
<b>Timbers</b>				
Walnut, American Black	Its heartwood ranges from a golden to rich chocolate brown colour, sometimes with narrow streaks of a darker purplish brown. Sapwood is a distinctive creamy white colour. American black walnut is a fine and generally straight-grained timber, although sometimes it has an attractive wavy or curly grain, giving it a highly decorative figure.	Species Type: Hardwood Commonly known as: Black Walnut Strength group: SD5 (medium strength) Density: 615kg/m <sup>3</sup> Joint strength/ construction: JD3 (Reasonably High) Hardness: 4.5kN /20kN (Medium) Durability above ground: Reasonably high (15-45 years)  Price per: 150x25: \$34.20	 <a href="https://cdn.shopify.com/s/files/1/2793/9882/products/">https://cdn.shopify.com/s/files/1/2793/9882/products/</a> Brown, chocolate, mottled or streaky	American black walnut doesn't fare well outdoors but maintains a beautiful warm appearance indoors therefore making a great option.  9.0/10
Oak, American White	American white oak has light-coloured sapwood and a light to dark brown heartwood. White oak is mostly straight grained with a medium to coarse texture, with longer rays and more figure than American red oak. It has large distinctive growth rings, and some medullary rays may be present.	Species Type: Hardwood Commonly known as: White Oak Strength group: SD6 (Reasonably Low) Density: 750kg/m <sup>3</sup> Joint strength/ construction: J2 (High) Hardness: 6kN/ 20kN (medium) Durability above ground: Medium 15-25 years  Price per: 150x25: \$23.44	 <a href="https://www.woodsolutions.com.au/">https://www.woodsolutions.com.au/</a> White, yellow, pale straw to light brown	White Oak is a durable and strong hardwood that can withstand the wear and tear of daily use, but may need a protective layer.  8.0/10
Pine, Hoop	fairly soft and has a low density, often with very wide annual growth rings. The sapwood is white to pale yellow, but often indistinguishable from the heartwood, which is light brown to yellow.	Species Type: Softwood Commonly known as: Queensland Pine Strength group: SD5 (Medium) Density: 530kg/m <sup>3</sup> Joint strength/ construction: JD4 (Medium) Hardness: 3.4kN/ 20kN (Reasonably Low) Durability above ground: 0-7 years  Price per: 140x90: \$4.85	 <a href="https://www.woodsolutions.com.au/">https://www.woodsolutions.com.au/</a> White, yellow, pale straw to light brown	The pine may be good to build the internal structure but it does not have the desired appearance therefore making it rank quite low.  6.3/10
Maple, American Hard	It produces an attractive timber with creamy-white sapwood, sometimes with a pink tinge, and light to reddish brown heartwood. Higher grades of the timber are selected for the white colour of the sapwood, and this can limit their availability. While generally straight-grained, American hard maple can have a distinctive curly, fiddleback or Birdseye figure. Figured maple is generally only commercially available as veneer.	Species Type: Hardwood Commonly known as: Sugar Maple Strength group: SD5 (Medium) Density: 705kg/m <sup>3</sup> Joint strength/ construction: JD3 (Reasonably High) Hardness: 6.4kN/ 20kN (Medium) Durability above ground: 7-15 years  Price per: 150x25: \$19.90	 <a href="https://www.woodsolutions.com.au/">https://www.woodsolutions.com.au/</a> White, yellow, pale straw to light brown	It is a hard and dense wood that can withstand daily use, spills, and scratches without denting or splintering. It is also relatively easy to work with, which makes it a popular choice for furniture makers.  7.5/10
Chestnut, Wormy	Wormy Chestnut is not a distinct species of Chestnut, but rather refers to American Chestnut ( <i>Castanea dentata</i> ) trees that were killed by the chestnut blight of the early 1900s, which were subsequently damaged by insects, leaving holes and discoloration in the standing trees.	Species Type: Hardwood Commonly known as: Aussie wormy chestnut Strength group: SD5 (Medium) Density: 800kg/m <sup>3</sup> Joint strength/ construction: JD3 (Reasonably High) Hardness: 8kN/ 20kN (Medium) Durability above ground: 7-15 years  Price per: 150x25: \$15.30	 <a href="https://www.wood-database.com/">https://www.wood-database.com/</a> Pink to pink, brown	While wormy chestnut can be a durable and strong wood, it may be necessary to fill in the wormholes and other imperfections. But has a beautiful appearance.  7.5/10

# RESEARCH

## Secondary Research - Materials

Product Name:	Appearance:	Benefits and Disadvantages: Price per (in mm):	Image & Description	Suitability /10
<b>Timbers</b>				
Ash, Victorian	<p>Victorian ash timber usually has a straight grain but may also produce fiddleback markings and have visible gum veins. It has a coarse texture. The heartwood ranges from pale pink to yellowish brown and a walnut colour can be achieved by steaming with ammonia. The heartwood is often indistinguishable in colour from the softwood.</p>	<p>Species Type: Hardwood Commonly known as: Mountain Ash Strength group: S4 (medium high) SD4 (medium strength) Density: 650kg/m3 Joint strength/ construction: JD3 (Reasonably High) Hardness: 5.7kN /20kN (Medium) Durability above ground: 7-15 years</p> <p>Price per: 150x25:</p>	 <p><a href="https://www.briggs.com.au/">https://www.briggs.com.au/</a> Pink to pink brown</p>	<p>A relatively light and strong wood, Victorian ash has a slight grain thereby not being as appealing and is not overly durable. Also it has a very light colour therefore it would look great.</p> <p>7.4/10</p>
Australian Blackwood	<p>It is definitely an 'appearance timber', with a heartwood that is a rich golden brown. This is sometimes complimented by reddish streaks or a narrow band of darker colour, indicative of the growth rings. The sapwood is much paler in appearance. Blackwood has a medium and even texture. Its grain can either be straight or have a wavy, fiddleback pattern, which is valued for furniture and veneers.</p>	<p>Species Type: Hardwood Commonly known as: Black Wattle Strength group: S4 (medium high) SD4 (medium strength) Density: 650kg/m3 Joint strength/ construction: JD3 (Reasonably High) Hardness: 7.6kN /20kN (Medium) Durability above ground: 7-15 years</p> <p>Price per: 150x25:</p>	 <p><a href="https://forestlegality.org/">https://forestlegality.org/</a> Pink to pink brown</p>	<p>Australian blackwood has beautiful grain and texture and offers a nice density but still is slightly overly reddish for the final piece.</p> <p>7.6/10</p>
Spotted Gum	<p>The species referred to as spotted gum vary in appearance but not in durability class or other properties. The heartwood ranges from light brown through to dark red-brown hues. Sapwood is usually white to light brown in colour. The presence of a wavy grain can produce an attractive fiddle-back figure. The wood has a slightly greasy feel.</p>	<p>Species Type: Hardwood Commonly known as: Spotted Iron gum Strength group: S2 (high) SD2 (high strength) Density: 990kg/m3 Joint strength/ construction: JD1 (Very High) Hardness: 11kN /20kN (Medium) Durability above ground: 40+ years</p>	 <p><a href="https://www.mortlock.com.au/learning/">https://www.mortlock.com.au/learning/</a> Brown, chocolate, mottled or streaky</p>	<p>Spotted gum offers a similar appearance to blackwood, the distinct difference is that it has more granular patterns which result in a oversaturated appearance</p> <p>6.7/10</p>
Sydney Bluegum	<p>Sydney blue gum is a large hardwood species growing to a height of 60 metres or more. It occurs natively in forests along the coast of New South Wales and southern Queensland. Sydney Blue Gum is also extensively grown as a plantation species in South Africa and South America, where rapid growth yields timber of much lower density than Australian material.</p>	<p>Species Type: Hardwood Commonly known as: Blue Gum Strength group: S3 (Reasonably high) SD3 (Reasonably high strength) Density: 840kg/m3</p> <p>Joint strength/ construction: JD2 (High) Hardness: 11kN /20kN (Medium) Durability above ground: 5-15 years</p>	 <p><a href="https://www.woodsolutions.com.au/">https://www.woodsolutions.com.au/</a> Light to dark red</p>	<p>Bluegum is extremely hard and strong but this also makes it very heavy and the table will be hard to move, it also has an overly orange colour.</p> <p>6.8/10</p>
Jarrah	<p>Jarrah is a unique Australian hardwood renowned for its versatility. Its durability and strength make it an ideal timber for a range of structural and design applications, with timbers that display colours ranging from deep red to blonde. Jarrah timbers reflect the hues of the Western Australian landscape. The heartwood varies in colour from rich reds to browns, while sapwood ranges from a pale yellow to orange. The texture of the timber is moderately coarse and even-textured grain, although some interlocked, wavy grain may feature, creating interesting fiddle-back figure. This makes it an appealing architectural and design material..</p>	<p>Species Type: Hardwood Commonly known as: Blue Gum Strength group: S4 (Medium high) SD4 (Medium high strength) Density: 820kg/m3 Joint strength/ construction: JD2 (High) Hardness: 11kN /20kN (Medium) Durability above ground: 5-15 years</p>	 <p><a href="https://www.woodsolutions.com.au/">https://www.woodsolutions.com.au/</a></p>	<p>Jarrah is extremely hard and strong resulting in a very heavy and hard to move table, this will be a hassle to clean around and to move, it also has an overly reddish, orange colour which will surpass the accepted visual contrast.</p> <p>6.9/10</p>

# RESEARCH

## Secondary Research - Materials

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
<b>Metals</b>				
SAE 304, Stainless Steel	304 stainless Steel has a shiny and reflective surface that gives it a modern and polished look. Furthermore, the material has a silver-Grey colour that is uniform and consistent throughout its surface.	Machinability: 45% Thermal expansion: $17.2 \times 10^{-6} /K$ Corrosion Resistance: Water, distilled: 1 (excellent) Tensile strength: 515 MPa Versatility: 80/100 Density: 7,930 Kg/m <sup>3</sup> Conductivity: 3.45% Hardness, Rockwell B: 92 HRB Magnetism: non-magnetic  Price 600 x 300 x 0.9mm: \$42.75	 <a href="https://www.clintonaluminum.com/304-stainless-steel">https://www.clintonaluminum.com/304-stainless-steel</a> silver colour, uniform spread	Stainless steel offers a wide range of protection and resistance, while not as machinable it has a extremely high strength and is not magnetic.  7.8/10
Yellow, Brass	Yellow brass is a popular metal alloy made of copper, zinc, and small amounts of other metals like lead, iron, or aluminium. It has a distinctive yellow-gold colour, this can vary in brightness depending on the amount of zinc in the alloy. While some brass objects have a smooth, polished surface, while others may have a brushed or hammered texture that adds visual interest.	Machinability: 80% Thermal expansion: $20 \times 10^{-6} /K$ Corrosion Resistance: Water, distilled: 2 (moderate) Tensile strength: 340-570 MPa Versatility: 85/100 Density: 8,470 Kg/m <sup>3</sup> Conductivity: 28% Hardness, Rockwell B: 75 HRB Magnetism: Non-magnetic  Price	 <a href="https://stock.adobe.com/au">https://stock.adobe.com/au</a> yellow gold colour, brushed finish	Having a beautiful gold appearance for a fraction of the price it is very visually aesthetic, as is also very machinable. But it is very dense and heavy.  7.8/10
Aluminium	Aluminium is a lightweight, durable metal that is widely used in a variety of industries, including aerospace, transportation, construction. It has a silvery-white colour, which can vary depending on the surface finish and texture. Aluminium can be polished to a high shine or left with a matte finish.	Machinability: 50-60% Thermal expansion: $23.1 \times 10^{-6} /K$ Corrosion Resistance: Water, distilled: 1 (excellent) Tensile strength: 40-90 MPa Versatility: 90/100 Density: 2,700 Kg/m <sup>3</sup> Conductivity: 61% Hardness, Rockwell B: 55 HRB Magnetism: Non-magnetic  Price: 0.5 x 300 x 900mm: \$27.48	 <a href="https://www.istockphoto.com/">https://www.istockphoto.com/</a> silver/white colour, high shine	Aluminium is much less dense then other materials but this comes at the cost of a very low tensile strength, appearance wise it will contrast nicely  6.8/10
Copper	Copper is a versatile and widely used metal known for its distinctive reddish-brown colour and its excellent electrical and thermal conductivity. Copper has a reddish-brown colour, which can range from bright and shiny to deep and muted. Copper can also develop a patina or tarnish over time, which can range from green to brown to black if oxidised.	Machinability: 40% Thermal expansion: $16.5 \times 10^{-6} /K$ Corrosion Resistance: Water, distilled: 1 (excellent) Tensile strength: 220-370 MPa Versatility: 90/100 Density: 8,960 Kg/m <sup>3</sup> Conductivity: 100% Hardness, Rockwell B: 65 HRB Magnetism: Non-magnetic  Price	 <a href="https://www.dreamstime.com/photos">https://www.dreamstime.com/photos</a> reddish colour, high sheen	While copper is not magnetic it is extremely reddish in tone therefore taking away the beauty of the table, this makes it difficult to fit into the table without visual conflict  6.2/10
Iron	Iron is a heavy, strong, and durable metal that has been used for thousands of years in a variety of applications, including construction, manufacturing, and art. One of the main appearance factors of iron is its dark grey or black colour, which can vary depending on the level of carbon and other elements in the alloy. Iron can be polished to a high shine.	Machinability: 25% Thermal expansion: $11.8 \times 10^{-6} /K$ Corrosion Resistance: Water, distilled: 3 (inferior) Tensile strength: 600 MPa Versatility: 80/100 Density: 7.870Kg/m <sup>3</sup> Conductivity: 50% Hardness, Rockwell B: 85 HRB Magnetism: Magnetic  Price	 <a href="https://www.pinterest.com.au/">https://www.pinterest.com.au/</a> Dark colours, low sheen, scratched/ wire brushed	While the dark iron will contrast quite well with the rest of the table it is magnetic therefore being a challenge when incorporating the metal ball  6.9/10

Mostly from <https://www.matweb.com/search/DataSheet.aspx?MatGUID=abc4415b0f8b490387e3c922237098da&ckck=1>

# RESEARCH

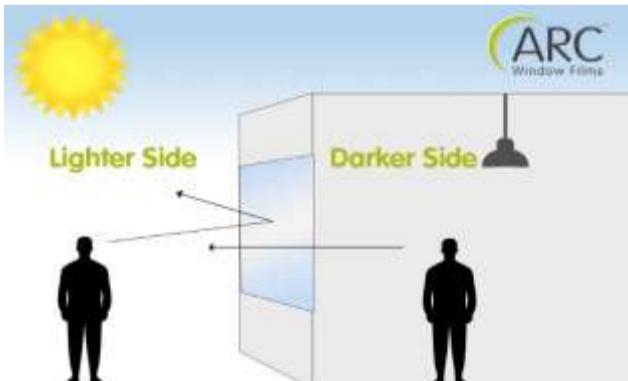
## Secondary Research - Materials

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
Plastics/ 3D Printing				
ABS	<p>Aesthetically, ABS is available in a range of colours, both solid and translucent, with a smooth and shiny surface finish. ABS has a slightly rough texture that may be visible on the surface of the print and can be minimized through the use of high-quality filament or sanding. Visible layer lines may also appear on larger prints and can be reduced through changes to the nozzle size or layer height. ABS provides a range of aesthetic options for 3D printing, including colour, surface finish, and texture.</p>	<p>Strength: 8 (excellent) Tensile strength: 45 MPa (high) Flexibility: 2/10 (not very flexible) Heat resistance: 80°C (very high) Chemical resistance: 9-10 pH (good) Price per gram in AUD: \$0.10-\$0.20 AUD per gram.</p> <p>Environmental impact: ABS has a high environmental impact due to its non-biodegradable nature and the potential release of harmful fumes during printing. Therefore, it can be rated as 8/10 (very high) in terms of environmental impact.</p>	 <a href="https://google.com/images">https://google.com/images</a>	<p>ABS is very strong compared to other filaments but isn't flexible, therefore making it a good product for designing items which will be used for a long time.</p> <p>7.9/10</p>
PEEK	<p>PEEK is typically available in its natural colour, which is amber. The surface finish of PEEK is smooth and glossy, but it can be further polished to achieve a higher gloss finish. PEEK is not prone to warping, which means that it does not require post-processing steps such as sanding or coating. However, the layer lines may be visible on the surface of the print, especially on larger prints. Overall, the primary aesthetic factors of PEEK are its natural amber colour, smooth surface finish, and visible layer lines.</p>	<p>Strength: 9 (excellent) Tensile strength: 100 MPa (excellent) Flexibility: 3/10 (not very flexible) Heat resistance: 250°C (extremely high) Chemical resistance: 9-10 pH (good) Price per gram in AUD \$1.50-\$2.50 AUD per gram.</p> <p>Environmental impact: PEEK is a high-performance thermoplastic that is recyclable and has a low environmental impact compared to other high-performance plastics. Therefore, it can be rated as 4/10 (moderate) in terms of environmental impact.</p>	 <a href="https://google.com/images">https://google.com/images</a>	<p>PEEK is extremely strong and lightly more flexible than ABS, PEEK is much more expensive per gram due to this added strength and durability. Further more having much more heat resistance to friction.</p> <p>8.4/10</p>
PLA	<p>PLA is available in a wide range of colours, including opaque, translucent, and metallic shades. The surface finish of PLA is smooth and glossy, and it is relatively easy to sand or polish for a higher gloss finish. PLA prints may have visible layer lines, especially on larger prints, but they can be minimized by using a smaller nozzle size or by increasing the layer height. Overall, the primary aesthetic factors of PLA are its wide range of colours, smooth surface finish, and visible layer lines.</p>	<p>Strength: 6 (good) Tensile strength: 60 MPa (good) Flexibility: 8/10 (very flexible) Heat resistance: 60°C (moderate) Chemical resistance: 7-8 pH (moderate) Price per gram in AUD: It varies but is usually around \$0.05-\$0.20 AUD per gram.</p> <p>Environmental impact: PLA is a biodegradable and compostable material made from renewable resources, such as corn-starch or sugarcane, making it a more environmentally friendly option than other plastics. Therefore, it can be rated as 2/10 (low) in terms of environmental impact.</p>	 <a href="https://google.com/images">https://google.com/images</a>	<p>PLA is typically a counterpart to ABS having a reduced strength while being incredibly more flexible and cheaper. Yet it will not be as functional if items being put to constant strain and friction.</p> <p>6.6/10</p>
ULTEM	<p>ULTEM is typically available in its natural amber colour, and it has a smooth and glossy surface finish that can be further polished to achieve a higher gloss finish. ULTEM prints may have visible layer lines, but they can be minimized by using a smaller nozzle size or by increasing the layer height. ULTEM is not prone to warping, which means that it does not require post-processing steps such as sanding or coating. Overall, the primary aesthetic factors of ULTEM are its natural amber colour, smooth surface finish, and visible layer lines.</p>	<p>Strength: 9 (excellent) Tensile strength: 80 MPa (very high) Flexibility: 3/10 (not very flexible) Heat resistance: 180°C (high) Chemical resistance: 9-10 pH (good) Price per gram in AUD: It varies but is usually around \$5-\$10 AUD per gram.</p> <p>Environmental impact: ULTEM is a high-performance thermoplastic that is not biodegradable and requires a significant amount of energy to produce, making it less environmentally friendly than some other materials. Therefore, it can be rated as 7/10 (high) in terms of environmental impact.</p>	 <a href="https://google.com/images">https://google.com/images</a>	<p>ULTEM is one of the strongest filaments but comes at the trade off of not being flexible, this is not to big if a deal as it will be used to create gears and holding brackets, another advantage of ULTEM is the heat resistance of 180°C</p> <p>9.3/10</p>

Mainly from <https://chat.openai.com/> and <https://filapedia.com/filament-database/>

# RESEARCH

## Secondary Research - Materials

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
<b>Clear Material</b>				
Tempered, Glass	<p>Tempered glass is a type of safety glass that is heat-treated to increase its strength and durability. Tempered glass is available in its natural colour, which is a clear and transparent finish that allows light to pass through. The surface of tempered glass is smooth and glossy, with a slight greenish tint that can be visible when viewed at an angle. Tempered glass can also be customized through the use of tinted or frosted glass, which provides additional aesthetic options for applications that require privacy or a specific visual effect. Overall, the primary aesthetic factors of tempered glass are its clear and glossy finish, transparency, and tinting options.</p>	<p>Strength: 10 (excellent) Tensile strength: 120 MPa (excellent) Flexibility: 1/10 (not flexible) Heat resistance: 200°C (excellent) Chemical resistance: 7-8 pH (good)</p> <p>Environmental impact: Tempered glass has a relatively low environmental impact compared to other materials used in 3D printing, as it is made from natural materials and can be recycled. However, the manufacturing process and transportation of tempered glass can still have some negative impact on the environment. On a scale of 1-10 where 10 is the highest impact, tempered glass would be around a 4/10 (moderate impact).</p> <p>Price:</p>	 <p><a href="https://clearglass.com.au/wp-content/uploads">https://clearglass.com.au/wp-content/uploads</a></p>	<p>Tempered glass offers a beautiful finish and incredible strength with a tensile strength of 120MPa, it offers no flexibility which will work perfectly as a table top. It has a slight blueish tint when viewed from a specific angle and is heavier than other materials.</p> <p>8.2/10</p>
Acrylic	<p>Acrylic is available in a wide range of colours, including opaque, translucent, and transparent finishes. The surface of acrylic is smooth and glossy, with a slightly plastic-like feel. Acrylic is also highly customizable, as it can be polished to achieve a higher gloss finish or sandblasted or etched to create a frosted or matte finish. Acrylic is also available in different textures, such as smooth, textured, or patterned surfaces, providing additional aesthetic options for various applications</p>	<p>Strength: 8/10 (very strong) Tensile strength: 72 MPa (excellent) Flexibility: 4/10 (not very flexible) Heat resistance: 70°C (high) Chemical resistance: 7-8 pH (good)</p> <p>Environmental impact: 6/10 (moderate). Clear Acrylic is a type of plastic, which has a moderate environmental impact due to its production process and disposal. However, it can be recycled and reused.</p> <p>Price:</p>	 <p><a href="https://www.justsignageonline.com.au/product">https://www.justsignageonline.com.au/product</a></p>	<p>Acrylic can be dyed and made opaque which means it has extreme cost. Customizability, it is typically lighter than tempered glass but not as much of a premium and can bend.</p> <p>7.6/10</p>
Acrylic mirror	<p>Acrylic mirrors are available in a range of colours, including clear, silver, gold, and bronze. The surface of acrylic mirrors is smooth and reflective, with a slightly plastic-like feel. Acrylic mirrors can also be customized by etching or sandblasting to create patterns, designs, or a frosted effect.</p> <p>Acrylic mirrors are also lightweight and easy to handle, making them ideal for various applications, such as interior design, art projects, and stage productions.</p>	<p>Strength: 8 (very good) Tensile strength: 75 MPa (high) Flexibility: 3/10 (not very flexible) Heat resistance: 80°C (very high) Chemical resistance: 9-10 pH (good)</p> <p>Environmental impact: 4/10 (moderate) while acrylic is recyclable, the production process can have negative environmental impacts and the material is not biodegradable. Additionally, the manufacturing process for creating the mirror coating on the acrylic can involve toxic chemicals.</p> <p>Price:</p>	 <p><a href="https://www.ebay.com.au/itm/252970436895">https://www.ebay.com.au/itm/252970436895</a></p>	<p>An acrylic mirror can be used where the opacity can be changed through using electrical currents, this will be much more pricy but again be a very premium product, it is quite strong offering decent resistance.</p> <p>6.6/10</p>
One way mirror	<p>One-way mirrors are typically made of glass with a partially reflective coating applied to one side. They have a silvered or tinted surface that appears opaque from one side while allowing visibility from the other side. The surface of one-way mirrors is smooth and reflective, with a slight green or grey tint. One-way mirrors are commonly used in surveillance rooms, optical devices, and theatrical performances, providing a unique and intriguing visual effect.</p>	<p>Strength: 7 (good) Tensile strength: 50 MPa (high) Flexibility: 1/10 (not flexible) Heat resistance: 80°C (very high) Chemical resistance: 9-10 pH (good)</p> <p>Environmental impact: 6/10 (high) - the production process for one-way mirrors made on glass can involve high energy consumption and use of potentially harmful chemicals. The disposal of glass can also have negative environmental impacts.</p> <p>Price:</p>	 <p><a href="https://www.arcwindowfilms.com/technical-information">https://www.arcwindowfilms.com/technical-information</a></p>	<p>A one way mirror can be used like the electronic mirror where light can change which side can see through, this will be difficult to implement but offer an impressive finish.</p> <p>7.2/10</p>

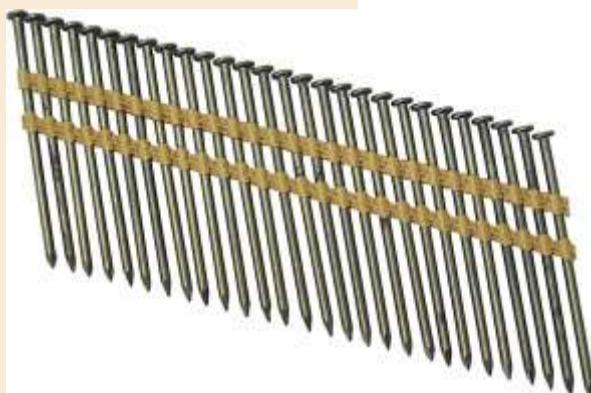
# RESEARCH

## Secondary Research - Fixings

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
<b>Glue &amp; Epoxy</b>				
Titebonds 3, Glue	When fully cured, it is not possible to determine the exact physical appearance of the glue because it dries to a translucent yellow colour that is difficult to distinguish from the surrounding wood fibres.	Type of glue: Polyurethane-based adhesive Waterproofing: 10/10 Bond strength: 2200 psi (15.2 MPa) Versatility: 14/20 Open time: 8-10 minutes Closed time: 24 hours Clean up: Can be cleaned up with water while wet, requires mechanical removal when dry. Price in AUD: \$20-\$30 per L	 <a href="https://titebond.com.au/products/titebond-iii">https://titebond.com.au/products/titebond-iii</a>	Titebond 3 has excellent curing capability's being able to hold extremely heavy pieces without breaking the bond, it finished in a translucent yellow colour.  9/10
Gorilla Glue, Glue	When fully cured, Gorilla Glue has a characteristic yellowish-brown colour and a hard, rigid texture	Type of glue: Polyurethane adhesive Waterproofing: 10/10 Bond strength: 4,000 psi (27.6 MPa) Versatility: 20/20 Open time: 10-15 minutes Closed time: 1-2 hours Clean up: Use acetone or isopropyl alcohol to remove uncured glue. Once cured, it can only be removed mechanically. Price in AUD: \$70-\$75 per L	 <a href="https://gorillaglue.com.au/">https://gorillaglue.com.au/</a>	Gorilla glue is extremely strong, even stronger than Titebond but comes the caveat of being extremely expensive per L and hard to remove.  7.6/10
JB-Weld, Glue/ Epoxy	Clear Weld cures to a clear, transparent bond when applied to a thickness of less than 15 mm. This means that the bond will turn transparent when it has reached full cure. While Marine Weld cures to a dark grey colour when fully cured	Type of glue: Epoxy Waterproofing: 10/10 Versatility: 20/20 Bond strength: 3960 psi (27.3 MPa) Open time: 20 minutes Closed time: 4-6 hours Clean up: Clean up uncured epoxy with acetone or rubbing alcohol. Cured epoxy must be mechanically removed or sanded. Price in AUD: \$15 per 25mL	 <a href="https://www.jbweld.com/">https://www.jbweld.com/</a>	JB weld is known to use an epoxy mix which will dry and harden into a very ridged finish that can be hard to remove and one of the most expensive options.  4.6/10
Epoxy Resin, Glue/ Epoxy	It generally undergoes a transformation from a liquid state to a solid state through a curing process that involves passing through a gel state. In terms of appearance, epoxy resin can have a clear, glass-like finish when fully cured, making it a popular choice for a variety of applications including coatings, art, and jewellery making. However, the final appearance can also be affected by factors such as the colour of the pigments or dyes added to the resin and the smoothness of the surface.	Type of glue: Epoxy Resin. Waterproofing: 10/10. Versatility: 18/20. Bond strength: 7,000-10,000 psi (48-69 MPa). Open time: 30min – 2hr Closed time: 36hr Clean up: Requires special solvents or alcohol-based cleaners to be cleaned up, as it does not dissolve in water. The surface should be wiped clean before the epoxy sets. Price in AUD: \$100-\$150 per L	 <a href="https://www.theepoxyresinstore.com/">https://www.theepoxyresinstore.com/</a>	Using a pure epoxy can be extremely strong but the curing time takes incredibly long and can stain the wood, but it is also immensely strong holding incredible weight.  5.6/10
Elmer's E7310 Carpenter's, Glue	They're affordable, easy to find, and offer a relatively strong bond. Many PVA glues will dry with a slightly milky white or yellow tint	Type of glue: Carpenter's Wood Glue Waterproofing: 8/10 Versatility: 15/20 Bond strength: 4,000 psi (27.6 MPa) Open time: 15 min Closed time: 20 min-30 min Clean up: Clean up excess glue with a damp cloth before it dries. Use soap and water to clean up dried glue. Share Prompt Price in AUD: \$150-\$180 per L	 <a href="https://www.elmers.com/hardware">https://www.elmers.com/hardware</a>	Elmer's glue is typically known as a school glue, the carpenter's glue has a decent versatility but comes with an immensely high price tag  4.8/10

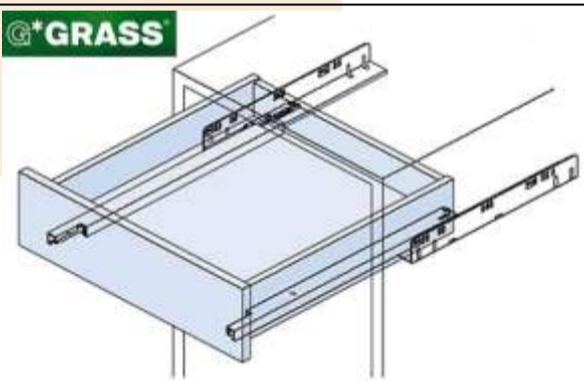
# RESEARCH

## Secondary Research - Features

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
Screws & Nails				
Framing, Nails	Framing nails are typically used in construction and carpentry for framing and other heavy-duty applications. These nails are usually larger and thicker than standard nails and are designed to provide a strong hold for structural components.	Size: 50mm - 150mm in length, and 2.5mm - 4mm thick. Material: Steel (with some made of stainless steel or galvanized steel) Shank: Ribbed Point: Diamond-shaped with a sharp angle of around 33° to 34° Coating: Zinc or galvanized coating (depending on the nail) Holding strength: 3.5mm thick nail with a length of 90mm able to hold up to 300kg. Tensile Strength: 300MPa-500MPa	 <a href="https://m.media-amazon.com/images">https://m.media-amazon.com/images</a>	Framing nails may be too large and bulky for this project as it is made to have a fine finish.  6.3/10
Common, Nails	Common nails are the most basic type of nail used in woodworking and construction. They are made of steel or iron and are typically uncoated, giving them a plain, metallic appearance. Common nails are used in a wide variety of applications, including framing, trim work, and general carpentry. They are often used for fastening wood to wood, such as in building walls, roofs, and floors.	Size: 13mm-150mm in length, and 1.2mm - 5.6mm thick Material: Steel, Stainless steel Shank: Smooth, Point: sharp but slightly blunted, 20°-25° Coating: zinc or galvanized coating Holding Strength: 3.5mm thick nail with a length of 90mm able to hold up to 250kg. Tensile strength: 500MPa-900 MPa.	 <a href="https://www.concrete-nails.com/img/">https://www.concrete-nails.com/img/</a>	Common nails have the benefit of good strength and being more compact, thus they will be better on this scale of project.  9.2/10
Box, Nails	Box nails are a type of common nail that is smaller in size and has a thinner shank than traditional common nails. They are typically made of steel or iron and are uncoated, giving them a plain, metallic appearance. One of the primary uses of box nails is in the construction of wooden boxes, crates, and other small-scale woodworking projects.	Size: 25mm-100mm in length and 1.6mm-3.8mm in thickness Material: Steel Shank: Smooth can have rib Point: Blunt point, 15°-20° Coating: zinc or galvanized coating Holding Strength: 3.5mm thick nail with a length of 90mm able to hold up to 180kg. Tensile strength: 400MPa-500MPa	 <a href="https://www.google.com">https://www.google.com</a>	Box nails come in very small sizes which means they will work properly for the micro joints and have a clean finish  9.4/10
Casing, Nails	Casing nails are a type of finishing nail that are designed to be used in finish carpentry applications, such as installing trim, moulding, and other decorative elements. They are typically made of steel or stainless steel and may be coated with a layer of galvanized or other corrosion-resistant material.	Size: 32mm-102mm in length and 2.5mm-4mm in thickness Material: Steel Shank: Smooth, can be either tapered or straight Point: sharp diamond point, 30°-34° Coating: such as a zinc or galvanized Holding Strength: A 3.5mm thick casing nail with a length of 90mm can typically hold up to around 260kg Tensile strength: 450MPa-550MPa	 <a href="https://www.reshow.no/debris/">https://www.reshow.no/debris/</a>	Casing nails are offer a more premium application as they typically are very thin leaving a tiny hole and quite a clean finish, But they aren't as strong  7.7/10
screws	Screws are a type of fastener that are commonly used in woodworking and construction projects. They are made of metal, typically steel, and come in a variety of sizes and shapes. Screws are available in a variety of head types, including flat, round, oval, and pan heads. The head type determines the tool required for installation, such as a flat-head screwdriver, Phillips-head screwdriver, or hex driver. Screws are commonly used in a wide variety of applications, including building decks, installing drywall, and assembling furniture. They are also used in cabinetry and woodworking projects.	Size: 10mm-150mm in length and, 2mm-8mm in thickness. Material: steel, stainless steel, brass, etc Shank: Threaded shank that can be fully or partially threaded depending on the type of screw. Point: Sharp, pointed tip that can be flat or cone-shaped, 40°-60° Coating: zinc or galvanized coating Holding Strength: Varies depending on the type of screw, the material it is being screwed into, and its length and thickness. Specific weight capacity cannot be provided without more information about the screw and its application. Tensile Strength: 400MPa-600MPa	 <a href="https://studentlesson.com/common-types-of-screws">https://studentlesson.com/common-types-of-screws</a>	Screws come with a wide range of features and a variety of uses, they offer superior holding strength because to the threads digging into the wood. They can be made to have a flush finish to be more aesthetically pleasing.  9.8/10

# RESEARCH

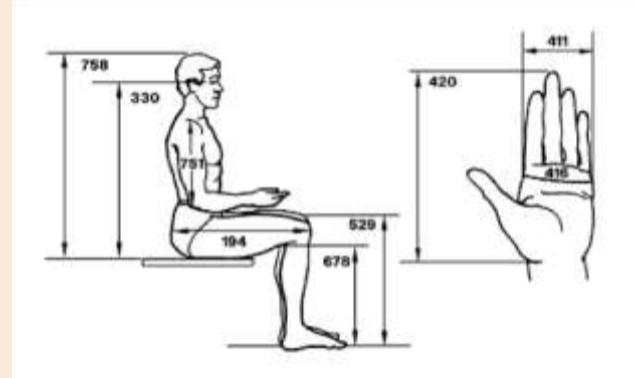
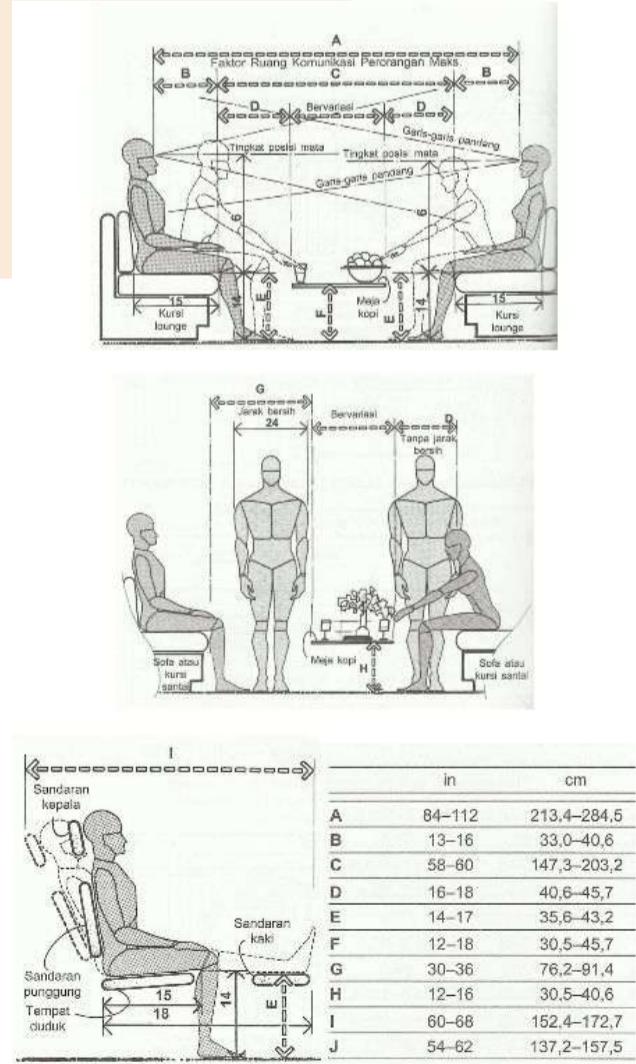
## Secondary Research - Features

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
Drawers & Shelfs				
Blum, Drawer runners	Blum drawer are both hated and loved by furniture makers as they offer an extremely soft finish being one of the smoothest drawer runners but come with some more fiddly parts to install correctly. But the final quality is fully worth the effort as it adds an extreme level of sophistication without any compromise	Compatibility: 20 (excellent) Ease of installation: Simple and straightforward; attach the runners to the drawer and then secure them to the cabinet sides. Durability: 450N breaking force Smooth operations/satisfying: 9/10 Weight Capacity (kg): Up to 30kg Price: \$60-\$120	 <a href="https://www.blum.com/au/en/">https://www.blum.com/au/en/</a>	Blum Drawer runners are one of the most smooth ones on the market offering the most premium finish but coming in extremely expensive. 9.3/10
Hettich, Drawer runners	These runners are made of high-grade materials for sophisticated use offering an extremely smooth use which is designed to last the test of time and being user over an extended period of time	Compatibility: 19/20 Ease of Installation: Attaches to drawer and cabinet with screws. Durability: 600N breaking force Smooth Operations/Satisfying: 9/10 Weight Capacity: Up to 45kg Price: \$30-\$50	 <a href="https://www.hettich.com/">https://www.hettich.com/</a>	Hettich are much cheaper than the before mentioned Blum runners, they are much stronger in terms of holding capacity but may not have as smooth operations. 8.7/10
Accuride, Drawer runners	These drawer runners are made from high-grade materials, such as cold-rolled steel, which gives them excellent durability and strength. They are also available in a variety of sizes, making them compatible with a wide range of drawer types and sizes.	Compatibility: 19/20 Ease of installation: Quick and easy using screws. Durability: 680N breaking force Smooth operation/satisfaction: 9/10 Weight capacity: Up to 45kg Price: \$20-\$50	 <a href="https://www.accuride.com/en-us">https://www.accuride.com/en-us</a>	Accuride runners offer a large holding capacity coming in many shapes and size, the are much cheaper than the premium models but may not be as smooth. 8.5/10
Grass, Drawer runners	Grass drawer runners are high-quality, durable components that are designed to provide smooth, quiet operation for drawers of various sizes. The runners are made of high-grade materials and are engineered to withstand significant weight and force and made to withstand the constant stress. Grass drawer runners have a sleek and simple appearance, with a silver or grey metallic finish.	Compatibility score: 18/ 20 Ease of installation: Screw runners onto cabinet and drawer sides, mounting bracket included Durability: 500N breaking force Smoothness score: 9/ 10 Weight capacity: Up to 30kg Price: \$50-\$70	 <a href="https://www.grass.at">https://www.grass.at</a>	Grass runners aren't overly strong in terms of holding capacity and are more expensive than the Accuride runners. 6.8/10
Shelves	Shelves are an essential piece of furniture found in almost every household and commercial space. They are designed to provide storage space for various items and come in different sizes, shapes, and materials to suit different needs and preferences.  Appearance wise they can be veneer or use a slab for a more aesthetic appearance.	Drawer storage cabinets are much better at making full use of the available cubic space  using shelves instead of drawers can also be a budget-friendly solution.  Shelves increase the visibility and accessibility of tools and provide a secure location for important records.  Shelves are flexible and can be adapted to fit different storage needs, making them a versatile storage solution.	 <a href="https://google.com">https://google.com</a>	Shelves can be made very easily without the requirement of a complex system of drawer runners, the cast next to nothing and when constructed right can handle extreme stress and weight. 8.7/10

<https://blog.theshelvingstore.com/>, <https://blog.storemorestore.com/>, <https://schoolofdecorating.com/>,

# RESEARCH

## Secondary Research - Features

Feature name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10																																	
Kinetic Sand Sculptor & Glass Tabletop																																					
Kinetic Sand Table	A metal ball rolls silently through sand, forever creating and erasing beautiful patterns. The table will use a Cartesian motion platform to move a magnet underneath a table. On top of the table, a metal sphere attached to the magnet moves through craft sand to draw attractive patterns, by blending movement along two independent axes, it can move a magnet under the sand field very precisely along predetermined paths stored in files within a small computer inside the table.	<ul style="list-style-type: none"> <li>- Aesthetic appearance</li> <li>- Interest to the table</li> <li>- Contrasting element</li> </ul>	 <p><a href="https://www.thisiscolossal.com/2016/09">https://www.thisiscolossal.com/2016/09</a></p>	The top will include a kinetic sand sculptor as it will offer a beautiful finish and a premium feature found in much more expensive tables, it will be the centrepiece of the table catching the eye.																																	
Anthropometry	Anthropometry is the study of the human body's measurements and proportions. Designers of furniture, like other product designers, use anthropometric data to create products that are comfortable and ergonomically designed for their users. It can be used to create a better fitting and suited piece of furniture which will last accordingly and have a more comfortable feel. In addition to improving comfort, furniture that is designed with anthropometry can also improve safety. For example, a desk that is too high or too low can cause discomfort and strain on the neck, shoulders, and back, while a chair that is too low can cause pressure on the knees and strain on the lower back. <a href="https://www.hfes.org/">https://www.hfes.org/</a> <a href="https://www.cdc.gov/niosh/topics/ergonomics/">https://www.cdc.gov/niosh/topics/ergonomics/</a>	<p>Improved Comfort: Designing products, including furniture, with anthropometry in mind ensures that they fit the human body properly.</p> <p>Better Accessibility: By taking into account the range of human body sizes and abilities, products can be designed to be more accessible to a wider range of users.</p> <p>Increased Efficiency: Designing products with anthropometry in mind can also increase efficiency.</p>	 <p><a href="https://benjenkins.weebly.com">https://benjenkins.weebly.com</a></p>	Anthropometry is the study of the human body's measurements and proportions. Similar to ergonomics, as this the table will be used often it will need to be comfortable to sit at and increase efficiency of use.																																	
Ergonomics	<p>Ergonomics is a crucial consideration in furniture design because it ensures that furniture is safe, comfortable, and effective for people to use. Ergonomic furniture is designed to reduce strain on the body, improve posture, and reduce the risk of injury. It takes into account how people interact with their surroundings and customizes furniture, lighting, and cabinets to suit individual needs.</p> <p>There are three types of ergonomics: physical, cognitive, and organizational. Physical ergonomics focuses on the body's interaction with the environment and is particularly relevant to furniture design. It aims to reduce discomfort, fatigue, and the risk of injury. Cognitive ergonomics deals with mental processes such as attention, perception, memory, and reasoning. It aims to optimize the design of furniture and other objects for ease of use, minimizing the need for training and reducing the risk of errors. Organizational ergonomics focuses on how work is organized and aims to optimize the design of furniture and other objects to increase productivity and reduce stress.</p> <p><a href="https://planner5d.com/blog/">https://planner5d.com/blog/</a>  <a href="https://sleephall.com/2023/02/14/">https://sleephall.com/2023/02/14/</a>  <a href="https://hatil.com/blog/en/">https://hatil.com/blog/en/</a></p>	<p>(Very similar to anthropometry)</p> <p>Improved Comfort: Ergonomic design aims to reduce discomfort and fatigue by ensuring that products fit the human body properly. For example, a keyboard that is angled to reduce wrist strain can help prevent repetitive strain injuries.</p> <p>Enhanced Safety: Ergonomic design can also make products safer to use. For example, a power tool with an ergonomic grip can reduce the risk of slipping or dropping the tool.</p> <p>Improved Health: Ergonomic design can have long-term health benefits, such as reducing the risk of musculoskeletal disorders or chronic pain caused by poor posture or repetitive strain injuries.</p>	 <table border="1"> <thead> <tr> <th></th> <th>in</th> <th>cm</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>84–112</td> <td>213,4–284,5</td> </tr> <tr> <td>B</td> <td>13–16</td> <td>33,0–40,6</td> </tr> <tr> <td>C</td> <td>58–60</td> <td>147,3–203,2</td> </tr> <tr> <td>D</td> <td>16–18</td> <td>40,6–45,7</td> </tr> <tr> <td>E</td> <td>14–17</td> <td>35,6–43,2</td> </tr> <tr> <td>F</td> <td>12–18</td> <td>30,5–45,7</td> </tr> <tr> <td>G</td> <td>30–36</td> <td>76,2–91,4</td> </tr> <tr> <td>H</td> <td>12–16</td> <td>30,5–40,6</td> </tr> <tr> <td>I</td> <td>60–68</td> <td>152,4–172,7</td> </tr> <tr> <td>J</td> <td>54–62</td> <td>137,2–157,5</td> </tr> </tbody> </table> <p><a href="https://library.binus.ac.id/eColls/eThesisdoc">https://library.binus.ac.id/eColls/eThesisdoc</a></p>		in	cm	A	84–112	213,4–284,5	B	13–16	33,0–40,6	C	58–60	147,3–203,2	D	16–18	40,6–45,7	E	14–17	35,6–43,2	F	12–18	30,5–45,7	G	30–36	76,2–91,4	H	12–16	30,5–40,6	I	60–68	152,4–172,7	J	54–62	137,2–157,5	Ergonomics follows a similar branch to anthropometry, it considers factors to improve comfort, enhance safety, and improve the long term health of the user, this can be done by finding the optimal height for a coffee table which will allow for easy use for most if not all people. It can be used to reduce chances of strains or chronic pains and is a must have in all furniture designs.
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Info from <https://chat.openai.com/>, [https://en.wikipedia.org/wiki/Vitruvian\\_Man](https://en.wikipedia.org/wiki/Vitruvian_Man), <https://humanforartists.com>,

# RESEARCH

## Secondary Research - Tactile Aesthetics

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
Finishes – Paint & Oil				
Sherwin-Williams, paint	<p>Cashmere® interior acrylic latex paint has a smooth, low-sheen finish</p> <p>SuperPaint® interior acrylic latex paint has a uniform, medium-sheen finish.</p> <p>ProMar® 200 Zero VOC interior latex paint, may have a slightly more textured finish.</p>	<p>Protection: 6/10 (good)</p> <p>UV resistance: Moderate</p> <p>Aesthetics: Highly regarded for aesthetic appeal, wide range of colours and finishes</p> <p>Durability: 8-10 years depending on surface and environmental conditions</p> <p>Ease to clean: Easy</p> <p>Price in AUD: \$35-\$70 per L</p>	 <a href="https://www.google.com.au/images">https://www.google.com.au/images</a>	<p>Sherwin-Williams paint offers good protection against UV resistance but is usually known for being more aesthetic, it is quite pricey.</p> <p>8.2/10</p>
Dulux, Bunnings, Paint	<p>Wash&amp;Wear® interior paint has a smooth, low-sheen finish,</p> <p>Dulux Weathershield® exterior paint has a more textured finish to help protect against weathering.</p> <p>Other Dulux products, such as their Design Effects Collection or their Suede and Velvet finishes,</p>	<p>Protection: 6/10 (good)</p> <p>UV resistance: moderate</p> <p>Aesthetics: - variety and ranging</p> <p>Durability: 8-10 years depending on the conditions it is exposed to.</p> <p>Ease to clean: Easy</p> <p>Price in AUD: AUD \$55 for 4L can (price may vary by location and colour)</p>	 <a href="https://www.bunnings.com.au/">https://www.bunnings.com.au/</a>	<p>Dulux is a basic company held in Bunnings, it offers good protection and comes in a variety of aesthetic options.</p> <p>8.9/10</p>
Monarch, paint	<p>Monarch Exterior Gloss enamel paint has a high gloss finish that provides a smooth and shiny texture</p> <p>Monarch Weather guard exterior paint has a more textured finish that helps to protect against weathering and fading.</p>	<p>Protection: 7/10 (good)</p> <p>UV Resistance: Moderate</p> <p>Aesthetics: Great, with a wide range of colour options and a smooth, even finish</p> <p>Durability: 7-9 years depending on the conditions it is exposed to.</p> <p>Ease of Cleaning: Moderate</p> <p>Price in AUD: \$30-\$50 per L</p>	 <a href="https://www.ppgpaints.com/products">https://www.ppgpaints.com/products</a>	<p>Monarch paint offers good protection against scratches and weather. It has a long life span coming in around 8 years, and is not overly pricy.</p> <p>8.9/10</p>
Cutek, K & M, Wood Oil	<p>Formulated to enhance the natural beauty of the timber, rather than covering it up like paint or other coatings.</p> <p>The final appearance of Cutek K &amp; M will depend on the type and condition of the timber being treated, as well as the number of coats applied.</p>	<p>Protection: 7/10 (good)</p> <p>UV resistance: Moderate (able to handle moderate UV light exposure)</p> <p>Aesthetics: The paint is available in a range of colours and finishes, including gloss and matte.</p> <p>Durability: 8-10 years, depending on the conditions it is exposed to.</p> <p>Ease to clean: Easy</p> <p>Price in AUD: \$50 per L</p>	 <a href="https://www.kmpaints.com.au/cutek_info.php">https://www.kmpaints.com.au/cutek_info.php</a>	<p>Cutek is a much more expensive paint that offers good protection it is able to handle an extensive amount of UV before peeling.</p> <p>8.6/10</p>
Minwax Tung, Wood Oil	natural, hand-rubbed look to interior wood surfaces such as furniture, cabinets, doors, and trim. Minwax Tung Oil Finish is smooth and satin-like, with a slight sheen, The final appearance of the finish will depend on the type and condition of the wood being treated, as well as the number of coats applied.	<p>Protection: 6/10 (good)</p> <p>UV resistance: Moderate</p> <p>Aesthetics: warm, natural-looking finish that enhances the wood's grain and colour.</p> <p>Durability: 2-3 years, depending on environmental factors.</p> <p>Ease to clean: mediocre</p> <p>Price in AUD: \$15-\$30 per L</p>	 <a href="https://www.amazon.com.au/">https://www.amazon.com.au/</a>	<p>Minmax oil is used in a wide array of furniture already, it has a relatively low life span before needing to be re applied but it is quite cheap and affordable.</p> <p>7.8/10</p>
Rustins Danish, Wood Oil	Designed to nourish, protect, and enhance the natural beauty of interior and exterior wood surfaces such as furniture, doors, cabinets, and decking. satin-like, with a subtle sheen that enhances the natural grain and colour of the wood.	<p>Protection: 8/10 (Excellent)</p> <p>UV resistance: Moderate -</p> <p>Aesthetics: Enhances the natural beauty of wood with a smooth and natural finish.</p> <p>Durability: up to 5 years</p> <p>Ease of cleaning: Easy</p> <p>Price in AUD: \$20-\$30 per L</p>	 <a href="https://www.wood-finishes-direct.com/product/">https://www.wood-finishes-direct.com/product/</a>	<p>Danish oil is similar to minmax oil, it has a slight sheen to it that enhances the natural grain pattern.</p> <p>7.7/10</p>

# RESEARCH

## Secondary Research - Tactile Aesthetics

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
Finishes – Shellac & Wax				
Rubio, Monocoat, Wood Finish/ Sealer	The finish is known for its ability to enhance the natural grain and texture of the wood, rather than hiding it like some other types of finishes. Rubio Monocoat is applied in a single layer, which allows the wood to retain its natural feel and texture, while also providing protection against moisture, stains, and wear. The finish is available in a wide range of colours to complement different types of wood and design preferences.	Protection: 8/10 (excellent) UV resistance: Moderate Aesthetics: Enhances natural beauty of wood, available in various colours. Durability: Average lifespan of 5-7 years Ease to clean: Easy to maintain and clean with a damp cloth Price in AUD: \$75 per L	 <a href="https://rubimonocoat.com.au/">https://rubimonocoat.com.au/</a>	Rubio Monocoat is a extremely premium finish which costs much more then other finishes, it enhance the colours and grain of the wood making it pop. 9.8/10
Zinsser, Shellac	Zinsser Shellac has a unique texture that is hard to describe. It's like a cross between velvet and glass, with a silky smooth feel that is both glossy and matte at the same time. The finish is incredibly durable and provides a long-lasting protective barrier against moisture, stains, and scratches. The texture is so unique that it has become a signature feature of Zinsser Shellac, setting it apart from other finishes on the market.	Protection: 8/10 (Excellent) UV resistance: Low Aesthetics: High-gloss finish, enhances natural wood grain, smooth and even finish Durability: 6-12 months Ease of cleaning: Easy Price in AUD: \$20-\$30 per L	 <a href="https://www.rustoleum.com.au/product-catalog/">https://www.rustoleum.com.au/product-catalog/</a>	Shellac has a high gloss finish and offers great protection, but needs to be reapplied quite often as it is wax based. 8.2/10
Minwax Paste Finish Wax	It is designed to be easy to apply with a soft cloth or brush, and it spreads evenly over the surface of the wood, making it appear richer and more vibrant.	Protection: 6/10 UV resistance: moderate Aesthetics: enhances natural beauty of wood, available in different shades, buffable to a high shine Durability: 6-12 months Ease to clean: relatively easy Price in AUD: \$30 per L	 <a href="https://sherwinwilliams.widen.net/content/">https://sherwinwilliams.widen.net/content/</a>	Finishing wax is like shellac but offers less protection and can even cost more, it is made to enhance the natural beauty of the piece. 7.6/10
Furniture Clinic Beeswax, Wood Wax	It is designed to be easy to apply with a soft cloth or brush, and it is absorbed into the wood to nourish and protect the surface. The end result is a smooth and polished finish that feels natural to the touch.	Protection: 6/10 UV Resistance: Moderate Aesthetics: Gives a traditional, warm and natural finish to wood surfaces, enhancing the natural grain and colour. Durability: 6-12 months Ease to clean: moderate Price in AUD: \$100 per L	 <a href="https://www.furnitureclinic.com/beeswax-polish">https://www.furnitureclinic.com/beeswax-polish</a>	Beeswax will offer a decent amount of protection and gives a traditional warm finish to the grain, the only issue is the extremely high price per litre coming in at 100\$. 8.8/10
Staples Crystal Clear, Wood Wax	semi-solid wax with a smooth and creamy texture. When applied to a surface, it dries to a clear, glossy finish that enhances the natural texture and appearance of the material. The wax does not typically alter the colour of the surface it is applied to, but it can help to highlight and deepen the colour and grain of the material. Overall, the appearance of Staples Crystal Clear Wax is designed to be transparent and subtle, allowing the beauty of the underlying material to shine through.	Protection: 6/10 (mediocre) UV resistance: Moderate Aesthetics: natural appearance of the surface Durability: Can last for several months before needing to be reapplied, Ease of cleaning: Easy, removed with a wax stripper if necessary Cost: Approximately AUD \$25 per 1 L	 <a href="https://www.amazon.com/STAPLES-211-Carnauba-Paste-1-Pound/dp/B001OBTOXM">https://www.amazon.com/STAPLES-211-Carnauba-Paste-1-Pound/dp/B001OBTOXM</a>	Another wood wax it stapes clear paste way, it sets clear and lasts several months before needing to be reapplied, it isn't too pricy but doesn't offer great protection. 7.6/10

Info from <https://www.woodsolutions.com.au>, <https://www.bunnings.com.au> and <https://www.woodsolutions.com.au/timber-finishes-interior> and etc..

# RESEARCH

## Secondary Research - Visual Aesthetics

Factor	Properties & effects:	Image:	Suitability /10
Colours & Tone			
Colour	<p>Mood enhancement: Colour can have a significant impact on our emotions and can be used to create different moods in a space.</p> <p>Visual interest: The use of colour in furniture can add visual interest and depth to a room, making it more visually appealing and dynamic.</p> <p>Room Balance: it can be used to balance the</p> <p><a href="https://journals.sagepub.com/doi/full/10.1177/2158244014525423">https://journals.sagepub.com/doi/full/10.1177/2158244014525423</a>  <a href="https://eilpatel.com/blog/choose-best-color-conversion">https://eilpatel.com/blog/choose-best-color-conversion</a>  <a href="https://www.pantone.com/products/lifestyle/color-messages-meanings">https://www.pantone.com/products/lifestyle/color-messages-meanings</a></p>		N/A
Black:	Is associated with power, sophistication, and elegance. Black can give a room a sleek and modern look, but it can also be associated with formality and can feel heavy and oppressive if used excessively.	 <a href="https://b2cfurniture.com.au/">https://b2cfurniture.com.au/</a>	The end user would prefer a lighter shade as they want a more vibrant room but font mind if it is on the darker end.
Brown:	Often associated with warmth, stability, and comfort. It can make the viewer feel grounded, safe, or cosy. Dark brown furniture can give a room a classic and timeless look, but it can also feel heavy and traditional.	 <a href="https://www.tlcinteriors.com.au/">https://www.tlcinteriors.com.au/</a>	Brown offers a traditional look making it quite good for a vintage theme but may not be great for the modern elements of the table.
Grey:	Gray is often associated with sophistication, neutrality, and balance. It can make the viewer feel calm, composed, or practical. Dark grey furniture can give a room a modern and minimalist look, but it can also feel cold and sterile if not balanced with warm colours.	 <a href="https://www.overstock.com/">https://www.overstock.com/</a>	Grey is quite modern and clean; it offers a practical look without overcompensating and being overly eye catching.
Beige:	Beige is often associated with warmth, neutrality, and calmness. It can make the viewer feel comfortable, relaxed, or grounded. Light beige furniture can give a room a cosy and welcoming feel, but it can also feel dull and uninspiring if not balanced with other colours.	 <a href="https://buffetandhutch.com.au/products/">https://buffetandhutch.com.au/products/</a>	Beige works well with whites as the contrast and complement each other but it may take away from the sand sculptor as the two colours will be overly similar.
White:	White is often associated with purity, innocence, and simplicity. It can make the viewer feel peaceful, clean, or spiritual. Light-coloured furniture can give a room a fresh and airy feel, but it can also feel sterile if not balanced with warm colours.	 <a href="https://www.ikea.com/au/en/p">https://www.ikea.com/au/en/p</a>	White will also overcompensate in terms of colour and take away from the sand sculptor, causing the viewer to be confused at what they are looking at initially.

<https://www.woodworkerssource.com/> and <https://www.minwax.com/>

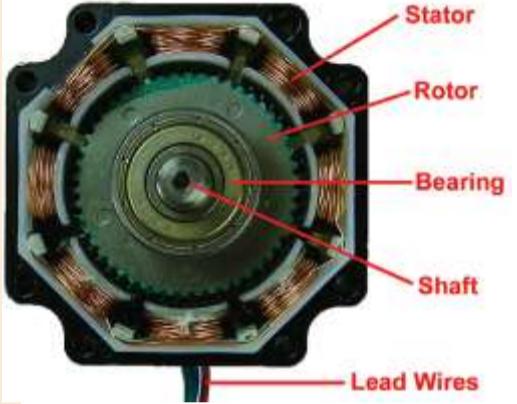
# RESEARCH

## Secondary Research – Environmental effects

Effect:	Description and Appearance:	Benefits and Disadvantages:	Image & Description:	Suitability /10
Sustainability and Weather				
Weather	Weather can have various effects on furniture, particularly wooden furniture. As the temperature and humidity fluctuate, wood furniture can expand and contract slightly, leading to cracks and splits in the wood. However, well-built furniture is designed to consider these effects and won't take damage from such movements.	To prevent damage to wooden furniture, it is recommended to keep the temperature and humidity within the home at around 22-23 degrees Celsius and 40-45 percent, respectively. Additionally, using a coaster for hot drinks and dishes can protect wooden surfaces from heat and moisture, which can cause staining and damage.  the disadvantages of weather on furniture may vary depending on the type of furniture and the weather conditions.	 <a href="https://www.lazysusanfurniture.co.uk">https://www.lazysusanfurniture.co.uk</a>	As the weather usually stays around 20 degrees in Victoria it won't be overly difficult to keep it protected as the table won't have to face external conditions.
Sustainability	Sustainability is a concept that focuses on meeting the needs of the present without compromising the ability of future generations to meet their own needs. It involves the responsible use and management of natural resources to support social, economic, and environmental well-being. Sustainability has three dimensions, namely environmental, economic, and social, and it is commonly described as having the environmental dimension as the most important.	Firstly, sustainability helps meet the needs of the present without compromising the ability of future generations to meet their needs, which is the primary goal of sustainability  Secondly, sustainable businesses tend to attract better quality investments and have a much lower financial, insurance, and liability risk  Thirdly, embracing sustainability practices can improve a company's bottom line by making it more marketable and attracting new customers, who are increasingly conscious of the environment	 <a href="https://www.sustain.ucla.edu">https://www.sustain.ucla.edu</a>	Sustainability has a huge impact on how and what the table will be constructed from, it will use sustainable and licenced wood to ensure as low of a carbon foot print and leaving enough for the next generation.
Life cycle assessment, LCA	Life cycle assessment (LCA) is a methodology used to evaluate the environmental impacts associated with all stages of the life cycle of a product, process, or service, from raw material extraction to disposal or recycling. LCA is also known as life cycle analysis  The assessment considers a wide range of environmental impacts such as energy consumption, greenhouse gas emissions, water usage, and waste generation. LCA is used to identify areas of improvement in the product's life cycle and to guide decision-making towards more sustainable options. It can also be used to compare different products or processes and to inform policy decisions	LCA consists of three main phases. The first phase is the goal and scope definition, where the purpose of the study and the system boundaries are defined. The second phase is the life cycle inventory, which involves collecting and structuring data on the inputs and outputs of the system being studied. The third phase is the life cycle impact assessment, where the significance of the environmental impacts is evaluated based on the life cycle inventory flows.  Environmental impact reduction: LCA can identify environmental hotspots within a product's lifecycle, allowing potential improvements to be identified and implemented. This can lead to a reduction in the product's overall environmental impact. <a href="https://ugreen.io">https://ugreen.io</a>  Identification of improvement opportunities: LCA can help identify areas where improvements can be made in a product's life cycle to reduce environmental impact. <a href="https://www.certifiedenergy.com.au">https://www.certifiedenergy.com.au</a>	 <a href="https://www.valsir.it/">https://www.valsir.it/</a>  <b>What is a Life Cycle Assessment?</b> Use Data Analytics to evaluate the environmental impacts of a fast-fashion retail product over its entire life cycle from production to disposal	The LCA effects everything and everyone, it factors the carbon foot print and what effect the production of a product will have. As there will be many different pieces coming together, it factors in how energy, water and etc are used to create the raw materials for production as well as transportation. Therefore I will have to factor all of these in to ensure the smallest carbon footprint as possible.

# RESEARCH

## Secondary Research – Innovative Feature parts

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image:
Stepper motors	<p>Stepper motors are a type of electromechanical device used for precise control of rotational motion. They are frequently employed in a variety of settings where precise positioning is necessary, including robots, 3D printing, CNC equipment, and automation systems.</p> <p>A rotor, a stator, and a number of electromagnetic coils make up stepper motors. The motor's revolving component is the rotor, while the stationary component is the stator. To produce a magnetic field that interacts with the rotor, the coils are positioned in pairs around it and energised in a particular order.</p>	<p>Precise Positioning: Stepper motors offer precise control over position and movement without the need for feedback devices like encoders.</p> <p>High Torque at Low Speeds: Stepper motors provide high torque at low speeds, making them suitable for applications requiring holding torque.</p> <p>Cost-Effective: Stepper motors are generally more cost-effective, eliminating the need for additional components.</p> <p>Easy to Control: Stepper motors have a straightforward control interface, making them accessible for beginners and hobbyists.</p>	
Linear guide rails	<p>Linear guide rails, also known as linear motion guides or linear slide rails, are mechanical components used in various applications to provide smooth and precise linear motion. They are often used in robotics, automation systems, industrial machines, and other areas where precise linear movement is necessary.</p> <p>A rail and a carriage are the components of linear guide rails. The rail acts as a guiding surface and is a long, stiff, and often straight track. In order to offer stability and resistance to wear, it is often built of hardened steel or other robust materials. A set of rolling components or bearings are located inside the carriage, which is attached to the rail and allows for smooth operation</p>	<p>Precise and Smooth Motion: Linear guide rails provide high accuracy and smooth linear motion for the gantry system. They minimize friction and play, ensuring consistent and reliable movement.</p> <p>Noise Reduction: The linear guide rail design minimizes vibration and noise during gantry operation. This is especially important in applications where noise levels need to be kept low, such as in medical or laboratory settings.</p> <p>Reduced Friction and Wear: The design of linear guide rails minimizes friction between the rail and the carriage, resulting in lower wear and tear. This reduces maintenance requirements and extends the lifespan of the gantry system.</p>	
Aluminium flat bar	<p>Aluminium flat bar refers to a type of aluminium extrusion that has a flat and rectangular cross-section. It is commonly used in various applications where a lightweight, corrosion-resistant, and easy-to-work-with material is required.</p> <p>Aluminium flat bars are typically manufactured through the extrusion process, where a billet of aluminium is heated and forced through a die to obtain the desired shape. The resulting flat bar has straight edges and a smooth surface finish.</p>	<p>Lightweight: Aluminium flat bars are lightweight compared to other materials like steel. This makes them easier to handle and transport, and it reduces the overall weight of the gantry system. The reduced weight can contribute to improved acceleration, lower energy consumption, and decreased wear on other components.</p> <p>Easy Machinability: Aluminium is a highly machinable material, making it easy to fabricate and modify according to specific requirements. It can be easily cut, drilled, or shaped to create custom linear guide rail configurations that suit the gantry system's design.</p>	
Belt drive	<p>Belt drives are mechanical devices that connect two or more spinning shafts together by transferring motion or power. They are constructed up of a flexible belt that wraps around pulleys or sheaves installed on the shafts and is often composed of rubber or synthetic polymers.</p> <p>Friction between the belt and the pulleys is the basis for how the belt drive works.</p>	<p>Energy Efficiency: Belt drives have excellent energy efficiency due to their low friction operation. The use of materials with high coefficient of friction, such as rubber, in the belt and pulley system ensures efficient power transmission. This can result in energy savings and reduced operating costs over time.</p> <p>Lightweight: Belt drives are lighter in weight compared to other drive systems, such as gear drives or chain drives. This lightweight nature makes them suitable for applications where weight reduction is a priority or where the overall weight of the system needs to be minimized.</p>	

# RESEARCH

## Secondary Research – Innovative Feature parts

### Estimated Minimum Items Required:

- Stepper motors (appropriate for your gantry system)
- Stepper motor drivers (matched to the motors)
- Microcontroller or PLC (to control the stepper motors)
- Power supply (suitable for your motors and drivers)
- Linear rails (for gantry movement)
- Belt drive system (to transmit motion from the motors to the gantry)
- End stop switches (to establish home positions)
- Wiring and connectors
- Mounting brackets and hardware



### Rough process of setting up the 2-dimensional gantry:

- 1) Design and assemble the gantry frame structure, including the linear rails and belt drive system. Ensure that the gantry is rigid and capable of supporting the load.
- 2) Install the stepper motors onto the gantry frame using appropriate mounting brackets. Make sure they are securely attached.
- 3) Connect the stepper motors to their respective drivers using suitable wiring and connectors. Pay attention to the correct wire connections (usually four or more wires per motor) and ensure proper insulation.
- 4) Connect the stepper motor drivers to the microcontroller or PLC. Refer to the datasheets and instructions for the specific drivers you are using to correctly wire them.
- 5) Connect the microcontroller or PLC to the power supply and ensure the voltage and current ratings are appropriate for your stepper motors and drivers. Take necessary precautions for electrical safety.
- 6) Install end stop switches at the gantry's home position(s) and wire them to the microcontroller or PLC. These switches will help establish reference positions during the homing process.
- 7) Program the microcontroller or PLC to control the stepper motors. You will need to define the desired motion profiles, steps, speeds, and acceleration/deceleration values. Use appropriate libraries or programming languages for stepper motor control.
- 8) Implement the homing process in your software. This typically involves moving the gantry towards the end stop switches until they are triggered, then establishing the corresponding positions as the home position(s).
- 9) Test the gantry's movement and motion control. Check if the motors move smoothly and accurately as per your programmed instructions.
- 10) Fine-tune the stepper motor parameters and control algorithms as necessary to optimize the gantry's performance. This may involve adjusting step timings, acceleration values, or implementing feedback control systems.
- 11) Once everything is working correctly, secure and protect all wiring and connections to ensure long-term reliability and safety.

Product Name:	Description and Appearance:	Benefits and Disadvantages:	Image:
Arduino	<p>The open-source Arduino hardware and software platform offers an adaptable and user-friendly setting for developing interactive electronic devices. The hardware part of it is a board with a programmable microcontroller, and the software part is an integrated development environment (IDE).</p> <p>A microcontroller unit (MCU) and input and output pins, such as digital and analogue pins, are commonly included on an Arduino board, allowing you to connect numerous sensors, actuators, and other electrical components. Either an external power supply or a USB connection can be used to power the board.</p>	<p><b>Easy to Use:</b> Arduino has a user-friendly development environment and a simplified version of C/C++ programming language, making it accessible for beginners and those without extensive programming experience.</p> <p><b>Open-Source:</b> Arduino is an open-source platform, meaning its hardware and software designs are freely available to the public. This openness fosters a collaborative community that shares projects, code, and knowledge, allowing users to learn from others and contribute to the platform.</p> <p><b>Cost-Effective:</b> Arduino boards are relatively inexpensive compared to other microcontroller platforms, making them accessible to a wide range of users. They offer a cost-effective solution for prototyping and DIY projects.</p>	

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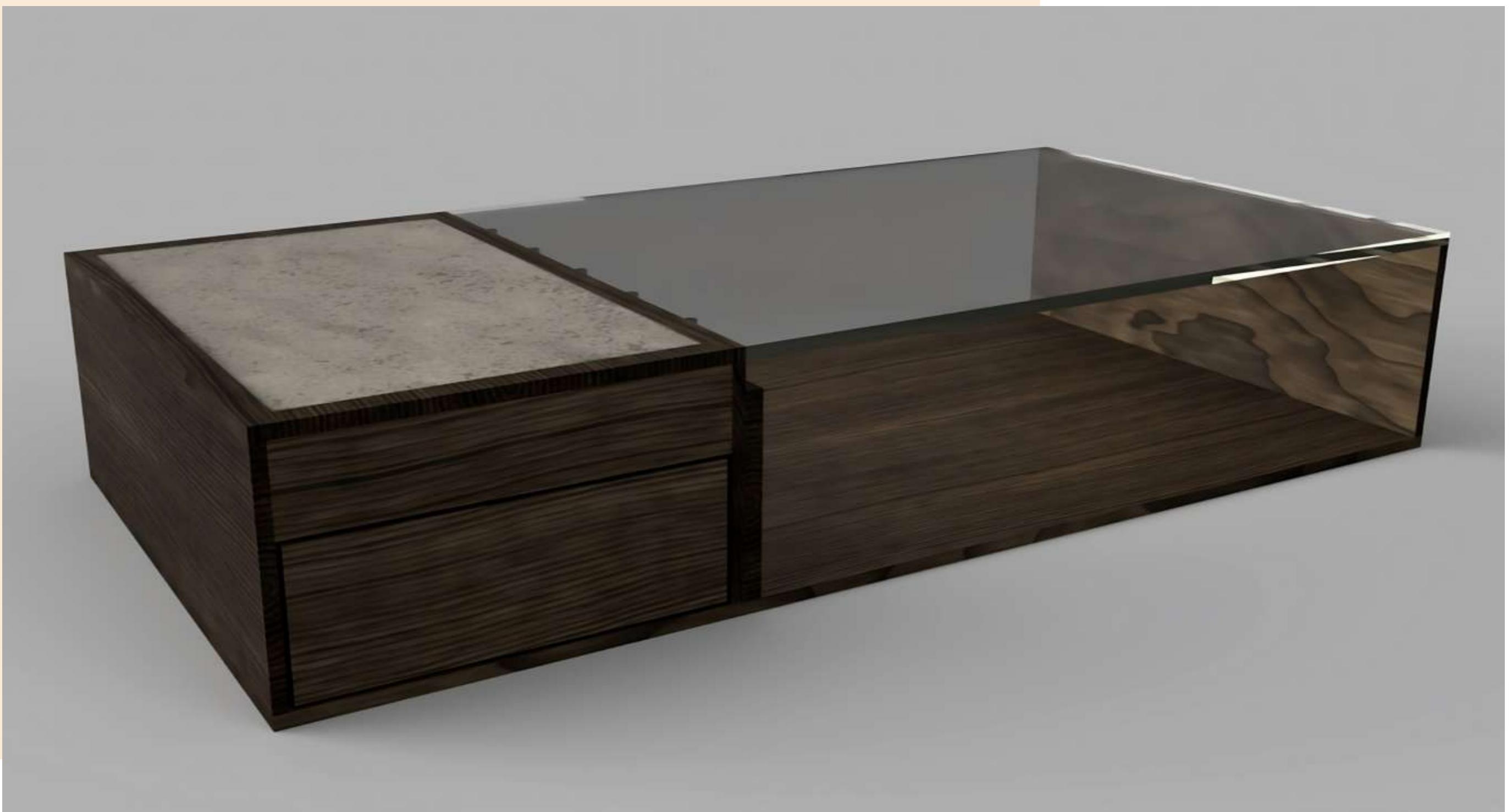
# SKETCHES & VISUALISATIONS

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# DESIGN OPTIONS AND JUSTIFICATION

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DESIGN OPTION: 1

# DESIGN OPTION: 1

## Evaluation:

No.	Evaluation criteria	Score /10	Explanation on how?
1	Is the Coffee table appropriately sized to fit the designated space?	8/10	The coffee table quite well fits within the restricted area but may be too small as the couches are relatively large.
2	Is the table be made of a durable, easy to clean material?	9/10	The table is constructed of walnut and steel with a high-grade finish, possibly rubio monocot as it is extremely resistant and easy to clean.
3	Does the table have a shape that complements the surrounding furniture and décor?	7/10	It works quite well in terms of visual appeal and filling the void in the room. The main issue is that it's a little small without legs.
4	Is the table of an appropriate height?	7/10	Its quite small without proper legs only being 200mm tall without legs.
5	How does the table include an engaging and interactive element.	7/10	The table incorporated the Kinetic Sand Sculptor, but the issue is that its quite small in comparison to other iterations meaning it doesn't get the full spotlight it deserves.
6	Does the product match the overall style and aesthetics of the room?	9/10	The colouring and style of the product do match the rest of the room well, the main consideration is still sizing vertically as it may look awkward being so much smaller then the couches
7	Is the table functional for its intended purpose?	9/10	It will easily function for holding up items and various oddities, the
8	Is the product sturdy and well balanced?	7/10	The product is extremely well balanced but will have difficulties leveling out on difficult terrain as the whole base must be touching the ground.
9	Is the table made to the upmost quality with limited imperfections?	7/10	The tables quality will be dependent on the final production it will, the main factor to consider is the overall joining which has been measured and checked in Fusion 360.
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	8/10	The timber will be received from a sustainable producer, this producer is Mathew's timbers, they are Australian certified and ensure sustainable wood.
Total scoring		78/100	

Overall end-user feedback

# DESIGN OPTION: 1



Unfortunately the options has quite a small Kinetic Sand Sculptor meaning it won't attract as much attention, furthermore it isn't supported by any lighting or other features to pull the focus to it.

The Option doesn't have legs and uses a wide flat base, the main issue with this is that it wont be overly easy to level out on uneven terrain or carpet.



Further comments: The overall aesthetics are quite nice but the main issue with the table is that it wont work overly well as an central piece.



## DESIGN OPTION: 2

# DESIGN OPTION: 2

## Evaluation:

No.	Evaluation criteria	Score /10	Explanation on how?
1	Is the Coffee table appropriately sized to fit the designated space?	7/10	The table fits but its slightly oversized and will need reduction, furthermore, is quite an awkward height to comfortably use.
2	Is the table be made of a durable, easy to clean material?	8/10	This table will be made of American white oak consisting of a rubio monocoat finish which offers a nano level finish.
3	Does the table have a shape that complements the surrounding furniture and décor?	7/10	While the overall table design works with the furniture the drawer boxes seem oversized and whole table has an overly light colouring which may make it pop out too much.
4	Is the table of an appropriate height?	6/10	It is slightly oversized which makes it somewhat awkward to grab and place items, it would need a overall size reduction to take up less space
5	How does the table include an engaging and interactive element.	7/10	The top successful encompasses the innovative feature but the main issue is that it takes up a lot more space then expected vertically, meaning the top would be extremely thick.
6	Does the product match the overall style and aesthetics of the room?	6/10	The overall aesthetics for the table work decently with the room as the couches are also a light colour which the back feature wall is black. This would provide nice contrast.
7	Is the table functional for its intended purpose?	8/10	It works perfectly for storing and putting items on top of, there is plenty of storage space for placing almost anything.
8	Is the product sturdy and well balanced?	7/10	The base consists of 4 thick legs which means it wont be going anywhere anytime soon, it can easily hold weight without shifting around.
9	Is the table made to the upmost quality with limited imperfections?	7/10	The tables quality will be dependent on the final production it will, the main factor to consider is the overall joining which has been measured and checked in Fusion 360. But because of a easy design it isn't overly difficult
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	8/10	The timber will be received from a sustainable producer, this producer is Mathew's timbers, they are Australian certified and ensure sustainable wood.
Total scoring		71/100	

Overall end-user feedback

## DESIGN OPTION: 2



Further comments:



DESIGN OPTION: 3

# DESIGN OPTION: 3

## Evaluation:

No.	Evaluation criteria	Score /10	Explanation on how?
1	Is the Coffee table appropriately sized to fit the designated space?	10/10	The Design fits nicely withing the designated space ensuring there isn't any overhang or collisions with surrounding items or space. Its slightly the height restriction therefore making it easy to use.
2	Is the table be made of a durable, easy to clean material?	9/10	The table is constructed of walnut and steel with a high-grade finish, possibly rubio monocot as it is extremely resistant and easy to clean.
3	Does the table have a shape that complements the surrounding furniture and décor?	9/10	It works quite well as the surrounding elements have a somewhat similar shaping. The table works well because its using roughly a 3:5 ratio which is considered a golden ratio in table making.
4	Is the table of an appropriate height?	10/10	The table is around 500mm tall which means it works well for the ergonomics and sizing of the surrounding couches, it can easily be used without needing to reach around too much.
5	How does the table include an engaging and interactive element.	10/10	The table incorporates the kinetic sand sculptor which will act as the interest piece of the table. After testing I found that it is engaging to watch and keeps the end-user entertained.
6	Does the product match the overall style and aesthetics of the room?	9/10	The room has a very mixed contrast of light-coloured walls with a dark feature wall, there's light couches and dark furniture, this means the table will suit the environment and aesthetics quite well.
7	Is the table functional for its intended purpose?	10/10	It is fully functional as a table and it completely supports anything put on the top, it is designed to support plenty of weight.
8	Is the product sturdy and well balanced?	10/10	Due to the full body steel base, it can handle immense amounts of weight without any sort of deformation or hindrances to strength.
9	Is the table made to the upmost quality with limited imperfections?	8/10	This will be dependent on production quality, but the table is designed to fit together perfectly.
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	7/10	The timber will be received from a sustainable producer, this producer is Mathew's timbers, they are Australian certified and ensure sustainable wood.
Total scoring		92/10	

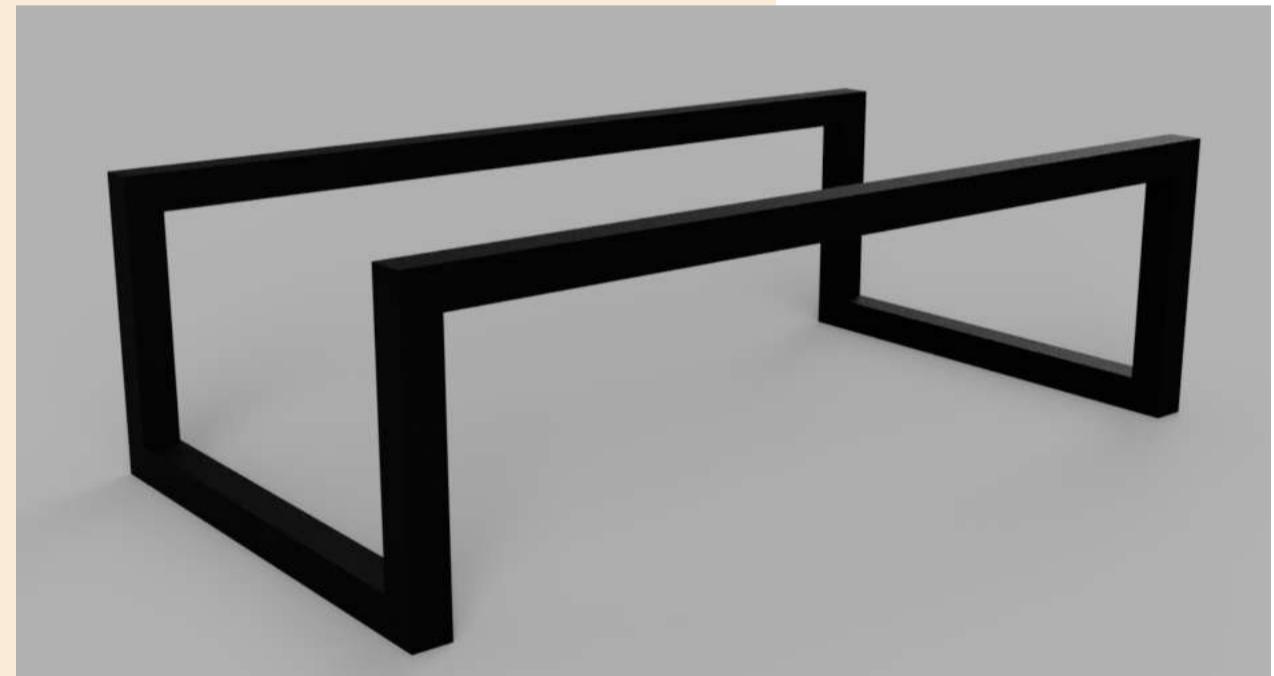
Overall end-user feedback

## DESIGN OPTION: 3



The innovative feature is the centrepiece of the design meaning it gets the most attention, it's got further interest added because of the lighting around the edges.

As the legs are made of steel square they won't have any issue on becoming level, furthermore, because they are quite wide they can easily deal with any weight put on the sides without the fear of it toppling over.



Further comments:

The table looks quite nice and offers a good appeal for being the main option. The black legs work well with the walnut; the overall table will have a nice contrast with the rest of the room.





DESIGN OPTION: 4

# DESIGN OPTION: 4

## Evaluation:

No.	Evaluation criteria	Score /10	Explanation on how?
1	Is the Coffee table appropriately sized to fit the designated space?	8/10	The Table easily fits within the designated spacing. Furthermore, the rounded corners allow for a softer more elegant walk around experience.
2	Is the table made of a durable, easy to clean material?	9/10	Yes, the table will be made of a beautiful maple wood, when finished with rubio monocoat will allow for super easy cleaning.
3	Does the table have a shape that complements the surrounding furniture and décor?	8/10	The shape works well as a centrepiece but the smooth curves most likely won't work overly well with the interior room.
4	Is the table of an appropriate height?	10/10	It is quite well designed in terms of height and offers adjustable legs to change the height to suit multiple couches.
5	How does the table include an engaging and interactive element.	8/10	The whole table is quite visually engaging and fascinating, this will be further with the addition of the innovative design component. The major factor to consider will be the extra required width of the top.
6	Does the product match the overall style and aesthetics of the room?	7/10	The overall design works decently with the room but as previously stated may not fit in seamlessly and most likely will grab attention straight away.
7	Is the table functional for its intended purpose?	8/10	It works perfectly fine in order to hold items, the only reason it doesn't receive a 10 is because there isn't any secure drawer to hide the clutter.
8	Is the product sturdy and well balanced?	7/10	It works well for balance as there are 4 sturdy legs to hold the weight of anything put on it and the weight of the top, the main issue is that its top heavy.
9	Is the table made to the upmost quality with limited imperfections?	8/10	As everything is finalized and designed most parts can have laser cut stencils and ensure near perfections to 1mm difference.
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	8/10	The timber will be received from a sustainable producer, this producer is Mathew's timbers, they are Australian certified and ensure sustainable wood.
Total scoring		81/100	

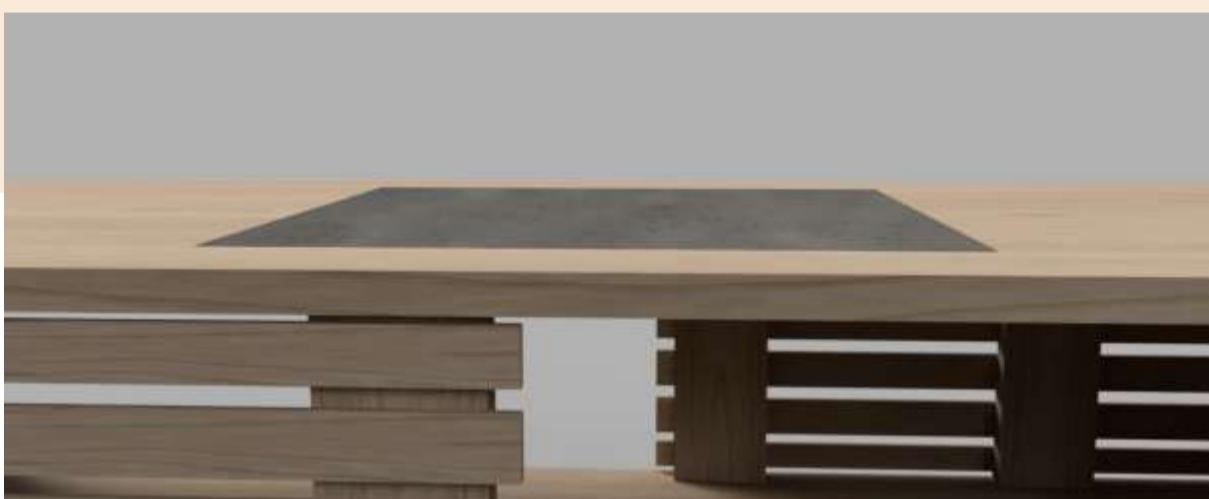
Overall end-user feedback

# DESIGN OPTION: 4



The primary function of the table is quite well suited and incorporated in the design but the main issue in the table is that it has curved edges which may cause items to fall down.

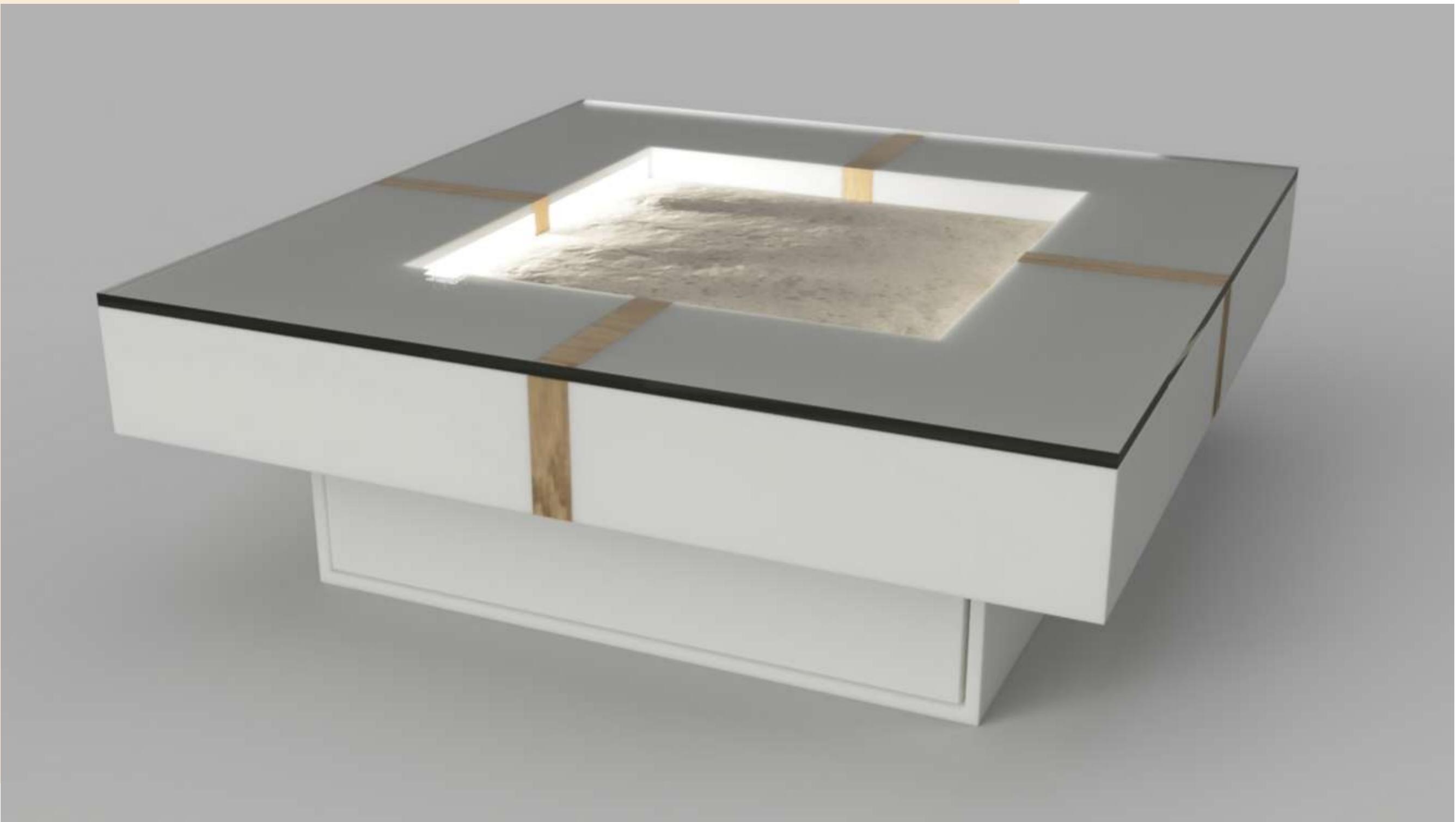
The legs will be solid steel meaning that it won't have issues in the leveling or scaling on carpet as it can push the carpet down, it makes sure that the whole table will be supported well. The curve will be made of multiple trapezoids.



Further comments:

The curved edges look very appealing but they do offer some technical difficulties in production, something to factor in for them would be to cut each one even without deviation, possibly this could be completed by using a router or templates





DESIGN OPTION: 5

# DESIGN OPTION: 5

## Evaluation:

No.	Evaluation criteria	Score /10	Explanation on how?
1	Is the Coffee table appropriately sized to fit the designated space?	7/10	The table is decently sized but may be an issue in terms of length as there would be a wider gap between couches on side compared to the others.
2	Is the table be made of a durable, easy to clean material?	9/10	The materials would be painted therefore allowing for very easy clean-up of the table, especially the glass.
3	Does the table have a shape that complements the surrounding furniture and décor?	6/10	The shape mostly complements the surrounding, the main difference is that the square shape may not look great in a rectangular space.
4	Is the table of an appropriate height?	9/10	The height works very well compared to the couches, it's easy to grab and place items from. Only issue in grabbing from a distance.
5	How does the table include an engaging and interactive element.	10/10	The table seamlessly incorporates the innovative feature without any hassle of where to place items and controllers. The batteries, rails, controller, MCU and etc can easily fit in the top.
6	Does the product match the overall style and aesthetics of the room?	8/10	The overall colour may pop out too much, but this can be dimmed in terms of paint colour choice, the lighter wood may be better as a dark walnut or spotted gum to contrast the couches and paint.
7	Is the table functional for its intended purpose?	9/10	It easily completes its purpose allowing for plenty of space for storing and holding of items.
8	Is the product sturdy and well balanced?	9/10	It's extremely well balanced but could fall only if there is extreme pressure placed on the very edge, but nothing normal will be this heavy.
9	Is the table made to the upmost quality with limited imperfections?	8/10	The table mainly consists of repeating parts therefore I can use a template and router to get exact pieces every time, furthermore parts may be able to get laser cut according to the Fusion 360 drawings.
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	8/10	The timber will be received from a sustainable producer, this producer is Mathew's timbers, they are Australian certified and ensure sustainable wood.
Total scoring		83/100	

Overall end-user feedback

# DESIGN OPTION: 5



The main feature of this option is how the innovative components seamlessly fits into the tables design. Some major features include the extra wide base, and the large drawers on each side which allow for plenty of storage space, the wood strip adds an element of visual interest and appeal to the overall design.



Further comments

# RANKING/ COMPARISON TABLE

		Design option 1	Design option 2	Design option 3	Design option 4	Design option 5
1	Is the Coffee table appropriately sized to fit the designated space?	8/10	7/10	10/10	8/10	7/10
2	Is the table made of a durable, easy to clean material?	9/10	8/10	9/10	9/10	9/10
3	Does the table have a shape that complements the surrounding furniture and décor?	7/10	7/10	9/10	8/10	6/10
4	Is the table of an appropriate height?	7/10	6/10	10/10	10/10	9/10
5	How does the table include an engaging and interactive element.	7/10	7/10	10/10	8/10	10/10
6	Does the product match the overall style and aesthetics of the room?	9/10	6/10	9/10	7/10	8/10
7	Is the table functional for its intended purpose?	9/10	8/10	10/10	8/10	9/10
8	Is the product sturdy and well balanced?	7/10	7/10	10/10	7/10	9/10
9	Is the table made to the upmost quality with limited imperfections?	7/10	7/10	8/10	8/10	8/10
10	Is the table environmentally friendly and sustainable in terms of material and manufacturing?	8/10	8/10	7/10	8/10	8/10
Total scoring		78/100	71/100	92/10	81/100	83/100

Final decision: the option beginning produced will be option 3 as it has met and exceeded most if not all of the criteria coming in with an overall ranking of 92/10.

# PREFERRED OPTION