OCR GCSE DESIGN AND TECHNOLOGY NEA

Strand 1

The Sip ‘n’ Snack Drinks Tray

Name:

Candidate number:

Centre number:

Contents

Complete from this point onwards

Delete the generic sections **BEFORE** handing in

Investigating the contexts

Introduction:
We have three contextual challenges to investigate for our coursework. Here I have evaluated all three options and have chosen the challenge, that I have decided to address.

Contextual Challenges:

Keeping Warm in Winter
Cold weather brings a number of challenges for older people. Explore the role of design in meeting the needs of the elderly during the winter months.

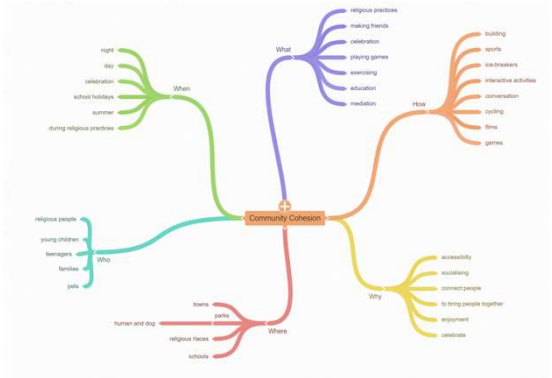
OR

Celebrations
We celebrate for lots of different reasons. Explore a celebration with the view to develop a product that enhances the experiences of those involved.

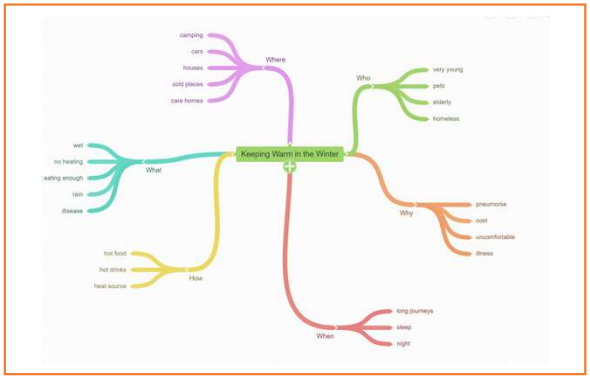
OR

Community cohesion
Public spaces help create a connection between people. Explore the role design can play in developing accessible spaces that bring people together.

Chosen context title:



Context: Community Cohesion
Problems identified/ Potential ideas for further exploration
- Isolation
- Discrimination
- Lack of activities



Context: Keeping warm in the winter
Problems identified/ Potential ideas for further exploration
- Elderly people getting cold
- Poor weather in winter

Context title:

Blurb why chosen/interested

I chose celebration, as there are possible issues around celebrations, and some of them could affect me in the future.

Problems identified/ Potential ideas for further exploration

1. Cold drinks can warm up
2. Drinks can be hard to carry
3. There can be damage to property
4. There can be drug users
5. Sunburn
6. Illness and accidents

Conclusion:
I have decided to choose celebration because there are lots of possible problems that I could explore and try to solve for the future. My next steps to get a better understanding will be to write a design brief and start brainstorming ideas of products that can solve problems.

Design Brief

Intro -
I thought of problems that could occur at a celebration/party and considered ways that these could be solved.

3-5 potential brief's (with pros and cons)

- I will design a product that will stop drinks from getting warm. One pro is that this will be a popular product that lots of people will use or buy. One con is that lots of other companies have made similar products in the past.
- I will design a product that will make carrying lots of drinks easier. One pro is that it makes it easier to carry the drink and less spills and breakages occur. Cons would be that products similar to this have been made in the past.
- I will design a product that will allow people to have lots of fun without breaking property. Pros would be is that this will please party holders and possibly encourage more people to have parties. Cons it would be very hard and expensive to build a product that could protect lots of different household items.
- I will design a product that will make storing and cooking food outside easier. Pros would be that it would be helpful for catering staff at outdoor celebration events. Cons would be that it will need a source of energy to cook the food.

Final Brief

I will design a product that will make drinks and food easier to carry and stop drinks from getting cold

Stakeholders: (Min 5)

- Waiters
- Bartenders
- Publicans
- Restaurateurs
- Party holders/planners
- Parents
- Teenagers
- Event Managers

Summary of stakeholders:
- These stakeholders are relevant to my product as they are mostly likely to want to buy and use it. This is due to them being involved with celebrations. My product therefore could benefit them.

Primary user(s):
(must be a person)
(Profile [age/profession/likes/dislikes/etc] and picture)

Name: Jack
Age: 17
Profession: bartender/waiter
Likes: being a waiter at big celebration events, carrying around drinking without spilling them, being able to easily give people snacks and drinks cold drinks easily.
Dislikes: Giving people warm drinks, unstable trays and dropping bowls and drinks.

Initial research into the chosen problem & wider issues

Many people and waiting staff at celebration events give or receive snacks and drinks. In England, the average person goes to about 3,000 different celebration events throughout their lifetime.

Typically trays, plates or drinks holders are used to carry drinks and snacks. However, there are some major flaws with the designs of many of the existing products available.
For Example:

- They are not stable
- The drinks spill easily
- The drinks don't stay cool
- Bowls of snacks slide around, sometimes falling off and breaking
- They are too small or too big
- They are made from poor quality materials

For example, this tray is too small for carrying lots of drinks and snacks, it doesn't have any drink holders, so drinks can spill/fall over very easily, and it doesn't have any way of keeping drinks cool.

Most people in the UK have either hosted or been involved in a celebration event (indoors or outdoors) this year. This is why it is important to have a suitable, safe and secure way of carrying drinks and snacks and keeping them at the right temperature.

Summary
- After my initial research, you can clearly see that most people will attend some kind of celebration event each year. The way drinks and snacks are carried around at parties has some significant flaws and having not been improved in many years, is ripe for innovative new ideas and enhancements.
- Some features in my design include drink holders to stop them from spilling, the facility to keep drinks cool and sections to accommodate different snacks to accompany the drinks.

Investigation of user and stakeholder needs

Intro

I investigated users needs by doing a survey online, which 26 people answered. In addition, I conducted an interview with a primary user.

1. How many celebration events do you go to per year?

More Details

1-5	13
5-15	11
15-25	1
25+	1

2. How do you carry your drinks and snacks?

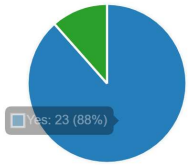
More Details

Tray	2
Drink holder	1
Just in your hands	22
Other	1

3. do you like your drinks to stay cool?

More Details

Yes	23
No	0
Maybe	3



4. Do you find it hard to carry lots of drinks and snacks with out spilling or dropping them?

More Details

Yes	21
No	5
Other	0

Survey results findings/summary
Points to consider in own design development
Link to the form:
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAAAAAAAN__huc68lUNjNaNUYzWkpENU9OVFVGQ0g4SktZQkNTOS4u

- The vast majority of people that took my survey go to between 1-15 celebration events per year. However, a couple attend 15-25+ per year.
- Everyone who answered my survey, either likes some or all drinks to be kept cool throughout the celebration.
- The majority of people who answered the survey carry their drinks and snacks in their hands, with a few using a tray or drinks holder. However, 21/26 people have said that they find it hard to carry their drink and snacks with out spilling or dropping them.
- This could mean that if a product came along that could keep their drinks cool, stopped them from spilling their drinks and stored their snacks, it could be very popular and helpful for them.
- There are clearly problems for both the severs or carriers of multiple drinks and snacks and also the individual recipients and consumes of these drinks and snacks.

Interview with Primary User

1. How often do you waiter at big celebration events?
   - 1-2 times a month.

2. What Problems do you come across when waitering at celebration events?
   - I find it hard to carry lots of drinks on a tray with out spilling them, also snacks are very hard to carry around and if the celebration is outside drinks get hot very quickly.

3. What products do you use at the moment to help you overcome this challenges?
   - At the moment, I use trays, but they can be awkward to carry with drinks on as they do not have holders, this means that the drinks fall off very easily. Also, they do not have a way of carrying snacks or keeping the drinks cool.

4. What kind of product would make it stand out to you and make you buy it?
   - I think that if a product looks practical at holding snack and drinks as well as it having a way of cooling down drinks, I would pick it over other products.

5. What would be a budget for you buying a product like this? And would you have a preferred material what it would be made out of?
   - I think the most I would be looking to spend is around £20-30, however if I needed to spend a little more to get one that I think would be really practical and helpful then I would.
   - As long as it is not going to break easily and is relatively lightweight it would not matter what the material is.

Summary and what I will include

I found, that a lot of people find it hard to carry drinks at celebration events. I also found out that my Primary user finds it hard to carry drinks around to people at celebration, without spilling the drinks. Features I will try include:

- Light weight, but durable and strong
- A cooling system
- A way to support drinks and store snacks
- A stand that can be used to put the product on a table.

Investigation of existing products

There are lots of different types of drink holders like simple trays to big cool boxes. Below, I have chosen some already existing products and evaluated them.

					
How it works?	Large tray to put drinks and snacks on.	A wooden frame with an open space in the middle, and a handle above. There is a bottle opener to open drinks.	There is a lid and insulation to keep drinks cool, and there is a good amount of room in the box.	A small drinks/glass holder to carry more than one drink around	Different holes for different food and drinks.
How is it used?	You put drinks and snacks on it and carry them around.	Drinks are put in the wooden frame, and it is then carried around by the handle. The drinks are opened with the bottle opener on the side.	You put freezer blocks into the cool box to keep it cool along with the food and drinks you want to store and then you put the lid on and carry it around with the handle	You put your drinks/glasses into the little slots and carry it by the handle	Some snacks go into the bowls and the drinks go into the drink holders. It is carried by the two handle at the bottle
Materials	Plastic	wood	Insulating material, plastic	Plastic or metal	Wood, metal
Cost	£2.49	£33.22	£40.00	£4.49	£66.58
Strengths	Lightweight, cheap, good size and can accommodate lots of drinks and snacks	Lightweight, stores six drinks, bottle opener on the side a useful feature, handle to make carrying it easier.	Good at keeping drinks cool, has lots of storage space to store food and drinks.	Super light, cheap	Carries snacks and drinks, handles to carry it easily
Weaknesses	Drinks and snacks not secure so can fall over of off easily, no handles so it can be uncomfortable/difficult to carry, no way of keeping the drinks cool.	No way of carrying snacks or keeping drinks cool, quite a bit more expensive. Not good for glasses. Not that practical in a party situation, better for a picnic.	Heavy, expensive, hard to carry. Not practical for distributing drinks at parties. Drinks and snacks not secure inside, no good for glasses. More suited to picnics.	Very weak, easy to spill drinks, no room for snacks, cannot keep drink cool, difficult to distribute drinks in party situation. Better suited to sports events.	Very expensive, only room for 2 drinks and snacks, no way of keeping the drinks cool. Bulky/cumbersome. No way to secure glasses of drinks.

Summary of research

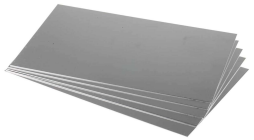
There are a variety of different products all with different approaches to the challenges of transporting drinks and snacks. Some are more expensive, larger, better at keeping drinks cool, etc. However, many of the designs are not practical in a drinks/party situation and do not facilitate the easy distribution of glasses of drinks. None of the designs cover all the challenges of keeping glasses of drinks secure and cold and accommodating snacks in an easy to distribute at a party design. Most are better suited to the transportation of pre-packed drinks and snacks in a picnic type of scenario, except the tray, but this has many additional flaws.

Features I will include in my design

- Not too expensive
- Lightweight, but durable
- Well-sized
- Allows drink to be kept cool whilst carrying/distributing
- Something to stop drinks from spilling
- Handles to make it easy to carry
- Accommodates snack and drinks and easy to distribute them to consumers

Exploration of materials and technical requirements

Introduction – here are some materials that I intend to use to build my product

Material	Pro(s)	Con(s)	Uses
Plywood 	Relatively cheap, lightweight, not very water-resistant. It is strong and durable, aswell as being slightly bendy, so strong against pressure being applied to it.	It can be difficult to sand or paint, Some types of plywood are not very water resistant.	This could be an option for the mainframe of my product.
Acrylic 	Lightweight, shatter resistant, waterproof (useful spillages), fairly strong and durable.	Acrylic can produce highly toxic fumes if burnt, but they have high melting points.	This will be used for the drink clips/holder in my product.
aluminium 	Aluminium is a conductor so will keep drinks cool, extremely malleable and does not rust.	Not particularly strong, and quite expensive.	This material will be used as the top layer of my product in order to help keep drinks and snacks as cold as possible, where required.
Oak wood 	Durable, long-lasting wood, attractive wood grain, less likely to warp when exposed to sunlight, good water-resistant properties, highly resistant to wear and tear, stains and polishes well.	Quite heavy and if you exposed to the elements, it will need maintenance. It is very expensive, so might not be able to afford with my budget	This will be used for the main frame of my product, as it is strong durable and water resistant and can be held easily without giving the user splinters.

Technical Requirements for my product
Lightweight – the product cannot be too heavy before adding drinks and snacks otherwise it will be difficult and uncomfortable to carry around.
Insulating ability – the product needs to have insulating ability to keep drinks cool for a reasonable period of time.
Durable – the product has to be durable and strong as it will be used regularly and in busy situtations. It needs to be resistant to scratches and not break if dropped. It also needs to last a good length of time.
Firm/rigid – the product has to be rigid in order to be able to carry drinks and snacks securely. When fully laden it will be reasonably heavy, so rigidity is vital. It cannot bend or wobble! It also needs to be firm and strong (not brittle) in order to not damage easily when used regularly in fast paced, busy environments and to resist breaking when dropped.
Aesthetically pleasing – the product need to be aesthetically pleasing, so the customers will be attracted to buy the product and will be proud to use it to present drinks and snacks to guests.

Summary/Features I may include in my design:
- Plywood is the cheapest wood that could be used for my design however, it is not very water resistant, so if drinks get spilled or it is used outside went it is raining, the liquid will soak into the wood. Oak wood, although it is more expensive, it is a better choice of material for my product as it is water resistant.
- aluminium is a great option for my product as it is light weight malleable and will be able to keep drinks cool for a long time.
- finally, Acrylic can be used for the clips to hold me drinks, as it is fairly strong and resistant. This will be great, if the drink size is slightly to big for the holder, as you should be able to push the drink in and the Acrylic will expand slightly, allowing the drink to go in.

Technical Specification

Introduction - These are the Technical Specification, for my celebration product

SPECIFICATION POINTS	Feature	Justification
Aesthetics	• The product will be aesthetically pleasing, using stylish design and quality materials	• This is to because it will be “on show” with guests when in use, so potential buyers will want something that looks smart
Cost	• Limit of £50 for cost of parts	• This is the budget set by the school
Customer	• The product will be aimed at people who organise/run events whether that be regularly at home or in a business/corporate setting	• This is because these are the people who will benefit the most from my product, and therefore will want to buy the product the most.
Environment	• The aim for the product is to be as environmentally friendly as possible, using sustainable materials where available. It is designed to last and to be reused and, once at its end of life, it can be broken down into its constituent parts and recycled accordingly	• Not only does this make sense from an environmental perspective it also makes business sense as it’s an increasingly important factor considered by potential buyers
Size	• The product must be big enough to hold several different types of drinks and snacks, but it cannot be too big otherwise, it will be to heavy and awkward to hold. It will be around50cm by 50cm by 10cm	• The size is designed to be big enough for snacks and drinks and enough depth for handles and to be able to balance/hold drinks in order to stop them from spilling
Safety	• The tray will have smooth edges • Also it will have drink holders	• This is to stop people from cutting themselves on the edges • This is so glasses/bottles don’t get knocked over and smashed
Function	• Must be able to keep drinks cool • Must be able to stop drinks from being spilled • Must be able to have space for snacks • Must be easy to use/hold and carry	• This so that people working at parties, do not have to carry multiple trays around, one for snacks, one for drinks, and also, they will have an easy way of keeping the drinks cool. • Another reason for these functions is to make it easy for people to carry multiple drinks for guests/friends
Material	• The materials used will need to be durable and strong (Aluminium/Oak) • There need to be some heat resistant materials (Aluminium) • There will also need to some flexible element • They should to be recyclable where possible	• This is so that is it able to take knocks, bumps and drops and so it lasts a long time • Keeping drinks cool and snacks fresh is a key benefit for the end user • This is primarily for the clips to enable them to hold different types and shapes of drinks and glasses
Manufacturing Processes	• Laser cutting • Carving • Line bending	• These manufacturing processes will be the best way for me to build my product.

GCSE DESIGN AND TECHNOLOGY PROJECT

Strand 2-3

The Sip ‘n’ Snack Drinks Tray

Name:

School name:

Centre number:

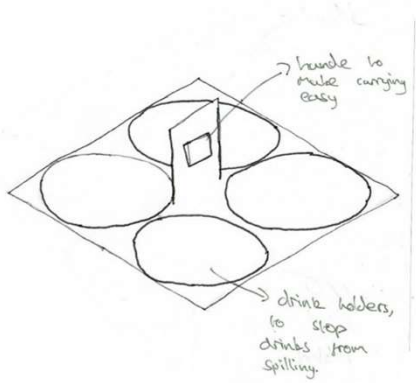
Candidate number:

Contents

Initial design ideas:

Intro: Below are some initial, collaboratively designed, drawings of my product, including the positives and negatives of each.

Idea 1



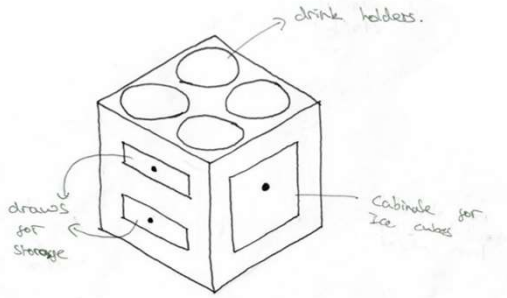
Description:
Carboard drinks holder

Pros:
- Super light weight
- There is a handle, so it is easy to carry

Cons:
- Made out of cardboard, so weak and will break easily, so probably not reuseable.
- Not waterproof, so if it gets wet it will break.
- There isn't any way to carry snack or keep the drinks cool

Primary user feedback:
Jack decided, that he would not buy this product as it has no way of carrying snacks and he would not be able to reuse it, if it breaks.

Idea 2



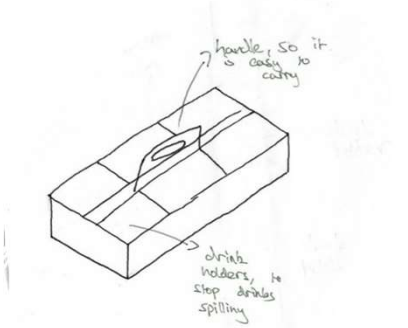
Description:
Wooden box, to store drinks and snacks

Pros:
- It has lots of storage for snacks
- It has room for ice cubes to keep drinks cool
- Made out of a strong material

Cons:
- Too big
- Awkward shape to carry
- Could be quite heavy if it is full

Primary user feedback:
Jack thought that this design has all the functions he would need, however it could become heavy and awkward to carry, he probably wouldn't want to carry it around at a celebration.

Idea 3



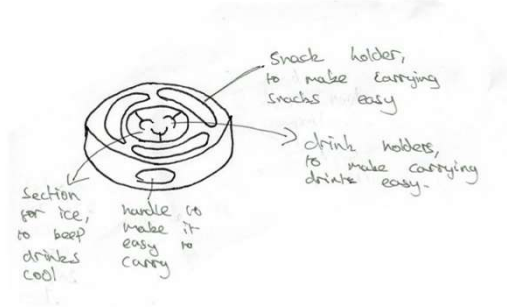
Description:
Wooden drink holder

Pros:
- Relatively light weight
- Big handle, easy to carry
- Good at stability and sturdiness, so better for carrying drinks

Cons:
- No way of carrying snacks
- No way of keeping drinks cool

Primary user feedback:
Jack really liked this idea, however he was slightly disappointed that there wasn't the ability to carry any snacks.

Idea 4



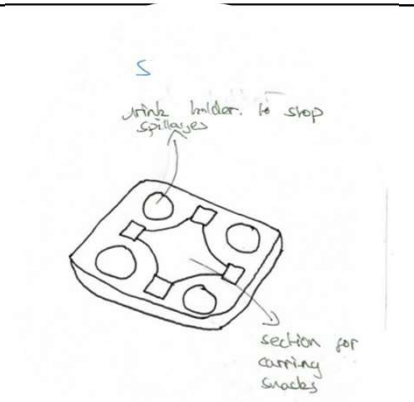
Description:
Circular wooden drinks tray

Pros:
- Made out of a strong durable material
- Has two handles, to make it easy to carry
- Has drink holders, and a section for ice, to keep the drinks cool
- Has 3 different snack compartments

Cons:
- The tray is quite thick

Primary user feedback:
Jack loved this design idea. He said if it was out on the market, he would definitely consider buying it as it is not too big and meets all of his needs.

Idea 5



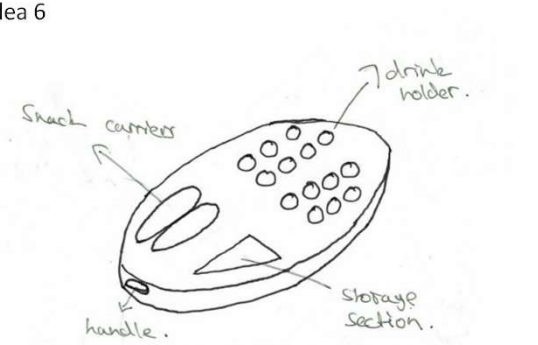
Description:
Plastic drinks tray

Pros:
- Has drinks holders
- Has a section to carry snacks
- Not too large so easy to carry
- Reuseable

Cons:
- Made out of plastic, so it is not environmentally friendly
- If it breaks, there could be a safety risk, as there could be sharp edges.
- There is no way of keeping drinks cool

Primary user feedback:
Jack was not sure about this product, as it is not environmentally friendly, but would consider it, as it has some good functions

Idea 6



Description:
Large plastic drinks and snacks tray

Pros:
- Has the ability to carry many drinks
- Has room for snacks and ice to keep drinks cool

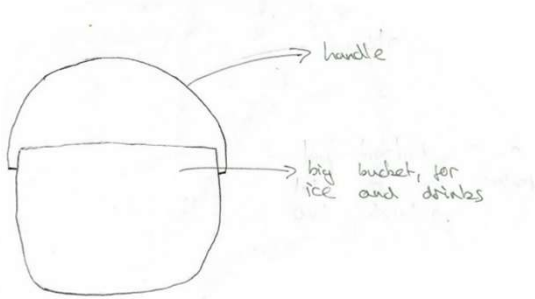
Cons:
- Very big, so it would be uncomfortable to carry
- Made out of plastic, so not environmentally friendly

Primary user feedback:
Jack thinks that this product, although it has lots of good functions that he would like, the size and material type would not work for him

Initial design ideas: (cont.)

Intro: Further design ideas and an overall summary.

Idea 7



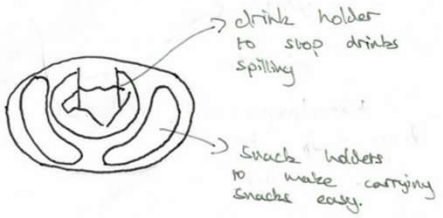
Description:
Big bucket

Pros:
- Has lots of storage space for drinks and ice
- Can be made from any material

Cons:
- To big, and awkward to carry
- Won't carry glasses, only carries cans and bottles
- No snack storage

Primary user feedback:
Jack thought that this would be a good idea if you are hosting a party and need a big storage unit for drinks, however he said that this was not a product that suited his needs, for carrying and distributing snacks and drinks

Idea 8



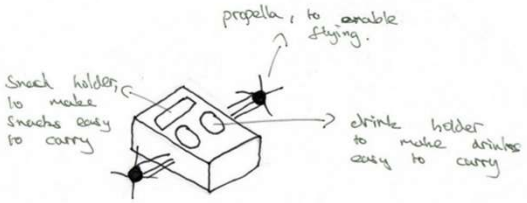
Description:
Plastic drinks and snacks holder

Pros:
- Has a drink holder to stop spillage
- Has 3 snack compartments
- Not too big
- Lightweight

Cons:
- Made out of plastic, so not environmentally friendly
- Only has one drink holder, so cannot carry multiple drinks at once
- Not very durable, could break easily

Primary user feedback:
Jack liked this product, but did not like that is was made out of plastic and that it only had one drinks holder

Idea 9



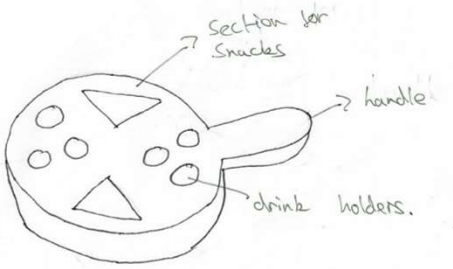
Description:
Drone drinks tray

Pros:
- Remote controlled, so you don't have to carry the drinks tray
- Novelty factor, will be a talking point

Cons:
- Have to carry the controller
- Not very safe at a celebration due to the blades on the propeller
- Very expensive
- Difficult to keep steady

Primary user feedback:
For a drinks tray, it would be too expensive and unsafe if there was a big crowd, so jack thought it would not be worth the money.

Idea 10



Description:
Drinks tray with pan handle

Pros:
- It has drinks and snacks holders
- Made out of wood, which is strong and durable, so it won't break easily
- Has a long handle

Cons:
- Due to the weight distribution the handle could make the tray quite hard to carry
- It has no way of keeping the drinks cool

Primary user feedback:
- Jack thought that this was a good idea, however, the handle would make it awkward to carry.

Summary: These designs were drawn collaboratively to reduce design fixation. I initially completed very rough sketches which I then re-drew almost exactly but making them neater. The next step is to score my designs in order to find the top 3 to develop further into prototyping.

Ideas scoring

Idea	A	C	C	E	S	S	F	M	Total
1)	4	10	2	1	6	7	1	1	32
2)	8	4	5	7	1	6	8	7	46
3)	5	7	6	9	7	8	4	9	55
4)	9	6	10	8	9	8	10	9	69
5)	1	7	3	1	8	6	6	3	35
6)	6	6	7	6	7	8	5	4	49
7)	1	6	2	7	0	6	4	7	33
8)	5	3	6	0	7	4	5	0	30
9)	10	0	7	5	4	3	5	3	37
10)	4	7	7	0	7	6	7	3	41

Key:

Top 3 scores

4-6 scores

7-10 scores

Primary user feedback:

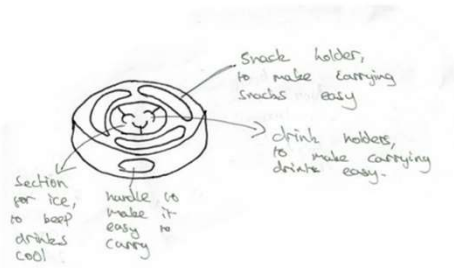
I scored my design ideas against ACCESSFM. As part of this process not only did I peer review the scorings to make sure there was no bias, I also asked my primary user for specific feedback on the designs and scoring.

My primary user, , thought that designs 3, 4 and 6 were best suited for the product, as they had all of the necessary functions he needs and that if one of these designs is available on the market, he would consider buying them. This has been confirmed by the results of the scoring system.

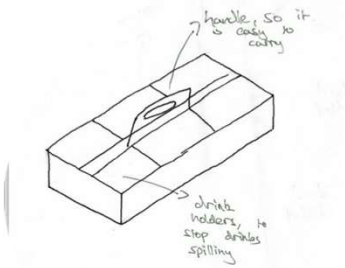
Jack thought out of the top three, design 4 would be the best, as not only does it have all the required functionality, but it is also very aesthetically pleasing. He particularly liked carry handles as they are well places and facilitated ease of use.

Designs 3 and 6, whilst also scoring highly, fell down on a lack of functionality and size (too large) respectively.

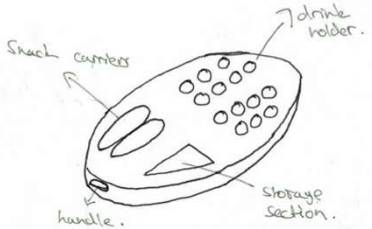
Design 4 – Top score



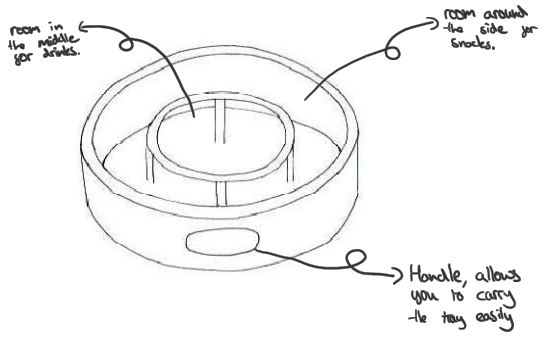
Design 3 – Second score



Design 6 – Third score

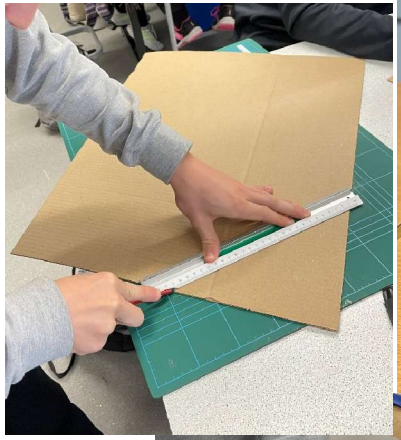


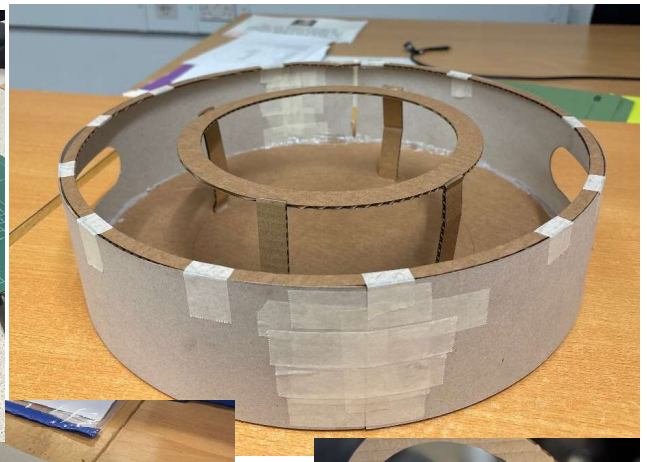
Design development: Idea # - Iteration 1

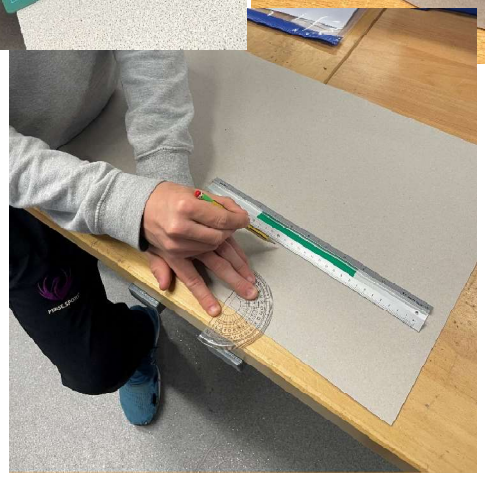


Primary users' thoughts:

Jacks' thoughts on iteration 1 – he said that this would be a 'cheap' solution because it doesn't have the key necessary features required for it to be useful. He also said that the drinks were likely to spill and there aren't any real spaces to hold snacks.



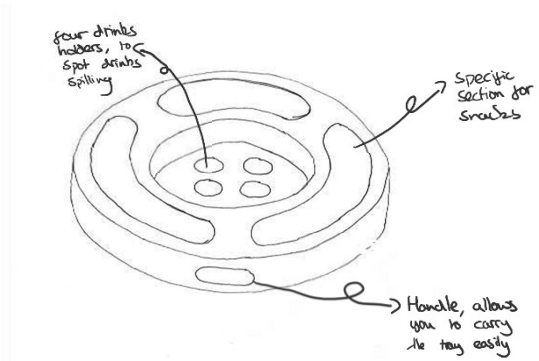


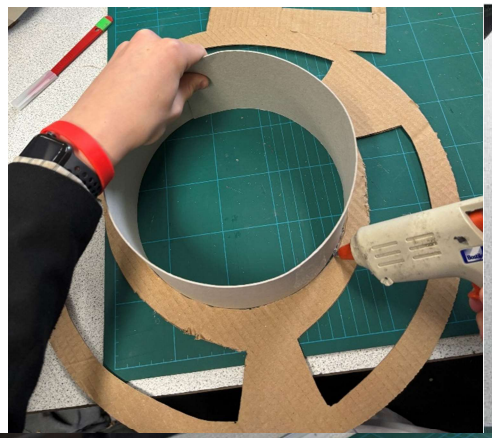


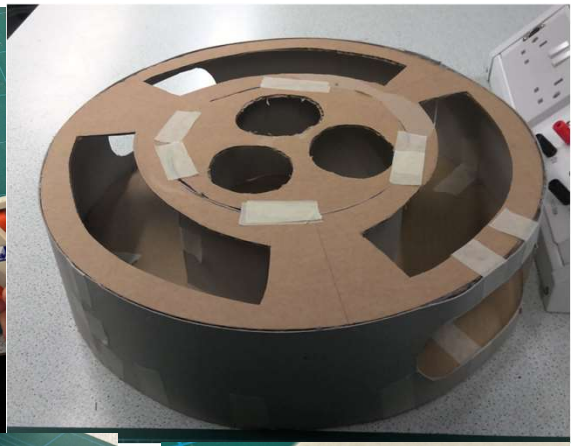
Process:
I made this iteration, by marking out all the measurements on carboard and using a crafting knife to cut them out. It was initially challenging to create a circle using the crafting knife, but I got better with practice.
After everything was cut out, I used sandpaper to smooth the edges. Following this, I used tape and hot glue to put all the parts together. The gluing process was a little on the messy side.

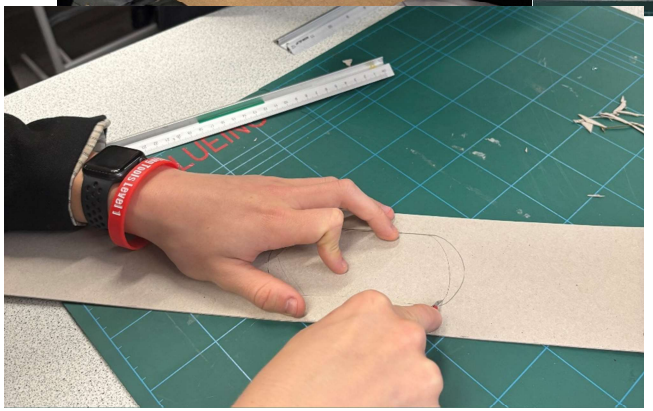
To improve the next iteration of my product I will add drinks holders and specific sections for snacks

Design development: Idea # - Iteration 2









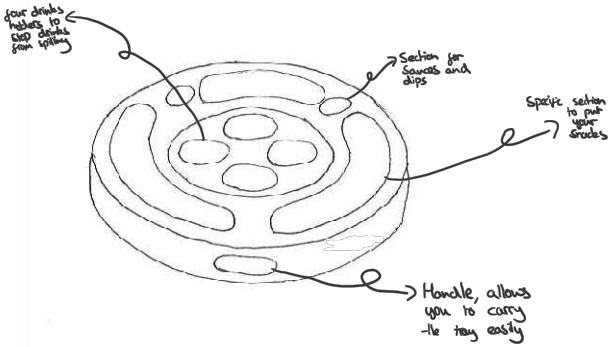
Primary users' thoughts:

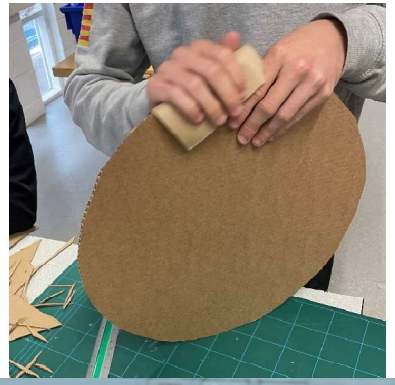
Jacks' thoughts on iteration 2 – "This is a much better solution" he said. This is because it has holders that would stop the drinks from spilling. Having said this, he thought it would be better if there were more drinks holders. In addition to this, he also liked the idea of snack sections, but felt they could be improved by adding specific sections.

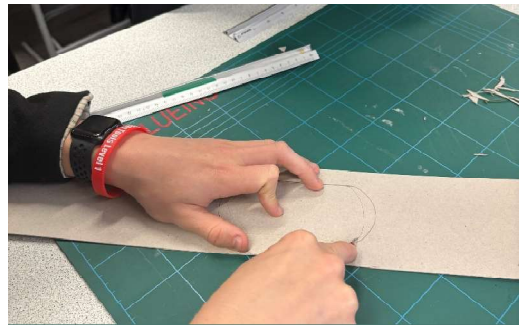
Process:
I made this iteration, by using the process as iteration 1. This was Using a Crafting knife to cut out the parts I needed and then using hot glue and tape to put the parts together

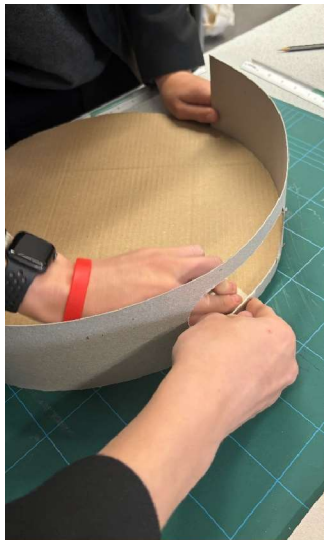
In iteration 3, I am going to add another drink holder, as well as making room for multiple snack sections.

Design development: Idea # - Iteration 3









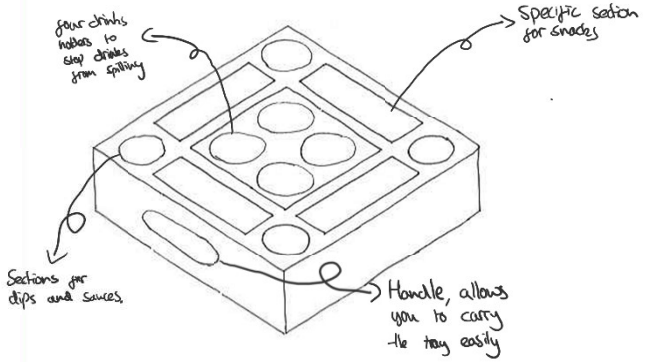
Primary users' thoughts:

Jacks' thoughts on iteration 3 – Jack really liked this product. In particular, he liked the extra drink holder. To improve this design, Jack suggested making a slightly larger tray area in order to accommodate extra snack and dip holders.

Process:
I made this iteration, by using the process as iteration 1 and 2. This was Using a Crafting knife to cut out the parts I needed and then using hot glue and tape to put the parts together

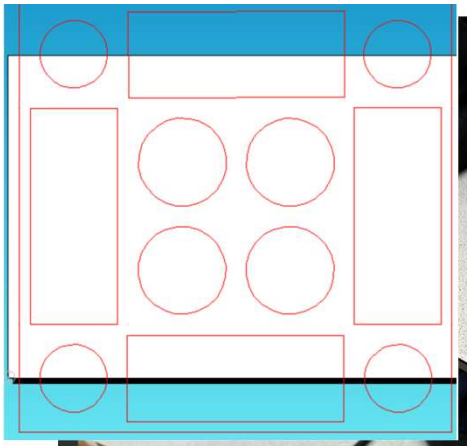
For iteration 4, I am going to make the tray a square. This will allow more sections for snacks without making it too wide, which could make it uncomfortable and awkward to carry.

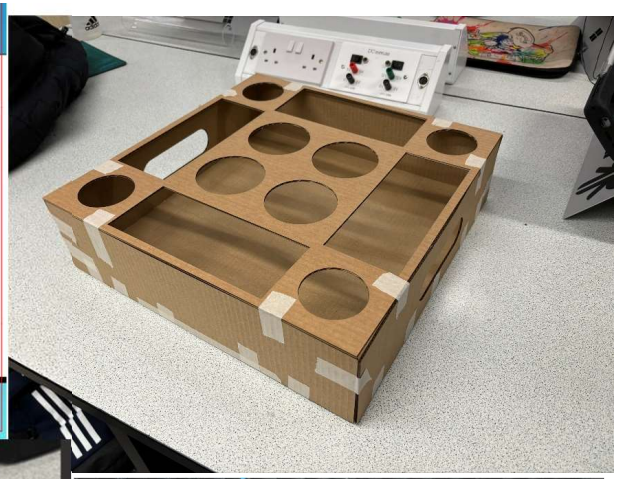
Design development: Idea # - Iteration 4

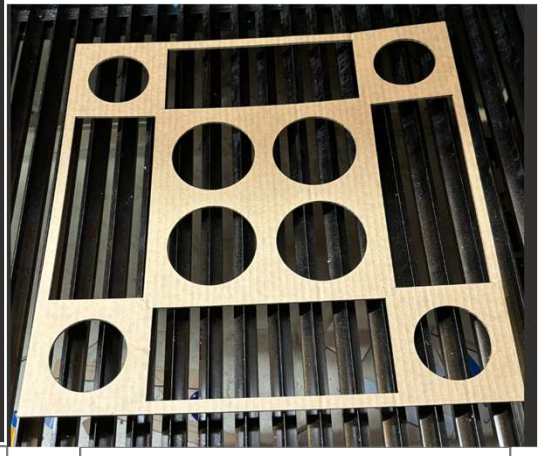


Primary users' thoughts:

Jacks' thoughts on iteration 4 – Jack really liked this final iteration, as it had enough room for all the different features he would need. However, one thing he said I could improve was to create extra support within the design, it make it stronger and more.







Process :
I made this iteration, by using 2D design to create the parts I needed, with the perfect measurements, which I then cut out using the laser cutter. Once all of this was done, I used masking tape to hold it all together. This whole Process was very easy and quick to do.

For the final design, I will create supports for the top of the tray, as otherwise the product not be very sturdy and will break easly.

Detail Research and Development – Snacks and Dip Bowls

Thermoplastic Filament

Uses:

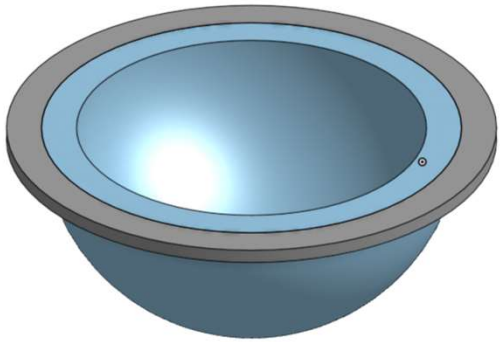
- **This will be used to create bowls for snack, dips and sauces.**

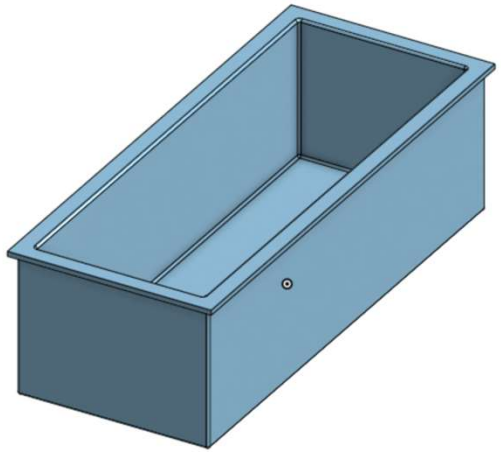
Pros:

- **Waterproof - This material being waterproof is very important, as it sauces and snacks are used, it needs to be able to withstand the sauces as well as being easy to clean.**
- **Durable - Being a durable material, means that if it is dropped or stood on it will not break easily.**
- **Light - This will not add much weight to the tray, so it will still be easy/comfortable to carry**

3D printed bowl

Creating plastic insert bowls for snacks and dips will make it easier for users to fill, carry, remove, clean and replace the dip/snack sections.





Detail Research and Development – Linseed Oil

Linseed Oil

Uses:

- **This will be used to give my product a water resistant and protective coat**

Pros:

- **Enhance wood appearance**
- **Hides dents and scratches**
- **Food safe and non-toxic – this is very important as my product carries food and drinks**
- **Easy to apply**
- **Water-resistant**
- **Eco-friendly**

Cons:

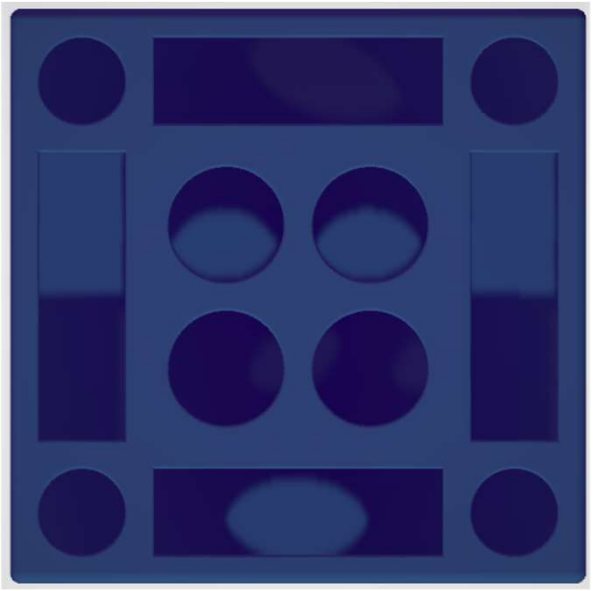
- **Yellows over time**
- **No UV resistance**

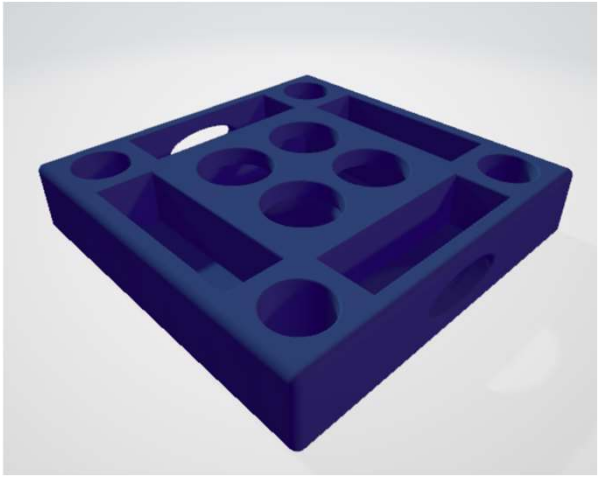
Cost of Linseed Oil

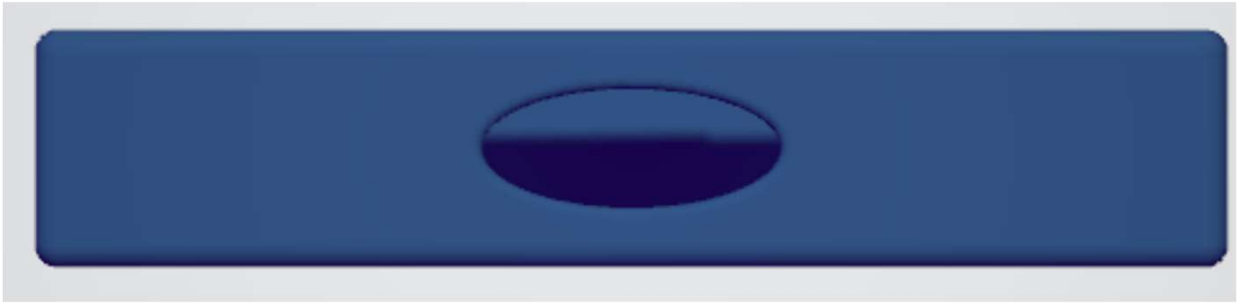
Linseed oil has different prices per company. The average price of it is £16 per litre

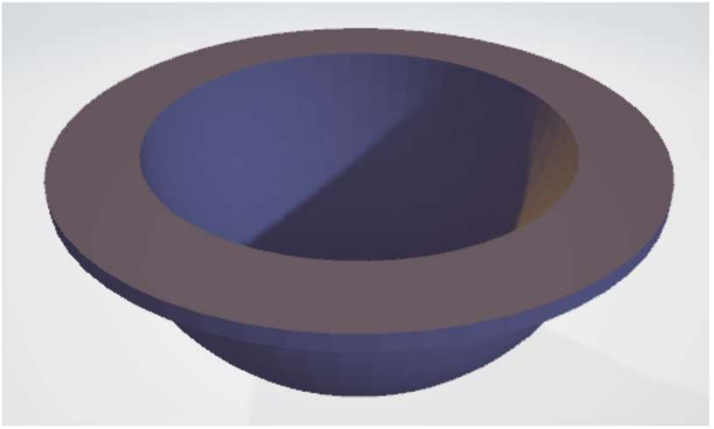
Final design solution:

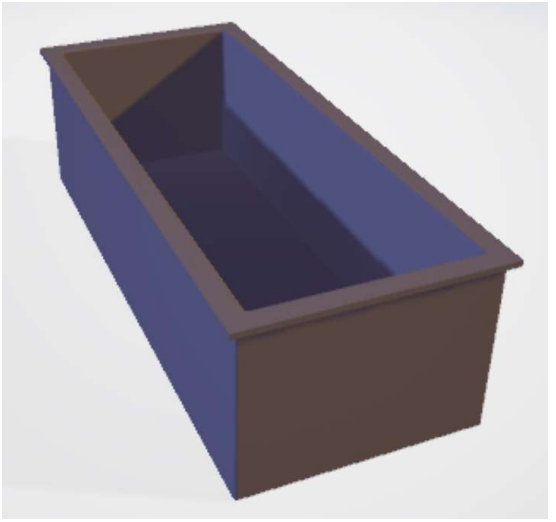
Sip ‘n’ Snack











Sip ‘n’ Snack

- The Sip ‘n’ snack is your flexible, easy to carry and easy to use all in one drinks and snacks tray
- Ideal for any celebration or special occasion, it makes delivering drinks, snacks and other party items both stylish and simple
- The Sip ‘n’ Snack is your essential party tray!

Key Features

Durable
- Made out of strong wood
- Protected for all weathers
- Clever strong design

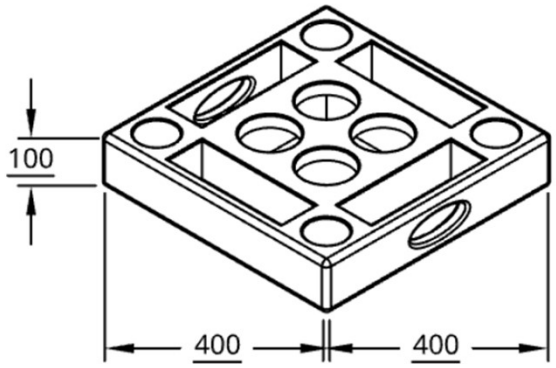
Sustainable
- Made out of wood, so can be recycled
- Designed to last and reuseable

Ease of use
- Handles to transport easily
- Removeable bowls makes cleaning easy and allows different options for use

Flexibility
- Can carry a variety of glasses cans and bottles
- Multi-use sections for snacks, canapes, dips and other party essentials such as cocktail sticks, cutlery, napkins or can even be filled with ice for cold drink storage

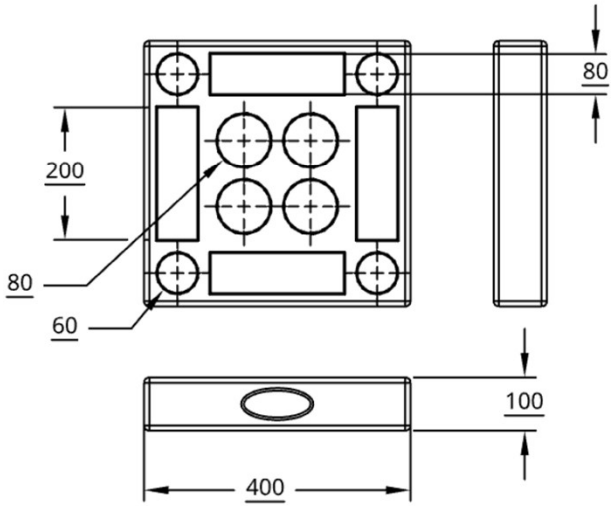
Final design solution – Sip ‘n’ Snack

Final design solution



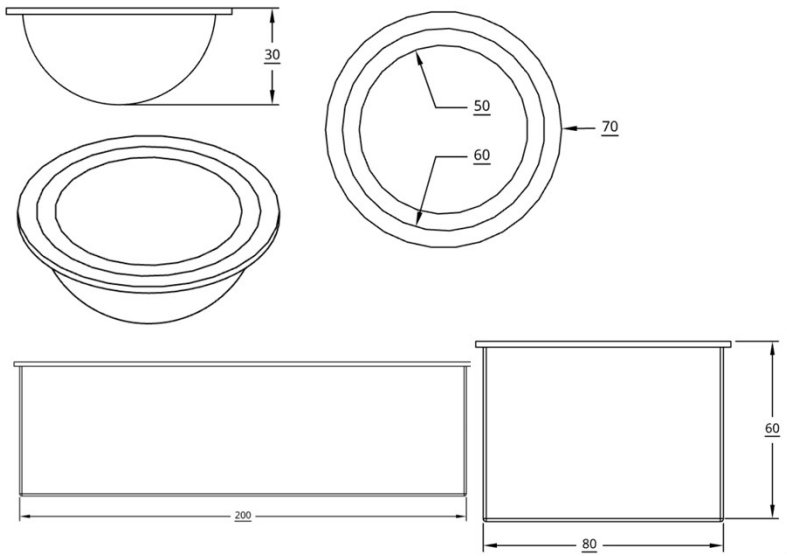
Each dimension is correct to the mm, estimating what and how the product will look and work. This means when I create my product I can come back to this page and easily uses the correct dimensions

Jack thought that this final design solution would be very helpful, and said that if it was on the market, he would buy it.



Versatility of Design:

- Round sections in the centre for larger glasses or drinks.
- Smaller round sections in each corner can be used for dips. However plastic inserts are removable, and holes have been specifically designed so that they can hold cans and smaller bottles.
- The four rectangular snack sections are primarily for snacks (such as nuts, crisps or olives), but have been designed in such a way that if snacks are not required, they can be used for other items such as ice cubes, additional bottles and cans, or other event necessities (e.g. cocktail sticks or lemon slices).



Item	Quantity req	Source (link)	Material	Cost per item	Cost for quantity
Drinks tray	1	Provided by school	PLY Wood	This is provided by school	£0
bowls	4 circular bowls and 4 rectangle bowls	Provided by school	Thermoplastic Filament	This is provided by school	£0
Protective coat	1-2 layers	Click Here For the oil I am going to use	Linseed oil	£12.29 per 500ml	£12.29
				Total cost:	**£12.29**

List of Requirements

Intro: Here are the requirements that are needed for my design and how I incorporated them into it

Identified Requirement	When is it identified? *(e.g Stakeholders – Slide 1)*	Why it was considered important to the context and brief?	Has it been considered in the final design solution? How? Or Why not?
Relatively light weight	User/stakeholder needs- slide 4 (strand 1)	The product needs to be lightweight because if not it will be hard to carry for any length of period when full of drinks and snacks.	Yes, I have fully achieved this in my final design solution, as my product will be made out of a light wood and light plastic. When the tray is full, it will be heavier, but there is nothing I can do about that.
Something that makes a number of drinks and snacks easy to carry	User/stakeholder needs- slide 4 (strand 1)	It must make carrying lots of drinks and snacks easy, so users will get their drinks and snacks quicker and are less likely to spill or drop their them. This will make the celebration more enjoyable.	The holes in the tops of the tray allows drinks and the 3D printed bowls to be supported, and to hold them in place.
Water resistant	Detailed research and development – slide 14 (strand 2-3)	It must be water resistant as it will sometimes be used outside, and liquids will be around it. Being water resistant, will allow the product to last longer and not stain.	Yes, my choice of materials, wood and plastic, were used with this in mind. After I have finished my product, I will add a layer of linseed oil, to give the wood extra protection and making it more water-resistant.
A product that is easy/not awkward to move around and can easily be put down.	User/stakeholder needs- slide 5 (strand 1)	The product must be easy to carry, so that you don't drop the tray by accident, or spill drinks.	I have achieved this buy making the product lightweight, big enough to carry drinks and snacks, but not too big as to be awkward. It also has a flat bottom so it can be easily put down on a table or side.
Durable	Investigation of existing products- slide 4 (strand 1)	It needs to be durable, so it can withstand different weather conditions and won't break if it is dropped. Durability is also important for longevity of use.	Due to the nature of material that I have used, my product will be strong and sturdy. It will also be durable in different weather conditions and have extra protection from the linseed oil.
Firm/rigid (holds its shape)	Throughout the project	It must be firm/rigid as the tray need to be able to hold the snacks and drinks without bending or breaking.	Yes, it will be made out of wood, a strong material that will not break easily and hold its shape.
Multiple compartments to carry a variety of drinks and snacks	Design development – iteration 1 – slide 9 (strand 2-3)	It must have different compartments for carrying different types and sizes of snacks and drinks, to cater for a variety of types of end users/guests.	I have fully achieved this in my finally design by having a section in the middle for drinks, rectangular sections round the outside for snacks and circular section in the corners for dips. These are also versatile with the ability to carry multiple types of drinks, snacks and other party items (e.g. napkins, cocktail sticks).
Cooling system	Investigation of existing products- slide 4 (strand 1)	It was important to consider, as having celebrations outside or on a warm day, can mean that drinks, which are nicer served cold, may warm very quickly.	I have not considered this in my final design solution as it was too complicated, would add a lot of extra weight and cost a lot more money to build. However, due to the versatility of my design, the bowls are able to carry ice cubes which can then be used to keep drinks cool.
Stand	Investigation of existing products- slide 4 (strand 1)	It was important to consider, as it could make putting the tray down easier.	I have not considered this in my final design, as it is not necessary for its use, as at most parties there are tables and sides, it can be placed on. Not only this, but if the stand breaks, it could leave sharp bits of wood, that could give the user splinters or cut them.

GCSE DESIGN AND TECHNOLOGY PROJECT

Strand 4-5

The Sip ‘n’ Snack Drinks Tray

Contents

BODY				
Order	**Task**	**Materials & Equipment**	**Health & Safety**	**Estimated Time (minutes)**
1	2D design	Computer, 2D design	N/A	30m
2	2D design	Computer, 2D design	N/A	30m
3	2D design	Computer, 2D design	N/A	30m
4	Laser cut	Laser Cutter, 2D design	Make sure extraction fan is on, to remove fumes being released from laser cutting process	20m
5	Add layer of Linseed Oil	Paint brush, Linseed oil	Wear gloves whilst applying to stop skin irritation	20m
6	Leave to dry	N/A	N/A	Over night
7	Glue	Wood Glue (PVA Glue)	Wear gloves whilst applying to stop skin irritation	20m
8	Leave to dry	N/A	N/A	Over night
9	Onshape	Computer, Onshape	N/A	30m
10	Onshape	Computer, Onshape	N/A	30m
11	3D Print	Computer, Cura	N/A	Over night
12	3D Print	Computer, Cura	N/A	Over night
			TOTAL	210mins (3.5hrs)

Intro : This is a plan of how I will create my final product.

List of tools and machines used:

- Computer for 2D design
- Laser cutter
- Wood glue (PVA glue)
- Computer for Onshape
- 3D printer
- Paint brush

Quality controls:

- Making sure I remeasure all the lengths before and after I have laser cut the pieces needed. (1-4)
- Making sure I get an even spread of linseed oil across the wood. (5-6)
- I need to get all the angles perfect while gluing the product together. (7-8)
- Making sure I remeasure all the dimensions of the Onshape designs before and after printing them. (9-12)

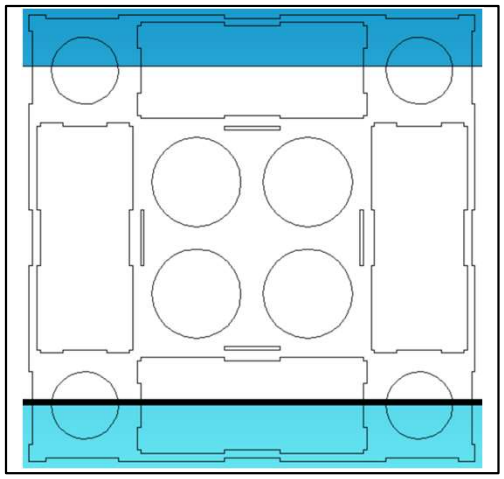
Lesson Times

Monday A	Thursday A	Friday B	Tuesday B	Friday B
40 mins	80 mins	40 mins	80 mins	40 mins
			TOTAL	280 mins

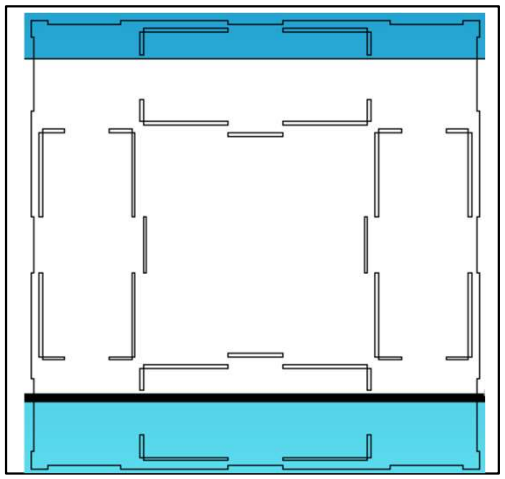
Summary & next steps:
I have plenty of time to complete the product, as my estimated time is 210 minutes (3.5 hours), however if there is a problem, or I run over time, I can always spend some homework time to complete the product.

Step-by Step evidence of equipment and processes needed/used when making a Final Prototype

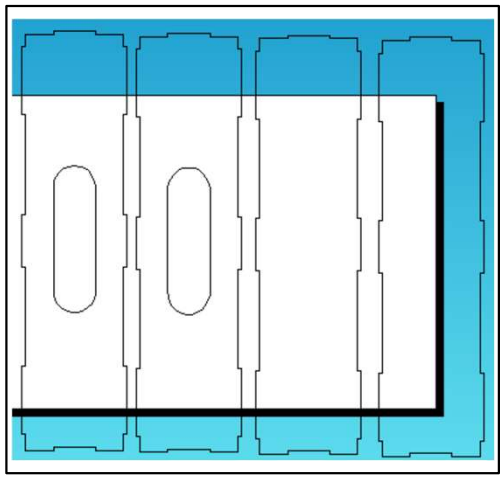
Introduction
These are the steps I am taking to create my final product



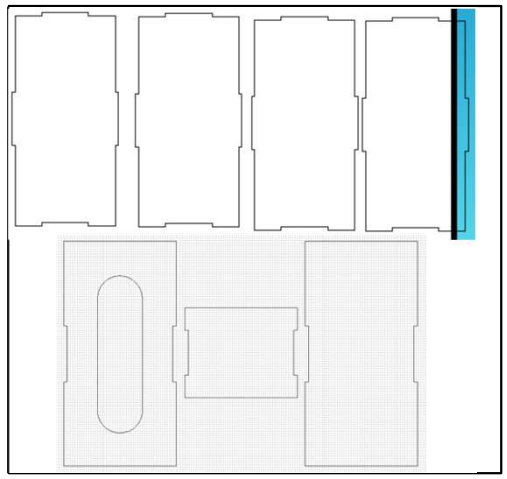
Step 1: Create the top of my design using 2D designs



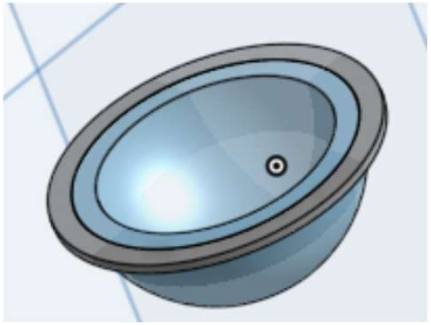
Step 2: Create the bottom of my design using 2D designs



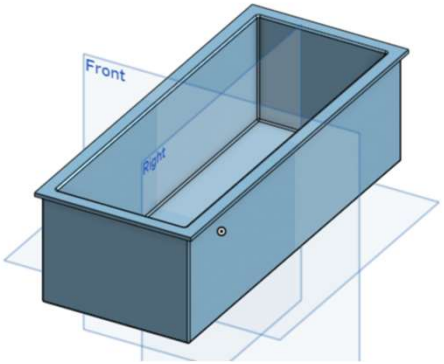
Step 3: Create the sides of my design using 2D designs



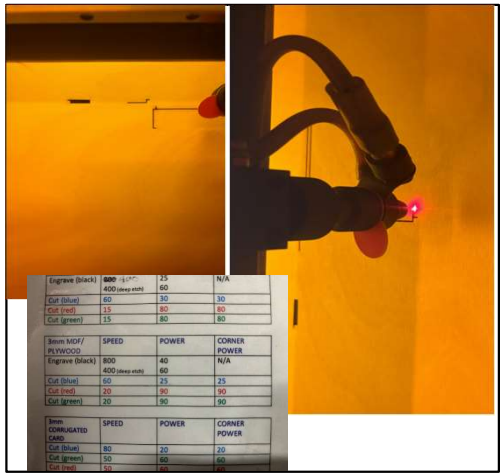
Step 4: Create the supports in my design using 2D designs



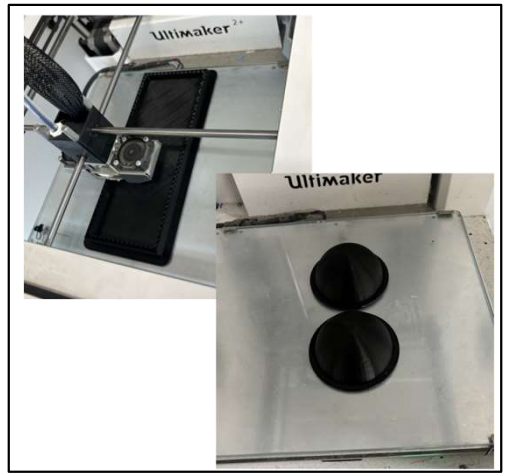
Step 5: Create the Circular bowls using OnShape



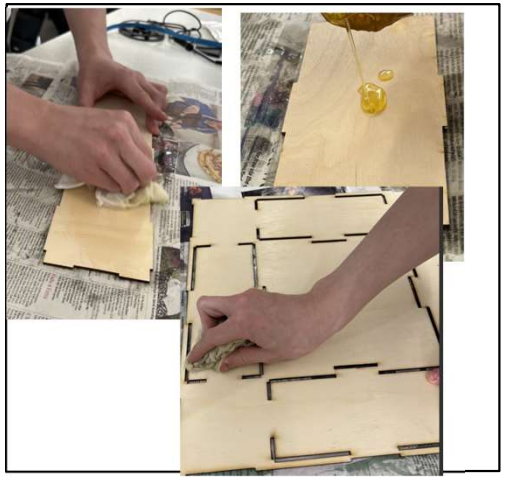
Step 6: Create the rectangular bowls using OnShape



Step 7: Laser Cut all the 2D designs for my product

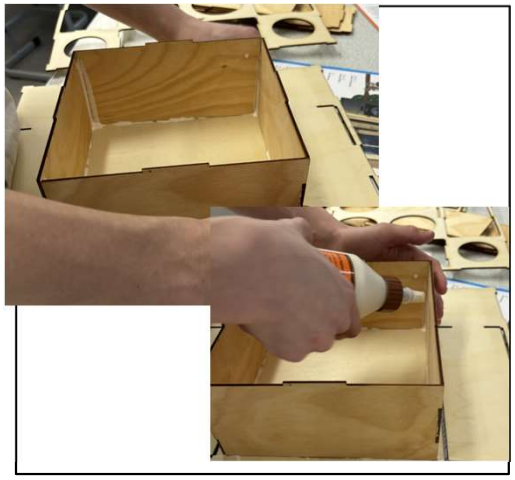


Step 8: 3D Print all the bowls for my product

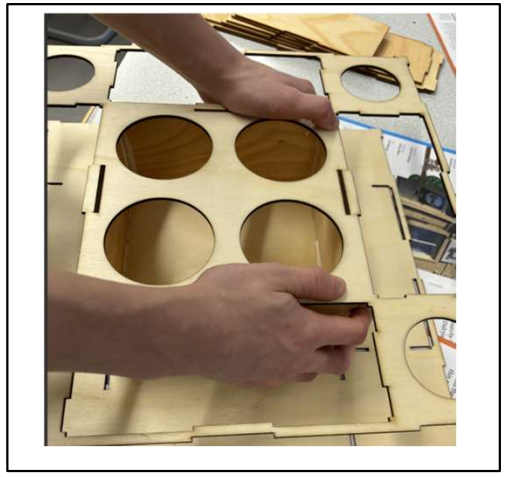


Step 9: Add a layer of linseed oil and leave to dry to each piece of wood

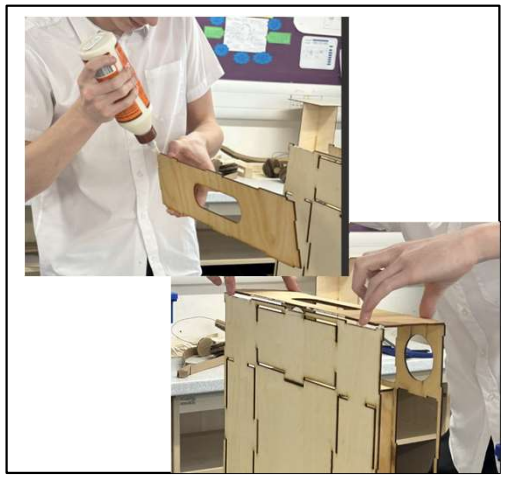
Step 10: Add a second layer of linseed oil to each piece of wood and leave to dry



Step 11: Glue the central supports to the bottom piece

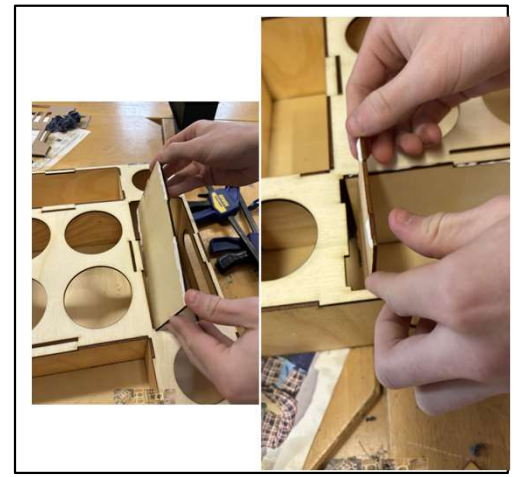


Step 12: Glue the top piece onto the central supports

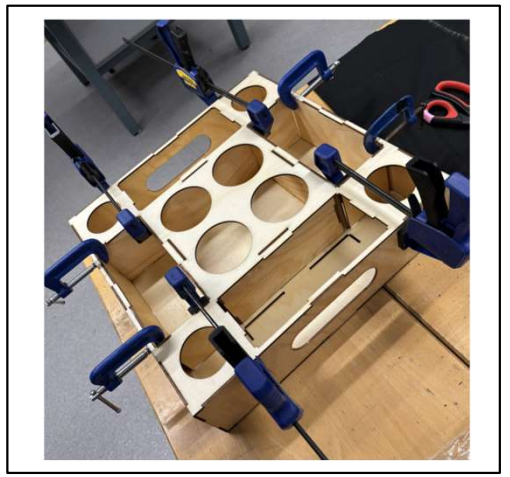


Step 13: Glue the slides and the handles on to the product

Step 14: Create support to allow the glue to dry



Step 15: Glue the snack bowl supports into the product.

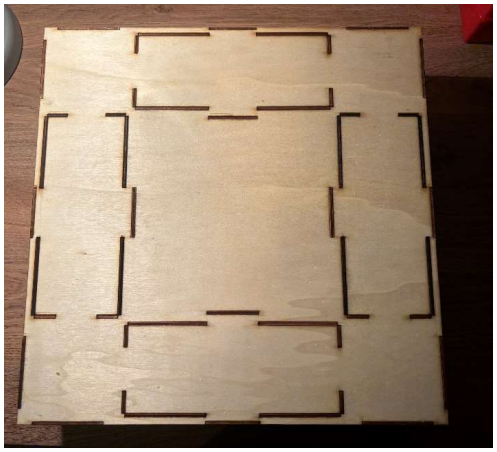


Step 16: use clamps to support the supports whilst the glue drys

Summary & next steps: it was important to follow the steps in the right order and the relevant point to provide support and time for the elements to dry and bind together. The correct safety gear and procedures when using the machines was used at all time

Final Prototype

Introduction: These are photos of my final design, as well as a video of it in use on the next slide.






Video of product in use

Test of Final System

Introduction: I carried out some tests on my product to ensure that the product works and functions in useful ways for the user.

Test 1 – Drink support Strength

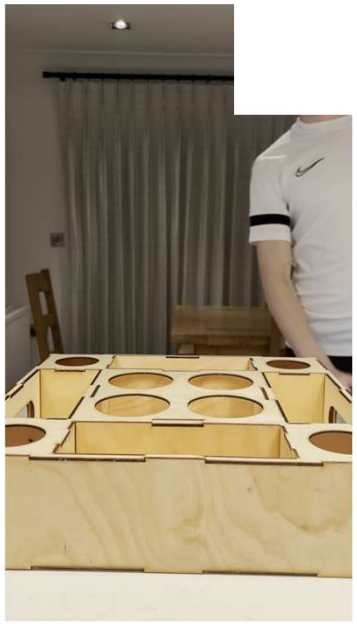
The drinks tray is very strong and supportive. It very easily supported 4 pint of water.

Test 2 – versatility of my design

My product is very versatile, as all the sections are multi-functional

Test 3 – handle functionality

The handles of my product work very well when the 2 rectangular bowls next to the handles are not in the tray, When the bowls are in the tray the handles become ineffective, I will fix this in the next steps



Test 4 – Water resistance

Thanks to the nature of the materials used and addition of protection from the linseed oil, the tray is very water resistant, as shown in the video

Interview with my Primary User:

Jacks' opinions:
He loves my product. He loves all the extra features especially all the different bowls, as it allow you to be super versatile with what snacks and drinks that you would like to carry.

He thinks that he can definitely see himself using the drinks tray in the future as a bartender.

Summary & next steps:

My product has passed all the necessary test, which mean it works well.

In the next step, I will explain the viability of my product and write about the marketability.

Viability of Final Prototype

Introduction: The viability of the final prototype is summarised below where I assess the positives and negatives of the final design and the marketability and cost of the product.

Marketability

Although primarily a drinks tray. My product has some very unique features that I haven't seen on any other tray. These include:

- Different sections in the drinks tray, allowing you to store your favourite types of drinks and snacks. Not only this, but all the sections are versatile, and some have removable bowl inserts, allowing you to customise what you may want or need during a celebration or event.

- As well as snacks and drinks, my product allows you to enjoy your snack and drinks with your favourite sauces and dips using bowls I have incorporated into my design.

- The product has handles, that allow you to carry your drinks and snacks easily, however the bowl inserts can get into the way of the handles. In the next step, I will create a new bowl design with a slanted edge/bottom, so they do not get in the way of your hands.

- The product is made from plywood, meaning it is environmentally friendly, and easily disposable.

- Finally, a layer of linseed oil stops water from soaking into the tray. This makes the tray water resistant

Viability of final design

My final design was very successful. All the main features and objectives of my design worked:
- It is water resistant.
- It holds drinks easily and stops them from being spilled.
- It holds snacks and dip sauces.
- It is very versatile.
- It has handles to making carrying the tray easy.

The one part of my design that I am going to improve in the step, is that I will change the design of two of the rectangular side bowls, so that they do not block the handles, when they are put into the tray. However, as seen in the photography below, these can be removed anyway and the space used to carry other things, enabling easy access to the handles

Differences to technical specification:

My final design, has followed my technical specification, the only thing to improve, which I will do in the next step, is t create a solution for when the bowl inserts are in, a easier way to carry the tray.

Summary & next steps:
Overall, my design was very successful, with only one or two small details that can be improved. In the next step of my final product, I will consider and create improvements to my final design.

Evaluation

Introduction: Below, I will evaluate my final prototype and show some possible improvements

Prototype Strengths

- Easy to carry
- Water resistant
- Durable
- Allows drinks and stacks to be carried
- Very versatile
- Aesthetically pleasing
- Environmentally friendly, made from wood

Prototype Weaknesses

- Not waterproof, it is water resistant
- The bowls get in the way of the handles, so the handles become ineffective when the bowls are inserted.

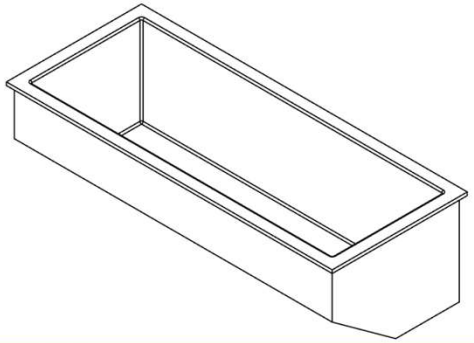
Design Optimisation

The optimal final design, would be to create the product again, and to ensure it is fully waterproof, by using acrylic. This will allow the user to customise their colour and make it more aesthetically pleasing to them. Not only this, but I will replace the two side bowls by the handle, with the design below to ensure that the handles are usable, no matter what you want or need to carry.

Suggested Modifications

- I have re-designed, the side bowls by the handles, to allow the handles to still be effective when the bowl inserts are in place.

- Instead of using plywood, I could have uses acrylic which would have allowed the drinks tray to be completely waterproof. It would have also allowed the user to pick their own colours, which would have made it more aesthetically pleasing to the user.



Conclusion:

overall, my product worked really well. My Primary user really likes it and can see himself using it in the future.

With the improvements I have suggest and created, my product meets all the criteria on my technical specification, and the product works really well, serving its purpose.

Soon I am looking to talk to the owner of my local pub, and present my product to him, to see if he thinks my product, would be helpful to him and his staff.

Prototype with modification of snack bowl

With the new modifications to the snack bowl, the handles on the main body of the product are now effective and work very well. The product is now easy to carry no matter what you decide to put in it.