



Understanding Standards

**Support pack for National course assessment
C819 75**

Design and Manufacture (SCQF 5) assignment

Identifier: ABCDEFG/2017 Candidate Evidence

This edition: December 2017 (version 1.0)

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Overview

Purpose

Understanding Standards packs are intended to provide teachers, lecturers and assessors with a clear understanding of the marks that have been awarded to specific examples of candidate evidence and the reasons why these have been awarded. They may be used in centres:

- ◆ to prepare for the assessment of the relevant course component
- ◆ as benchmarks to help assessors judge the evidence produced by their own candidates
- ◆ for training purposes

The commentary and candidate evidence in this pack should be read in conjunction with the relevant coursework assessment task and the marking instructions.

Candidate evidence

Candidate A

Notes to candidates

Before you start the research you should have read the instructions for candidates and be familiar with:

- ◆ the brief
- ◆ the skills you have to demonstrate
- ◆ the type of evidence you have to provide

You should speak to your teacher or lecturer if you are unsure about the areas above.

Research

The company has carried out research and identified a few requirements for the shelf. You should gather further information to ensure the proposal is suitable for the company and the teenagers you know.

You should record your research information on this sheet (you can use both sides).

You should use findings from your research to complete the specification below.

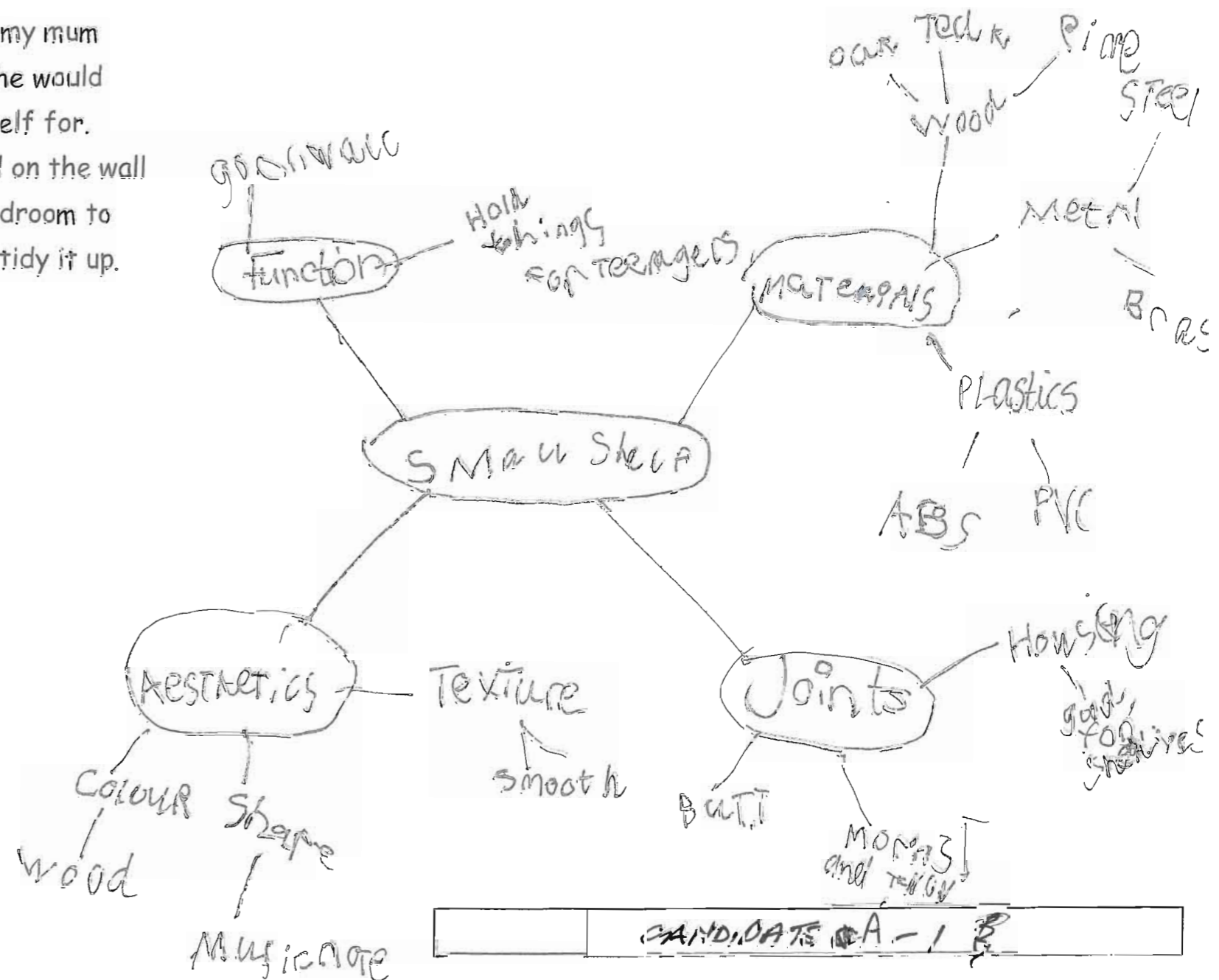
A small shelf – specification

The shelf must:

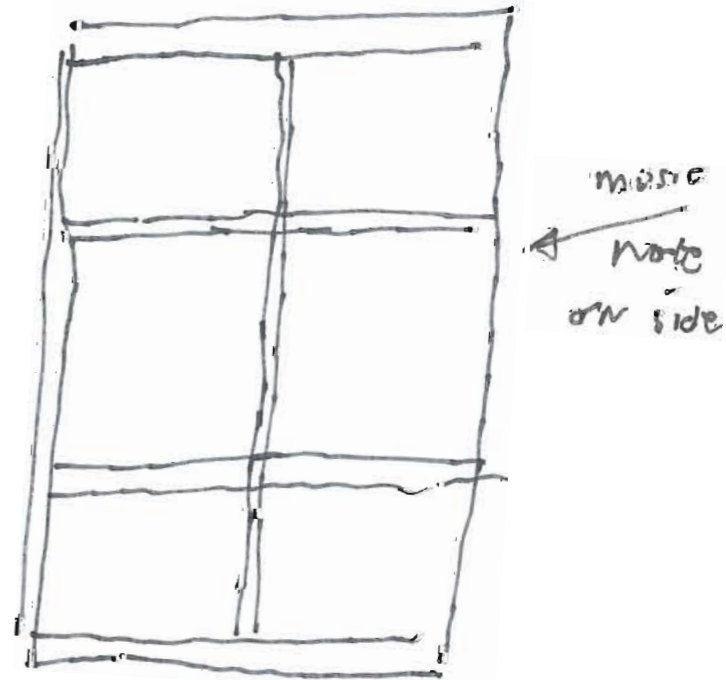
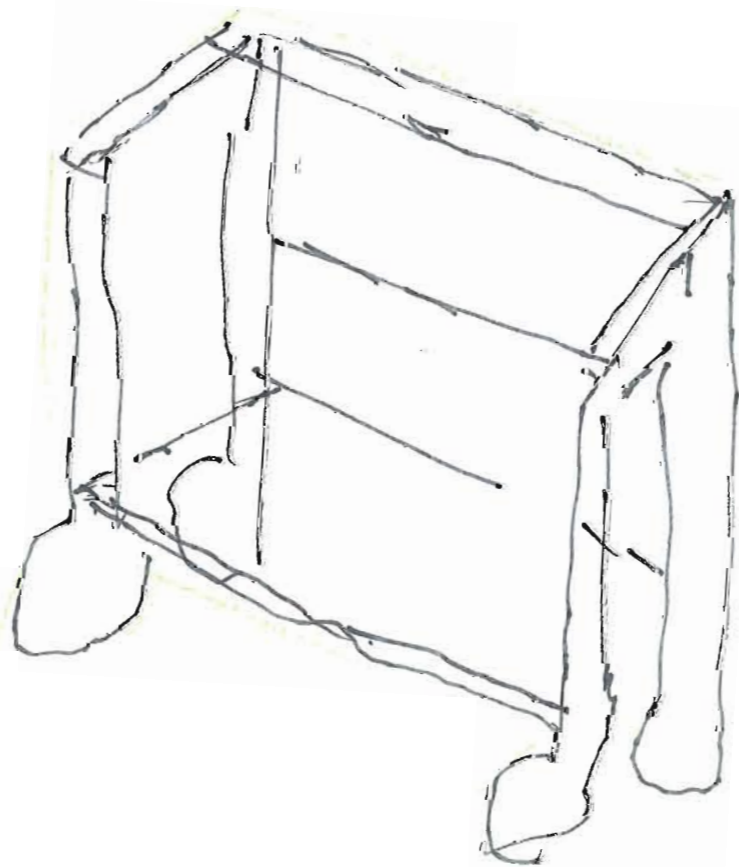
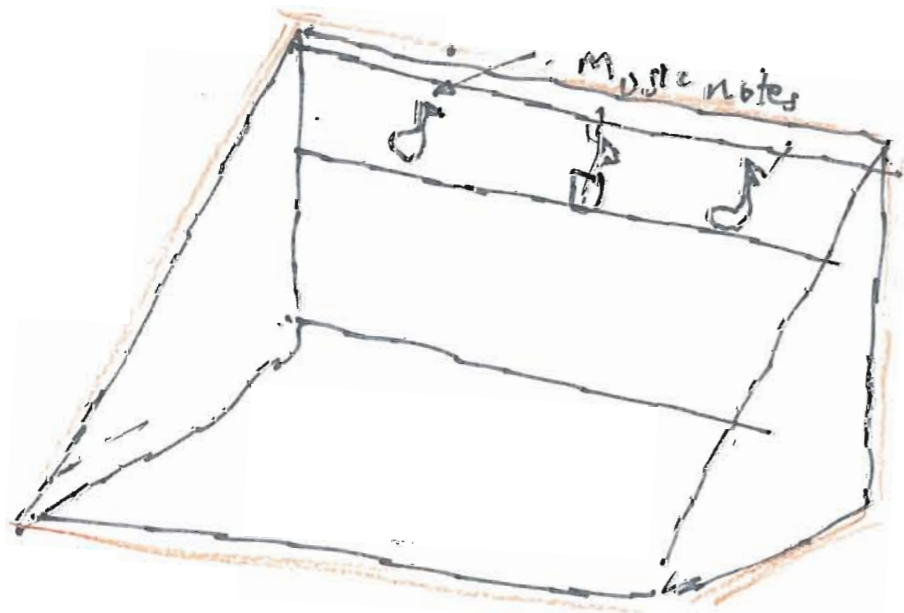
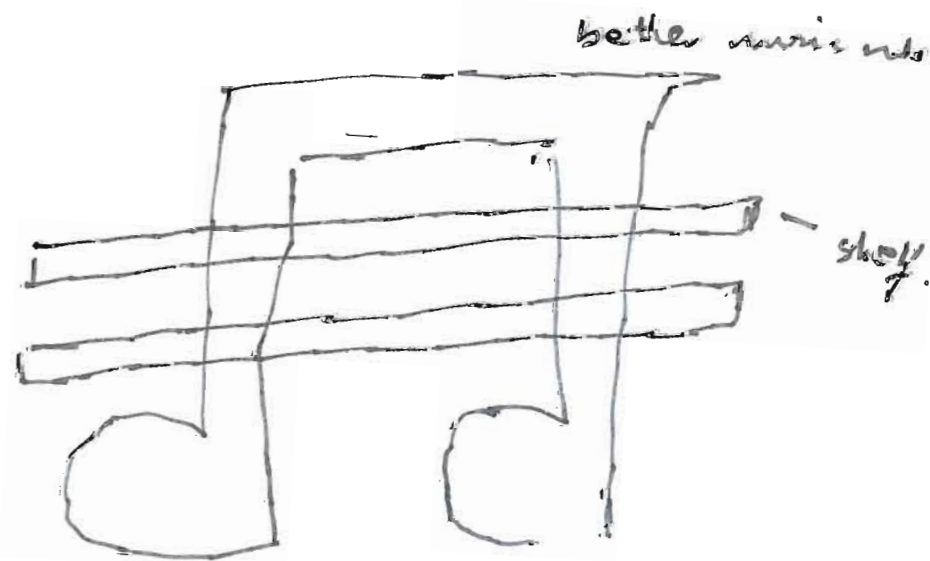
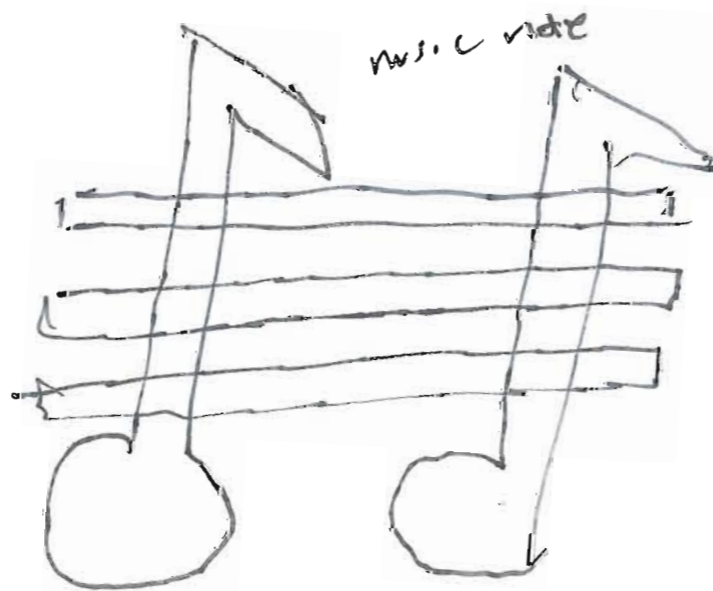
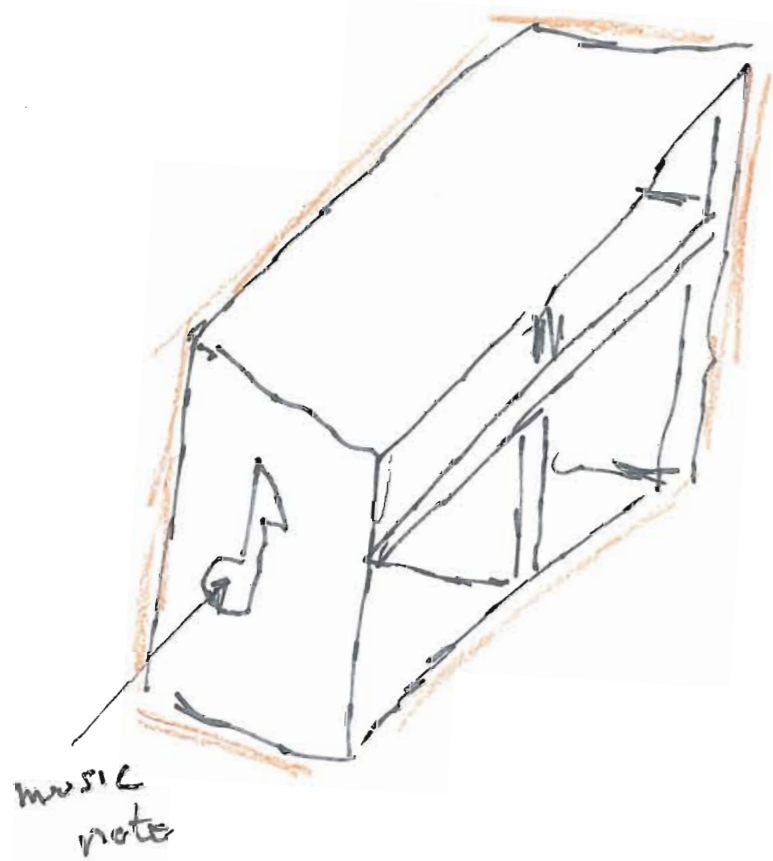
- demonstrate a high level of craftsmanship
- Have a music theme
- Must go on a wall



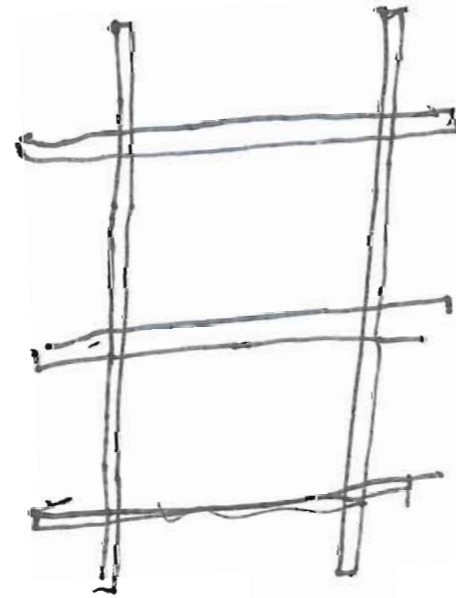
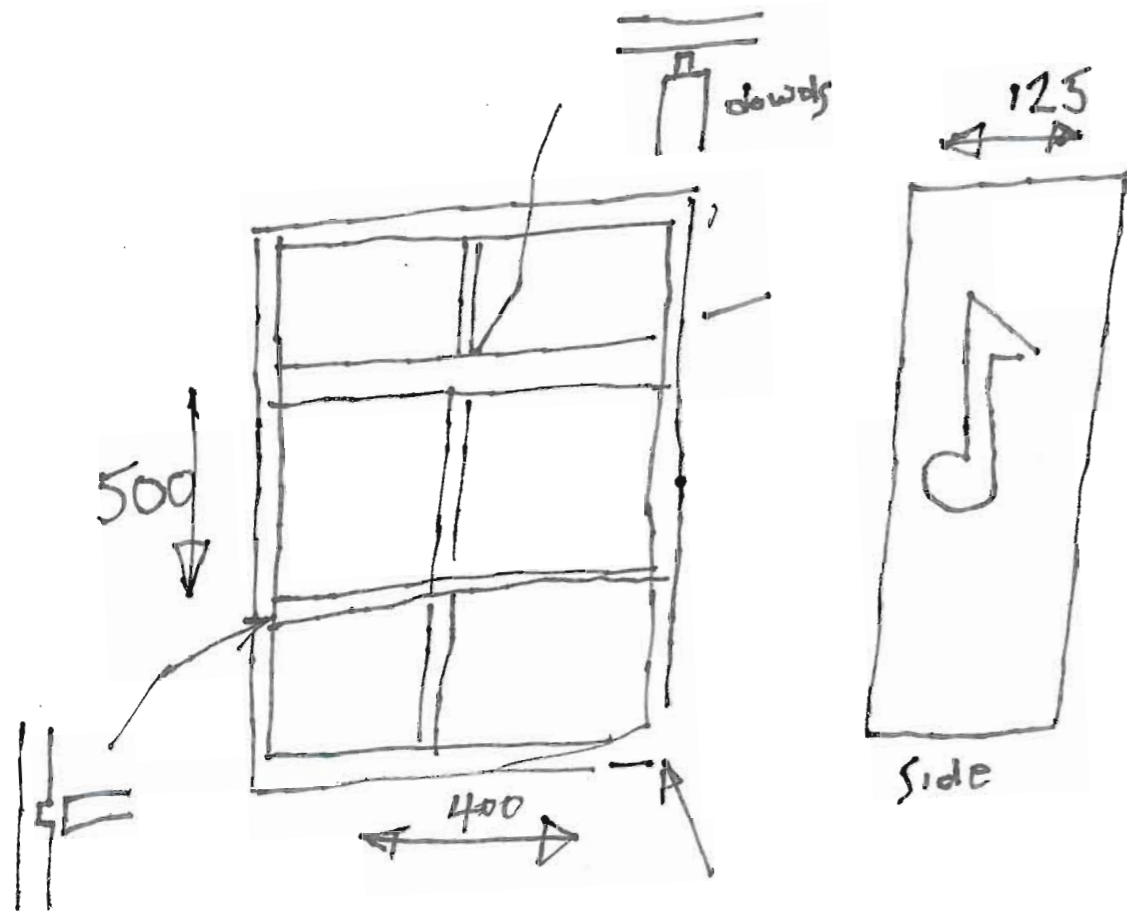
I asked my mum where she would like a shelf for. She said on the wall in my bedroom to help me tidy it up.



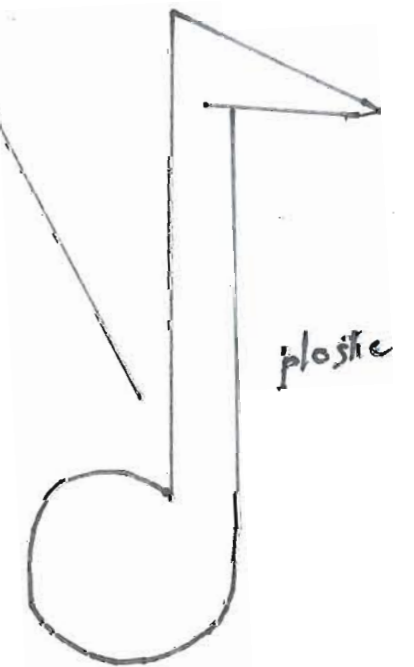
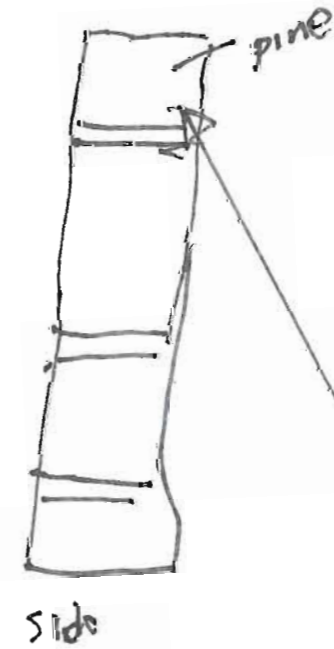
IDEAS



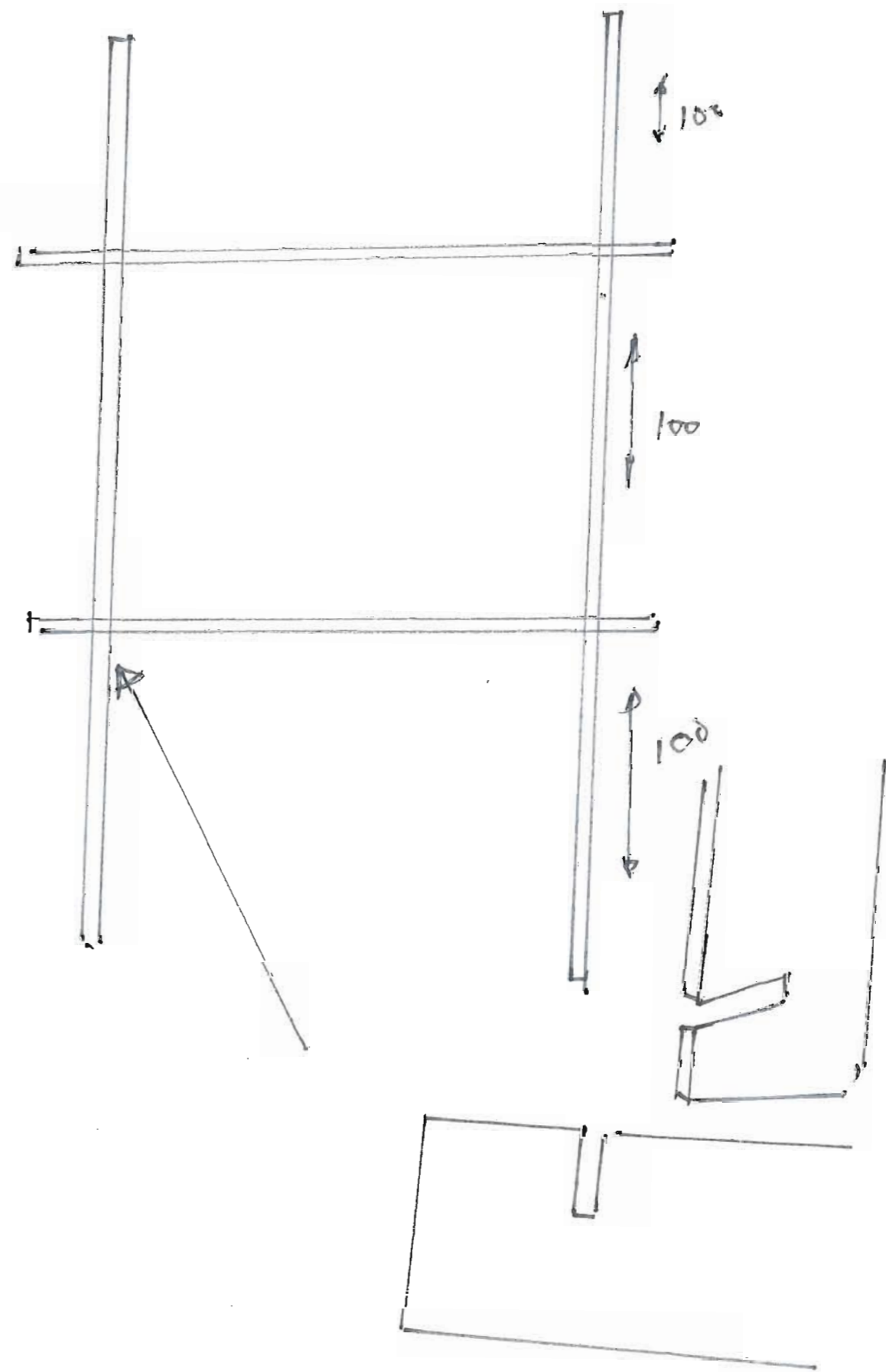
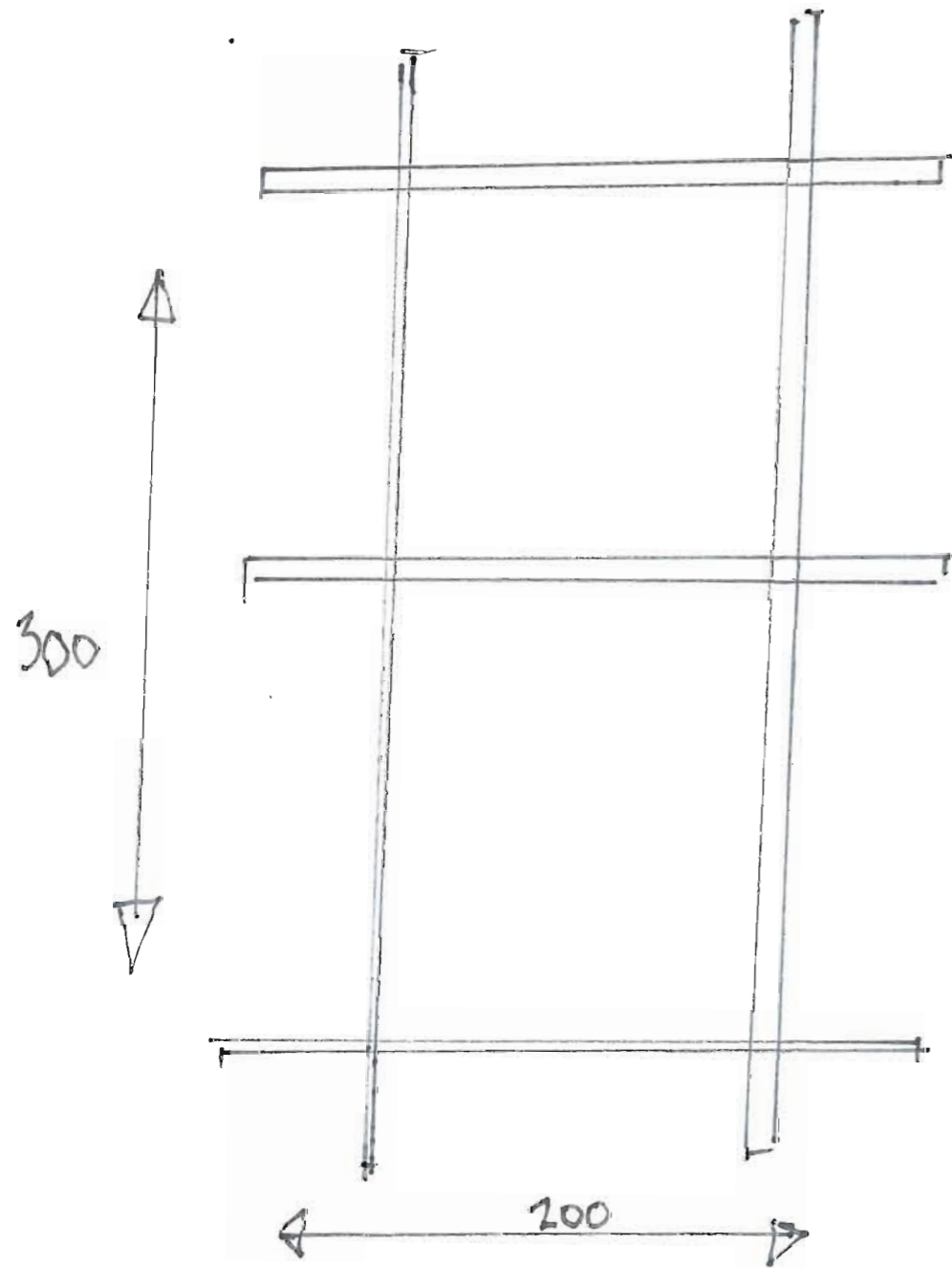
DEVELOPING IDEAS - 1



easier
to make

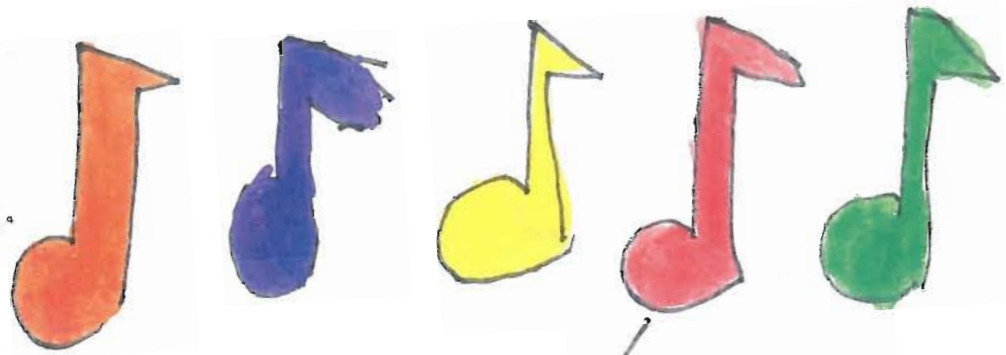


DEVELOPING IDEAS - 2

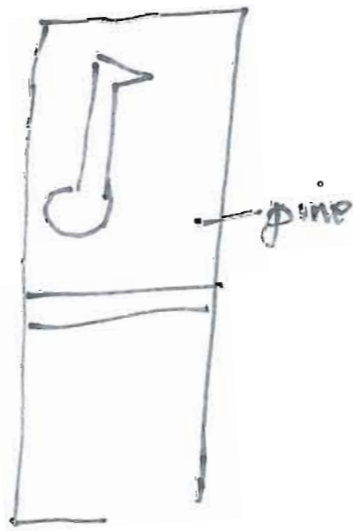


DEVELOPING - 3

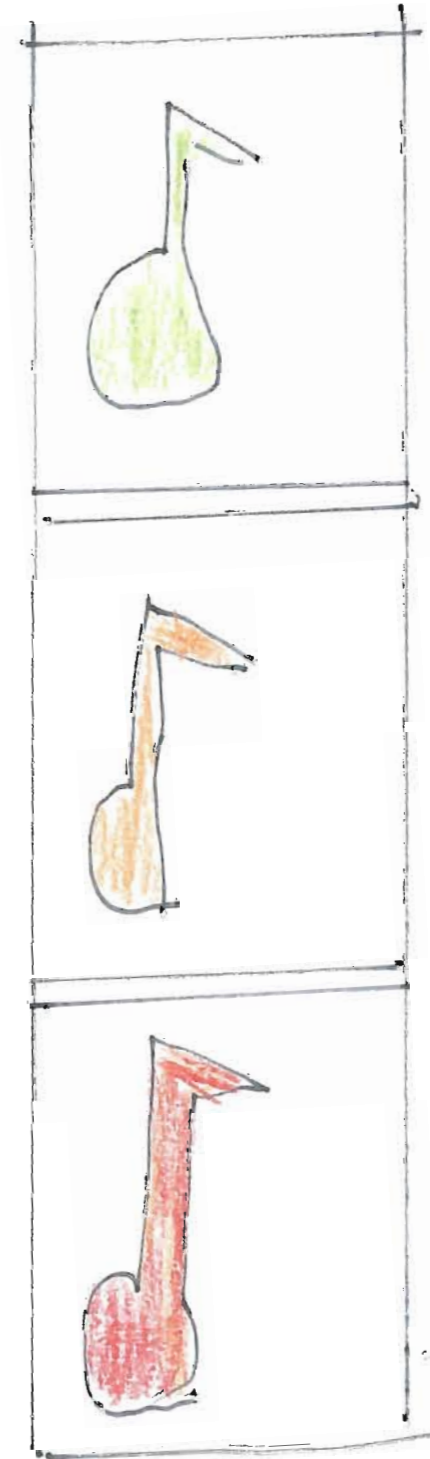
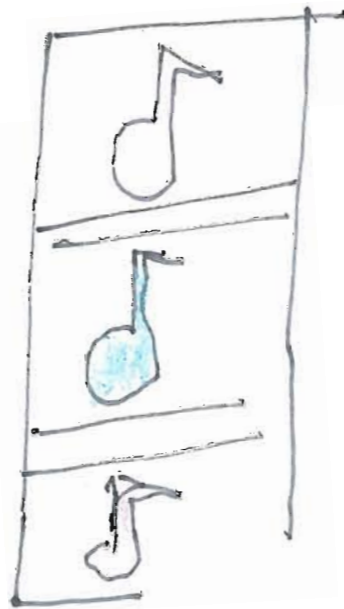
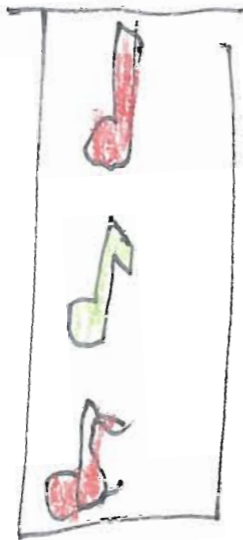
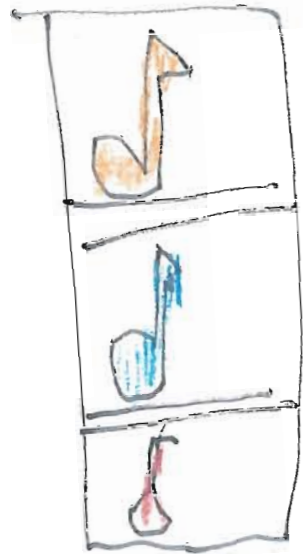
Note
can be
different
colours.



This one will be best for teenagers.



could have different colours.



Best idea looks like
traffic lights - will appeal
to teenagers

N5

Design and Manufacture DESIGN

TASK 1: A small shelf

PLANNING FOR MANUFACTURE SHEET



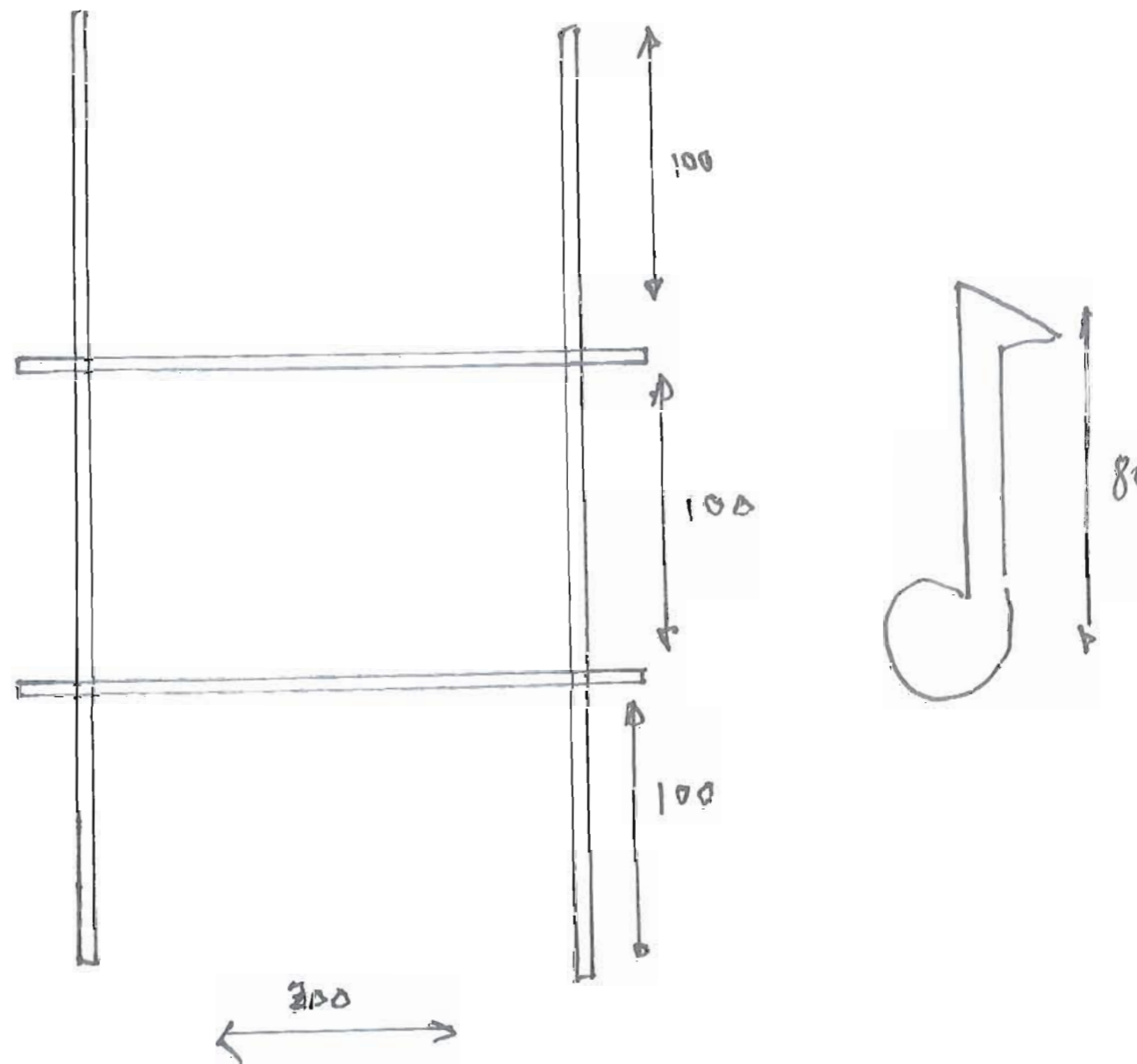
WORKING DRAWING/SKETCH

SEQUENCE OF OPERATIONS

STAGE	OPERATION	TOOLS/EQUIPMENT
1	get material	
2	Cut joints	Saw
3	Put together	PVA wood glue
4	cut note with laser cutter	laser cutter
5	Stick notes on	glue

CUTTING LIST

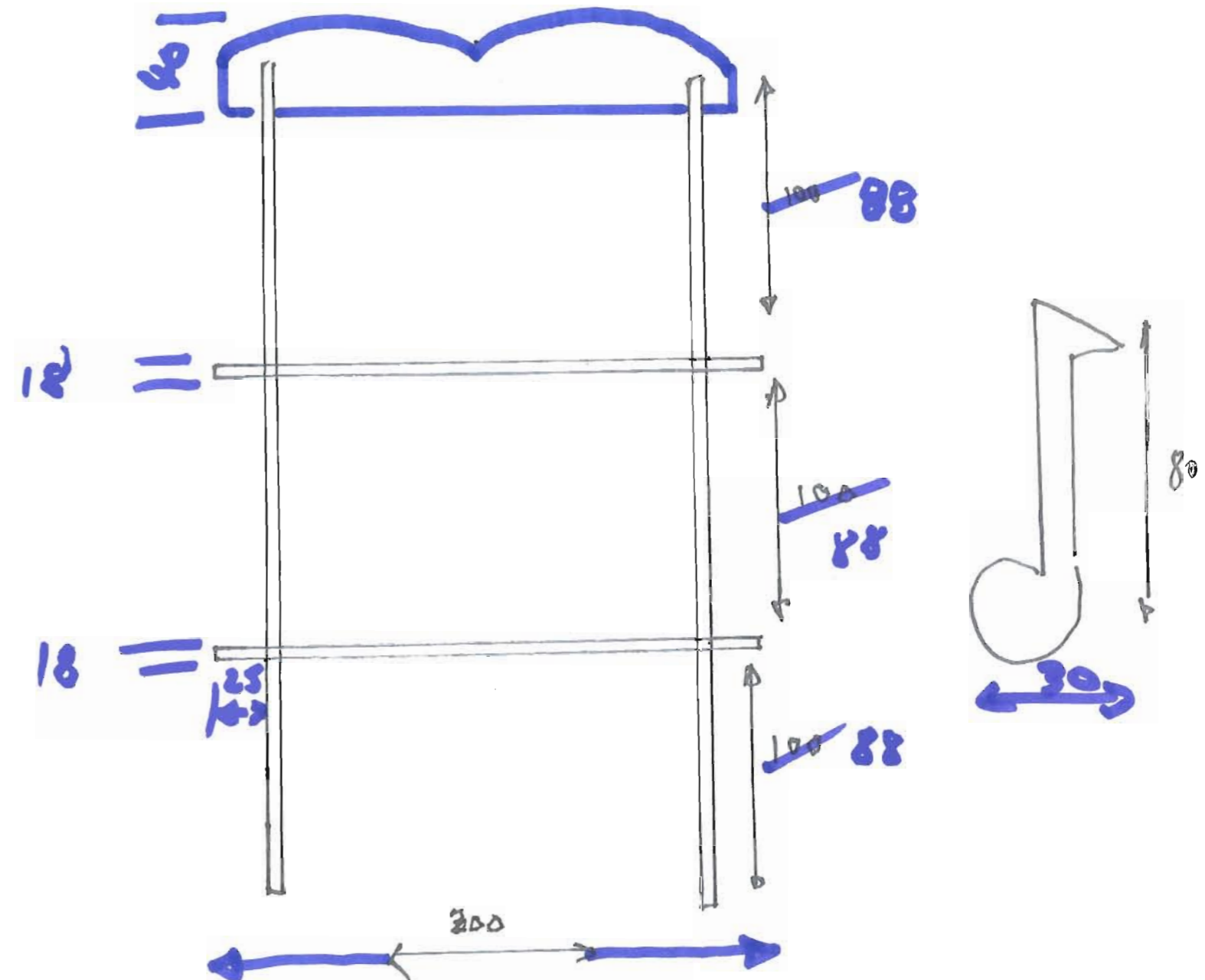
PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
SIDES	PINE	2	300	100	20
SHELF	PINE	2	200	100	20
NOTES	ACRYLIC	6	20	40	3



CANDIDATE A - 6A

SEQUENCE OF OPERATIONS

STAGE	OPERATION	TOOLS/EQUIPMENT
1	get material	
2	cut joints	Saw
3	Put together	PVA wood glue
4	cut note with laser cutter	laser cutter
5	stick notes on	glue



CUTTING LIST

PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
SIDES	PINE	2	300	400	20 18
SHELFs	PINE	2	200	100	20 18
NOTES	ACRYLIC	6	20	40	3

CANDIDATE A - 6B (MARKED UP)

Candidate B

Notes to candidates

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You should use findings from your research to complete the specification below.

A small shelf – specification

The shelf must:

- demonstrate a high level of craftsmanship
- have simple modern design
- use calm, neutral colours and materials
- be influenced by guitars
- incorporate guitar features such as strings
- hold hair brushes (see research for size)
- hold hairdryer & straighteners (research has sizes)
- be easy to get things in and out
- be easy to wall mount.

RESEARCH FINDINGS – You may use the other side of this sheet

I am going to design for teenage girls.

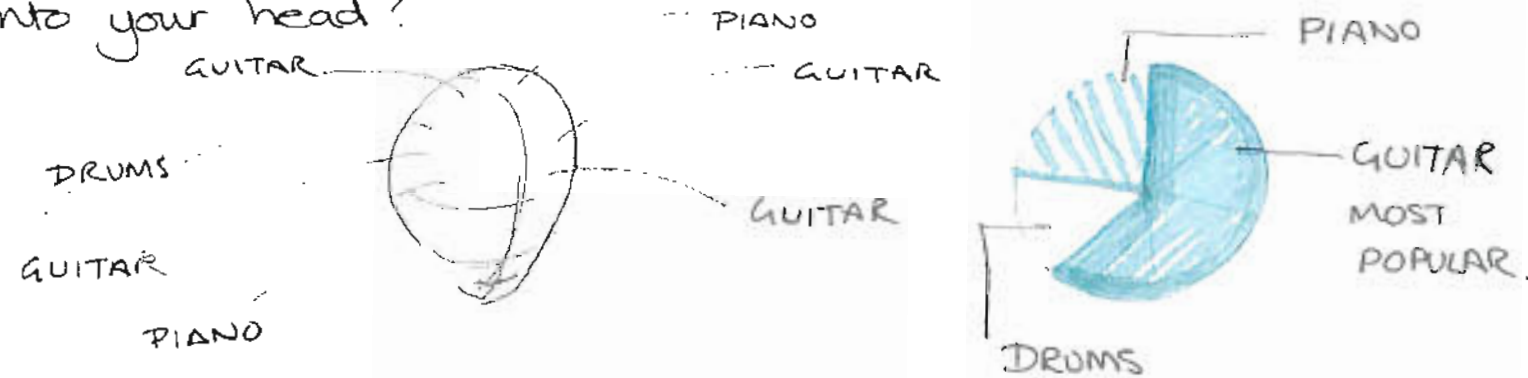
I asked the girls in my class:
 What bedroom best matches your style?



- Some of the reasons:
- A - Calm colours, simple, relaxing, modern, white wood
 - B - Too busy, too much pattern.
 - C - Too busy, too bright, chaotic
 - D - Simple, light wood, not too busy

MUSIC THEME

What is the first musical instrument that comes into your head?



FUNCTION

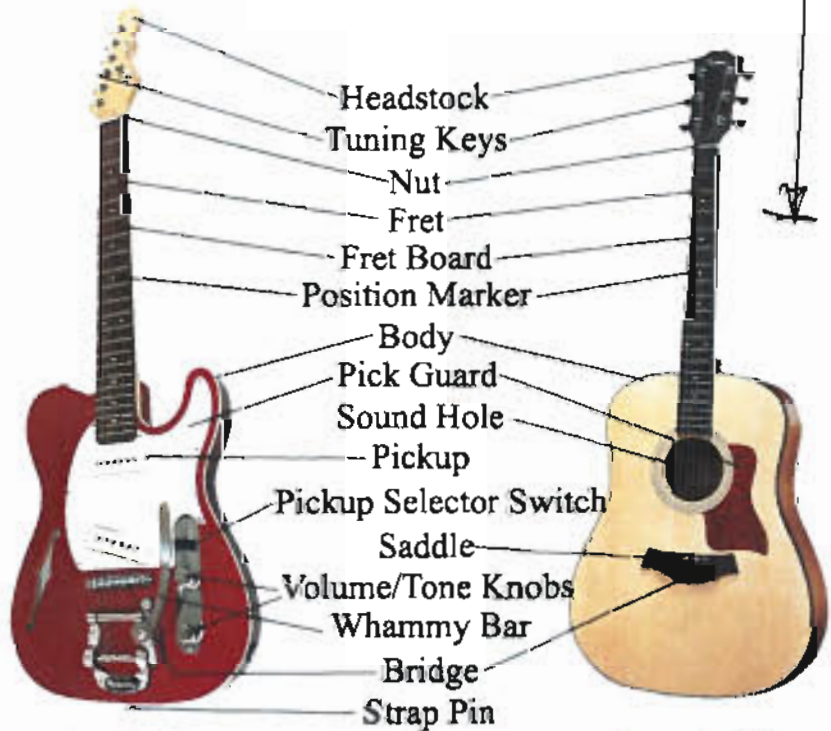
I am designing a shelf to store hair products. Which of these should it store?

Hair dryer	5/7
Straighteners	6/7
Brushes	7/7
Comb	2/7
Hair products	3/7
Accessories	4/7

CANDIDATE B -1

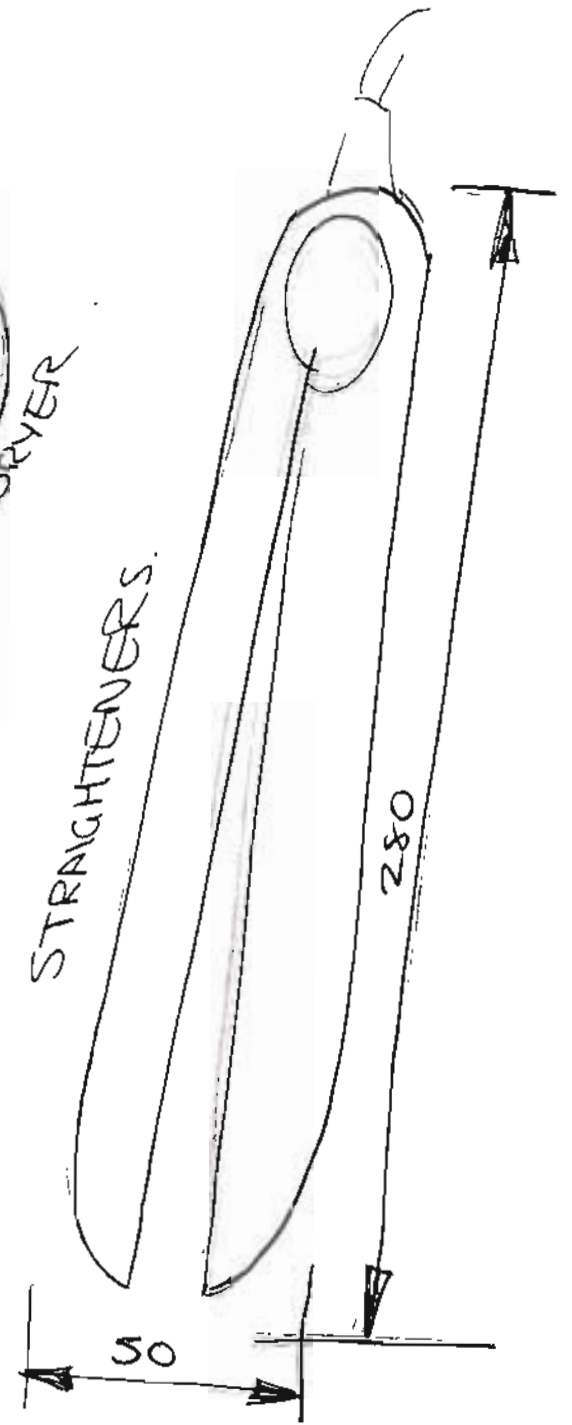
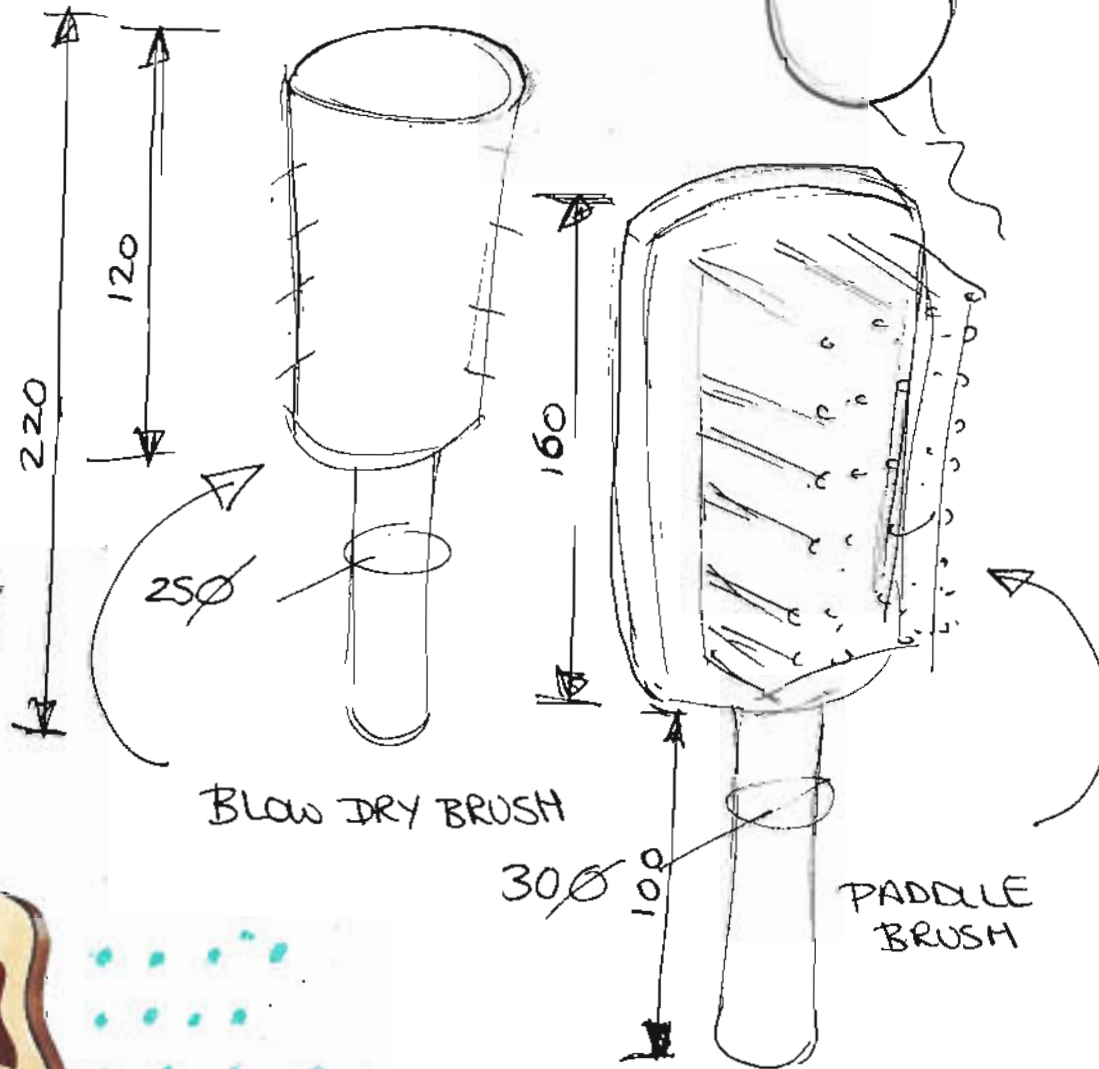
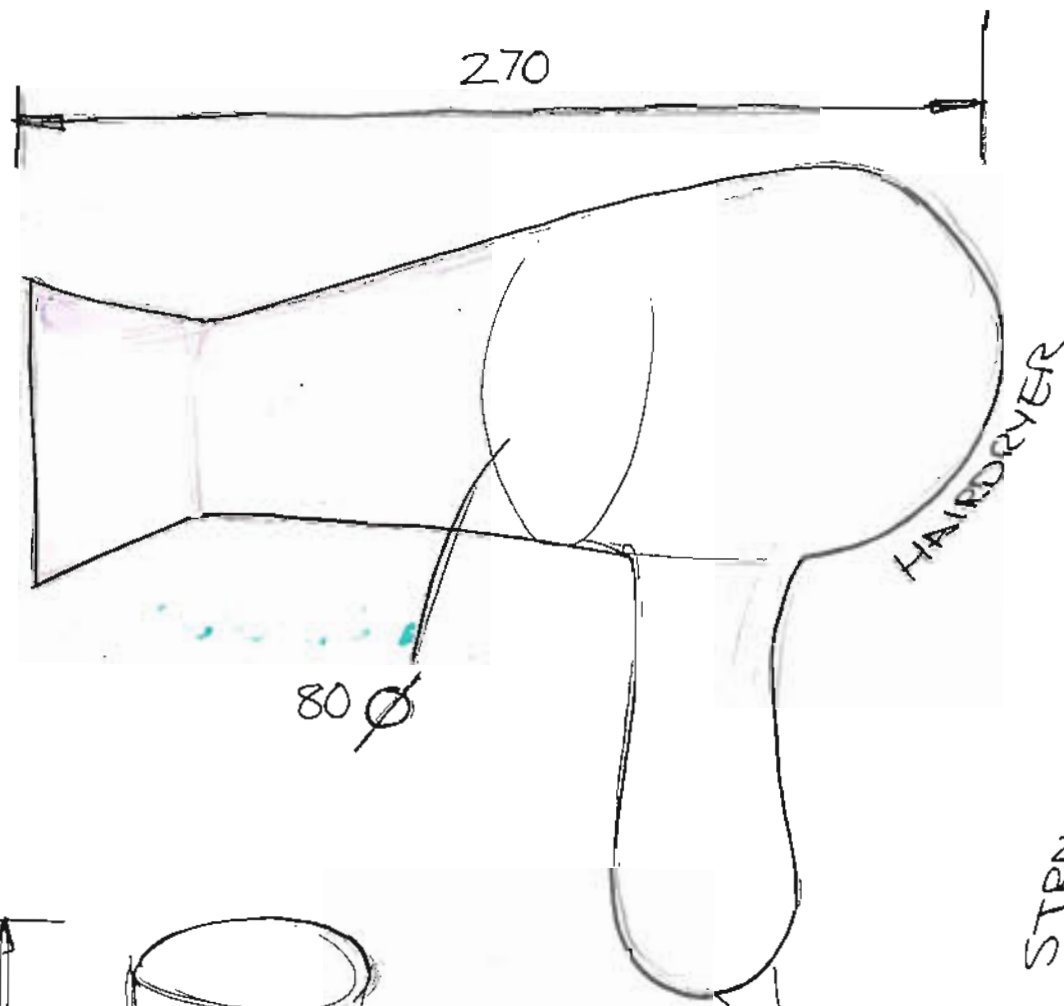


GUITAR LESSONS
 ALL SKILL LEVELS • CHORD PROGRESSION
 555-9341 ask for Patrick • CLASSICAL PICKING
 • MUSIC THEORY • TABLATURE

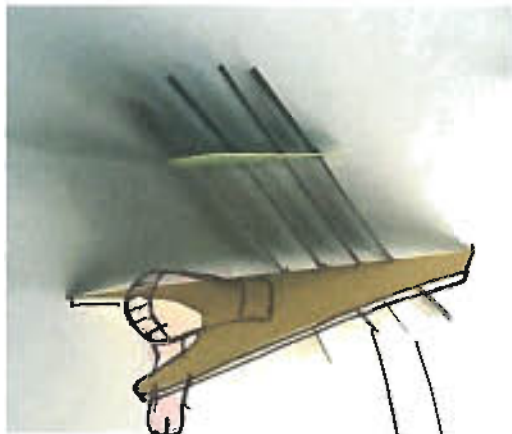


Electric Guitar

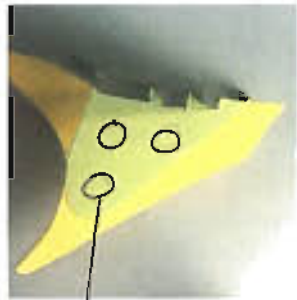
Acoustic Guitar



I measured my hair stuff to get the key sizes to make sure they fit in my design.



HAIRDRYER SITS IN SHELF INDENT.



HOLES TO STORE BRUSHES



SHELF AREA

GUITAR SHAPE FORMED FROM ACRYLIC OR FLEXI PLY.



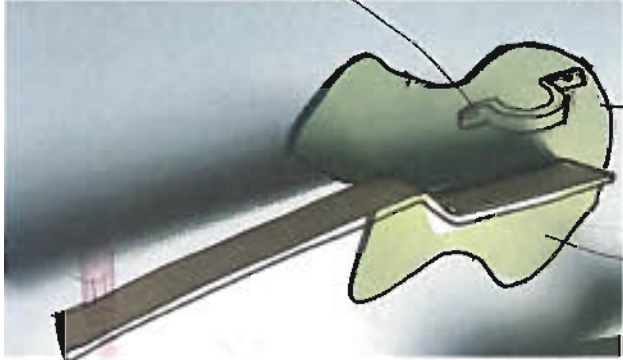
ROPE/ELASTIC? HOLDS STUFF IN PLACE

IDEA FROM ELECTRIC GUITAR

COULD BE METAL OR PLASTIC RODS

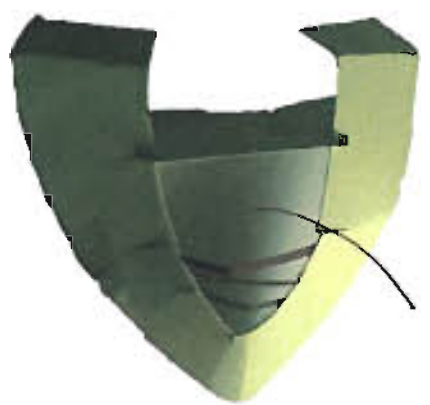
BRACKETS TO STORE HAIRDRYER / STRAIGHTENER

COULD ALSO BE USED LIKE THIS



LIMITED ASSEMBLY

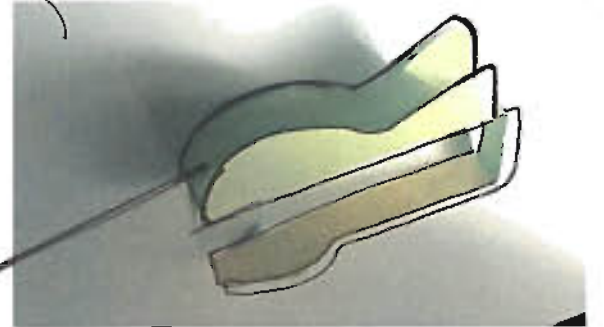
LOOKS TOO MUCH LIKE A GUITAR



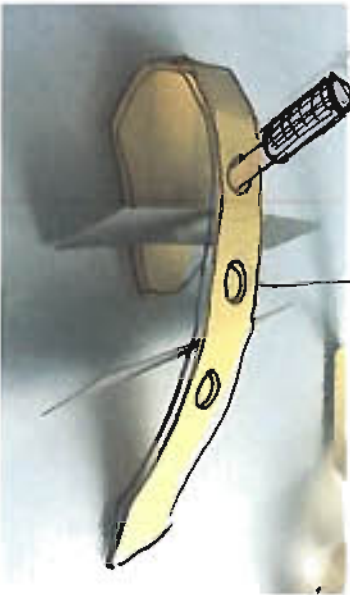
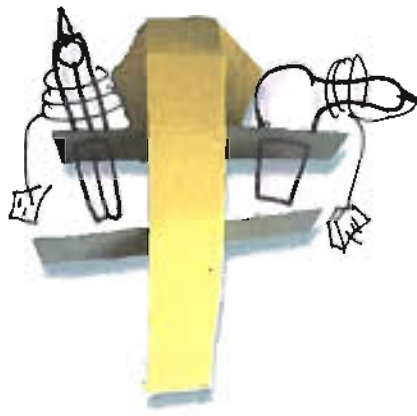
HAIR DRYER STORED IN POCKET AREA



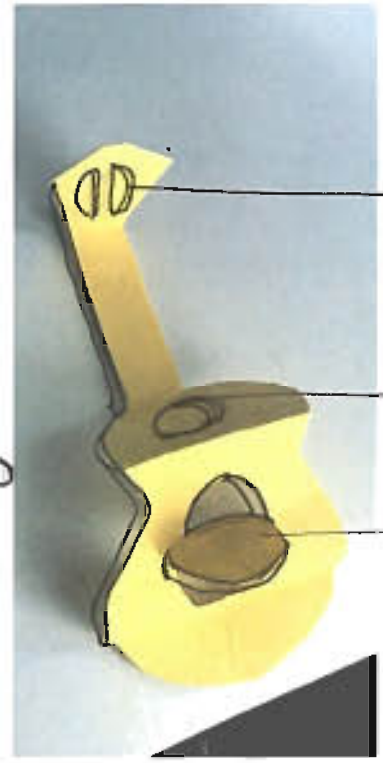
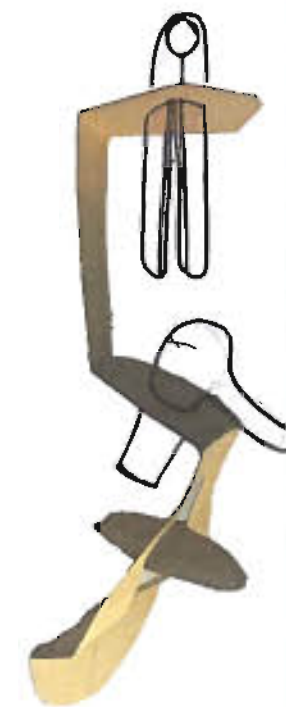
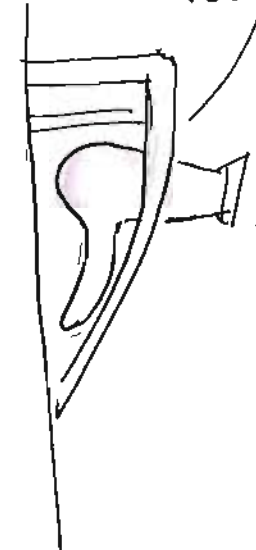
ITEMS HIDDEN IF USED THIS WAY UP



SUBTLE MUSIC THEME



HOLES TO STORE BRUSHES.

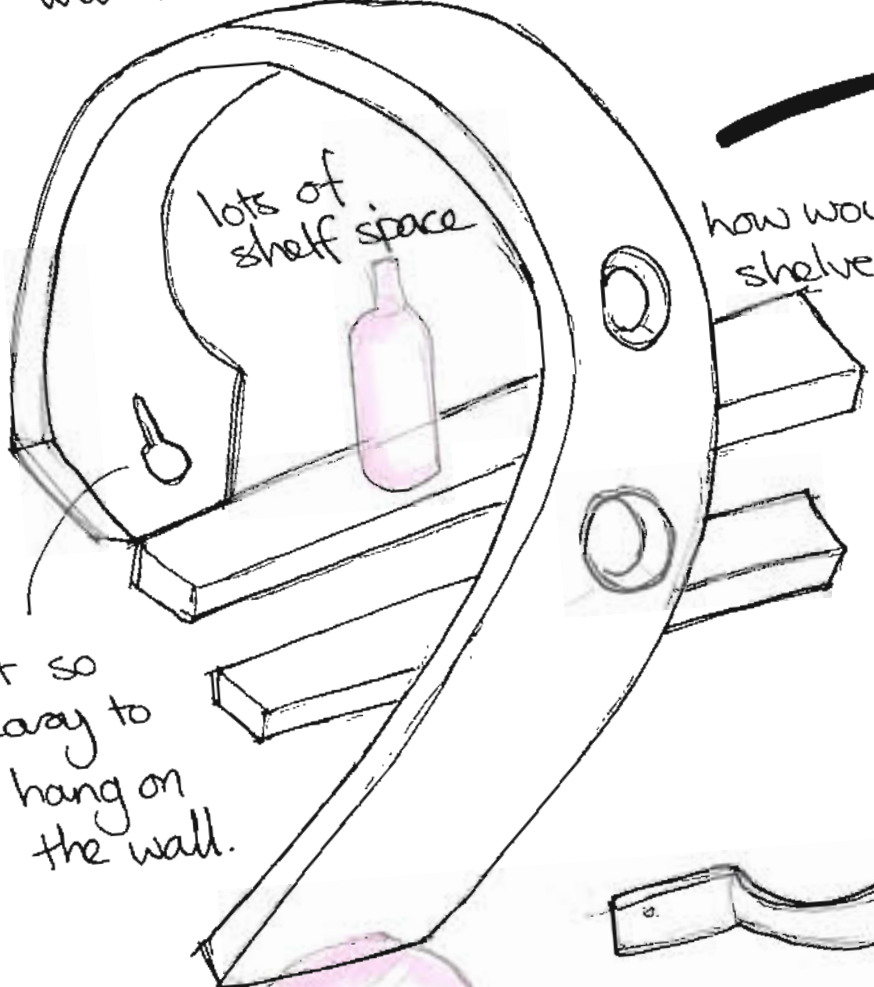


SPLIT HOLE FOR STRAIGHTENERS

HOLE FOR HAIR DRYER

COULD REVOLVE MIRROR/SHELF

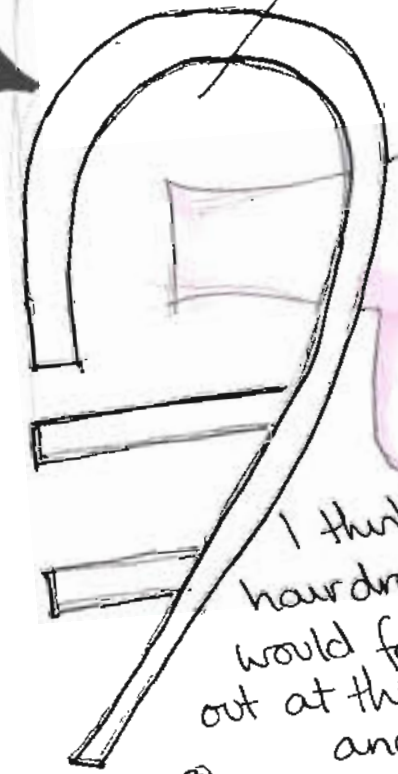
How will the design hold stuff?



lots of shelf space

slot so easy to hang on the wall.

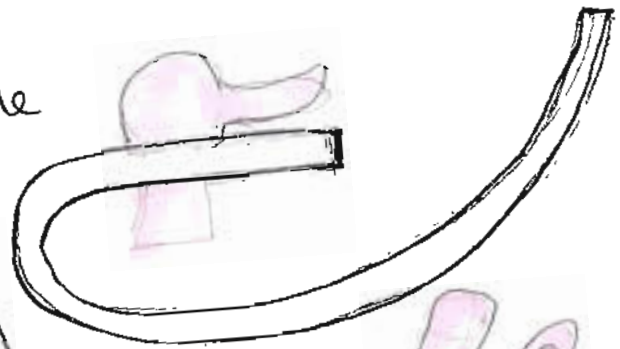
how would the shelves attach?



lots of space

I think the hair dryer would fall out at this angle.

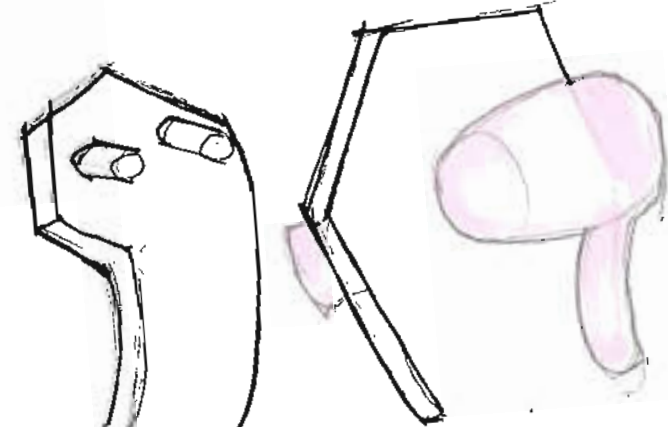
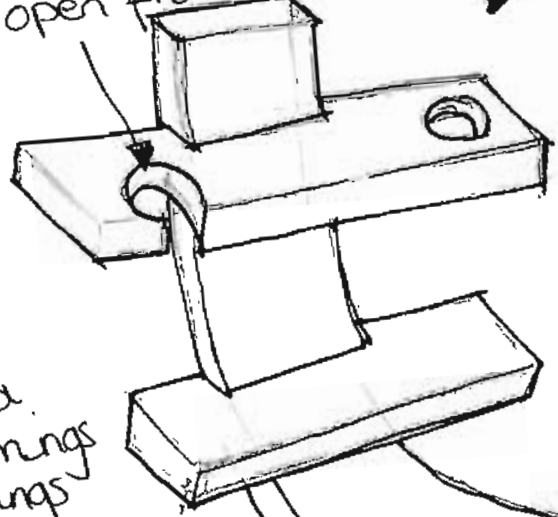
hair dryer at an angle is more interesting looking.



limited shelf space

all have limited practical skill

don't like the open front hole



a bracket could be screwed on. I could make this from acrylic or aluminium would look messy and ruin the look.

dowels or rods could be used. Like tuning pegs on a guitar

I like the idea of using strings to hold things

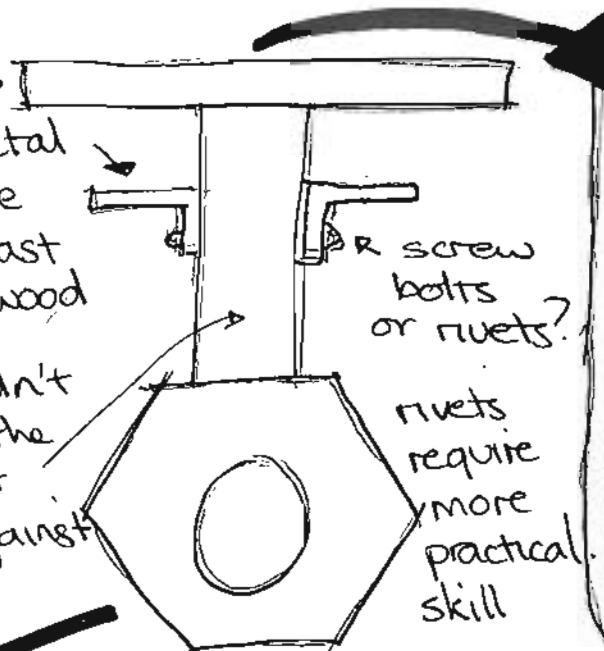
this is more unusual / abstract.

using the guitar head to hold the hair dryer makes it more of a feature. looks better / more secure than davel option.



I could use metal shelves. these would contrast with the wood

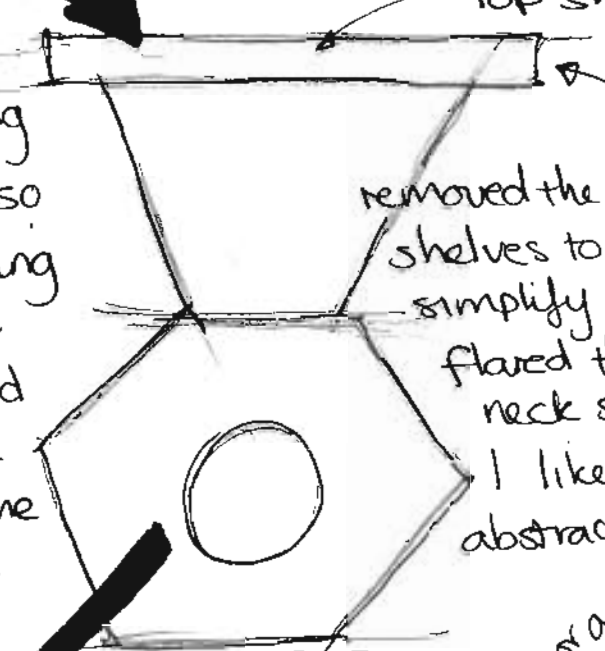
these wouldn't work as the middle bit is flat against the wall.



screw bolts or rivets?

rivets require more practical skill

I tried changing the orientation so you are looking at the edge. this would make the guitar theme hard to see.



removed the shelves to simplify and flared the neck shape. I like this as it abstracts the guitar look.

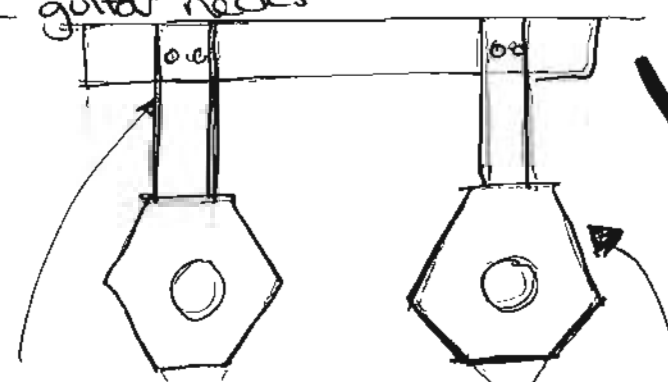
top shelf

dovetail/finger joints could be used

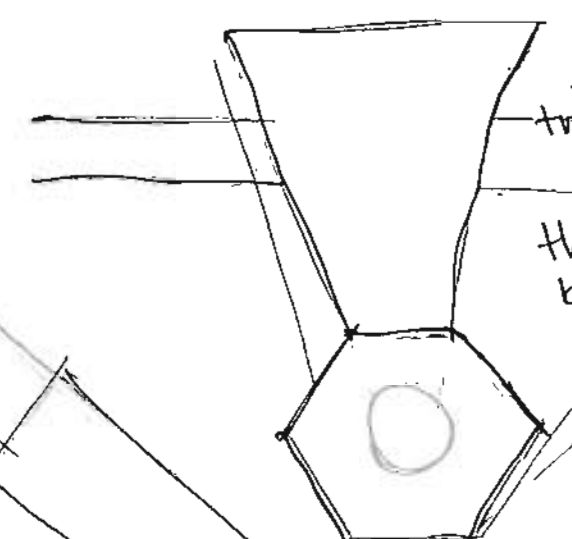


I don't think I could make this joint well in the time

thinking about having 2 guitar necks



could screw or rivet these onto a back plate. there isn't any shelf space so this wouldn't satisfy the brief.

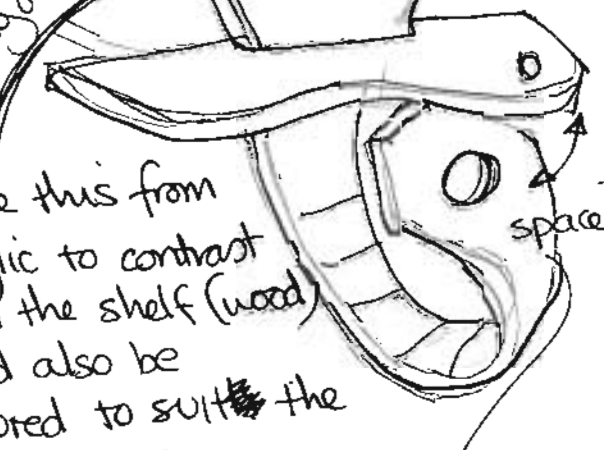


tried lowering the shelf. this looks better & would be easier to join using a housing.

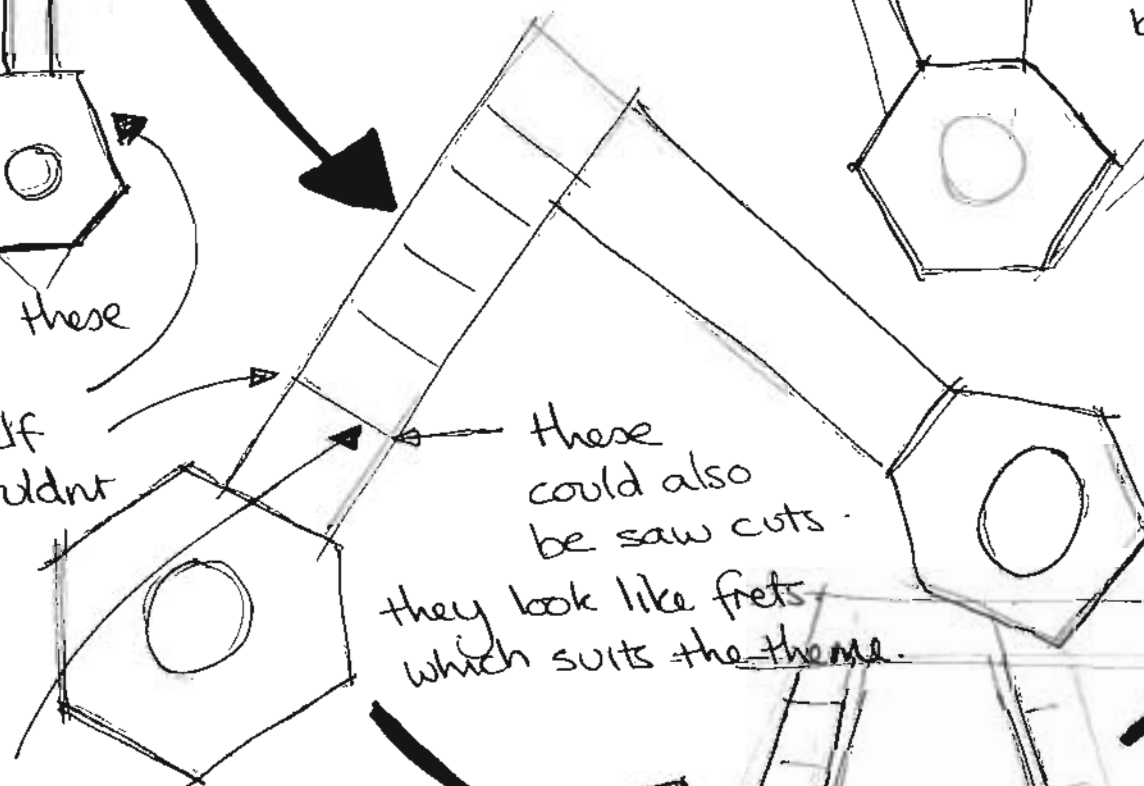
Flexi ply would need to be shaped after forming. this wouldn't work

make this from acrylic to contrast with the shelf (wood) wood also be coloured to suit the teen room.

flexi ply or acrylic?



space?



these could also be saw cuts. they look like frets which suits the theme.

an interesting way to hold both straighteners and the hair dryer

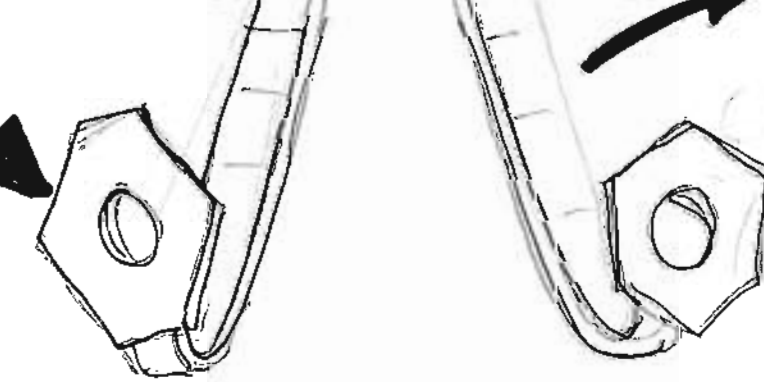
but I still don't like side on shape.



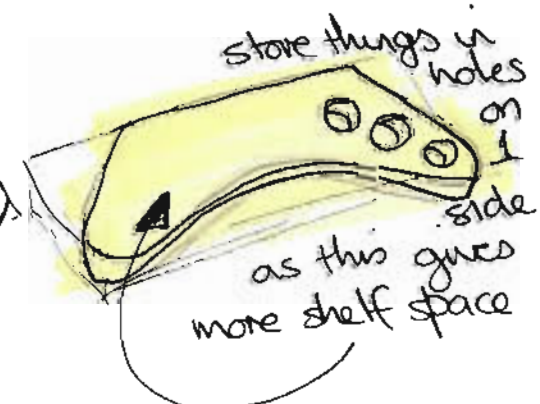
looks like music notes now.

need to make sure/work out if there is enough room to get the hair dryer in and out.

these could be strings and could be used to store things. How would these be joined? Would they look untidy?

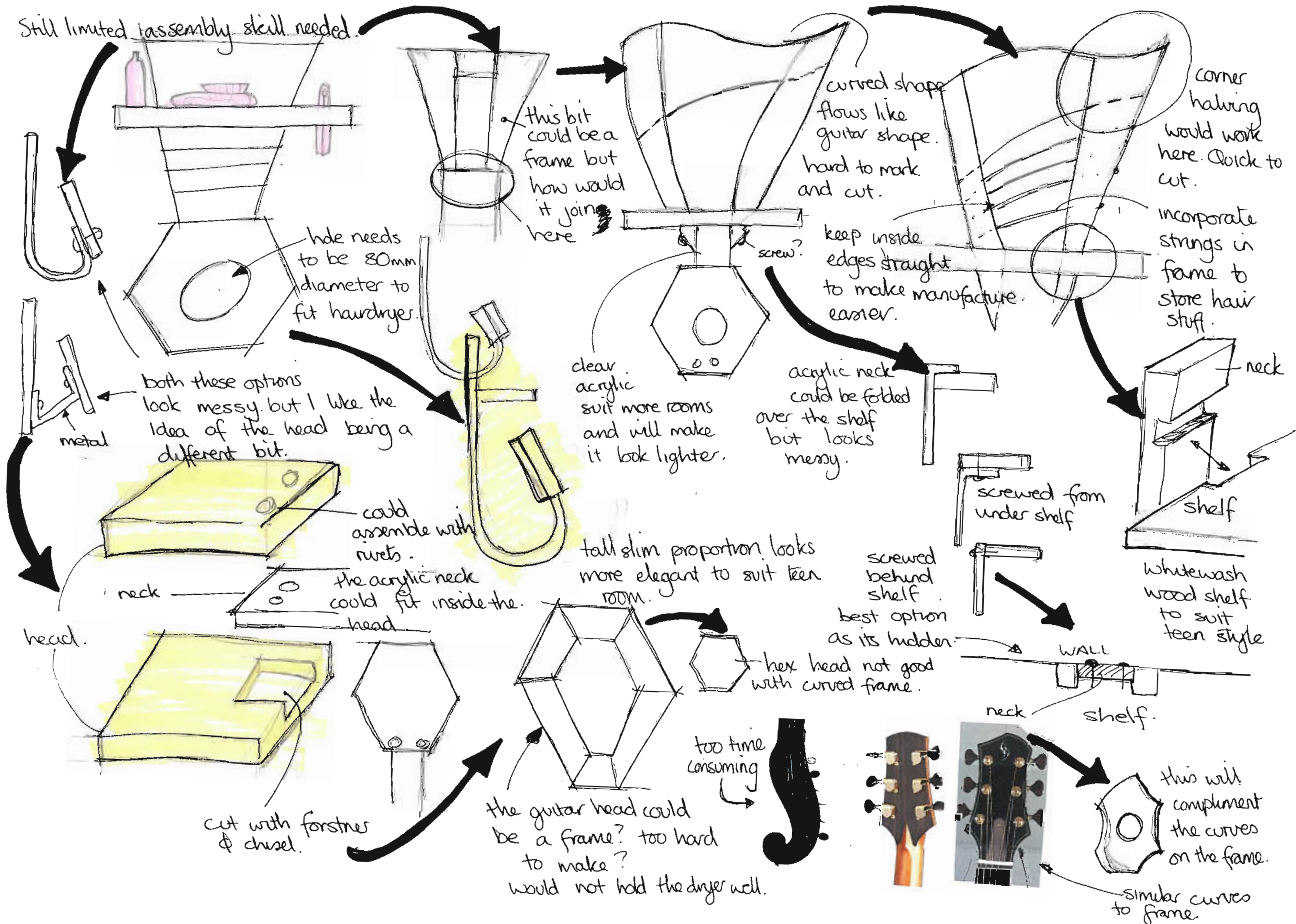


guitar shape shelf.



store things in holes on 1 side as this gives more shelf space

Still limited assembly skill needed.

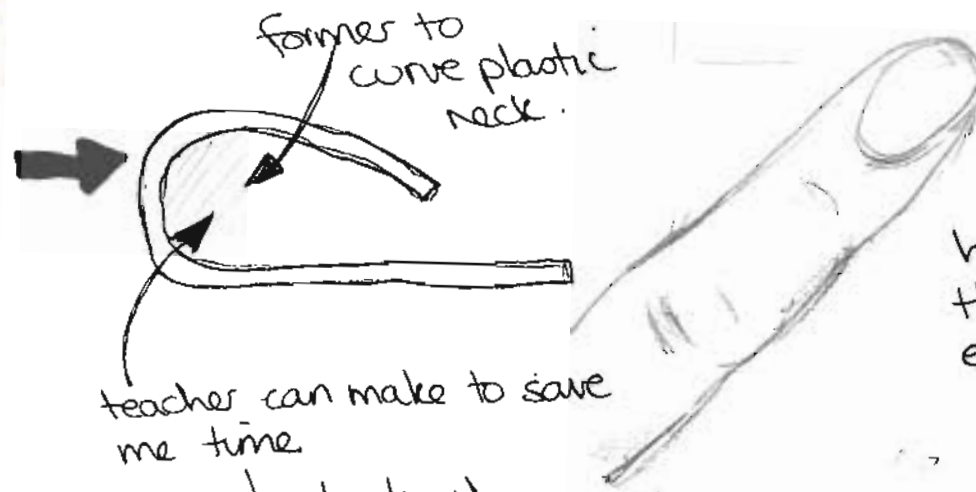
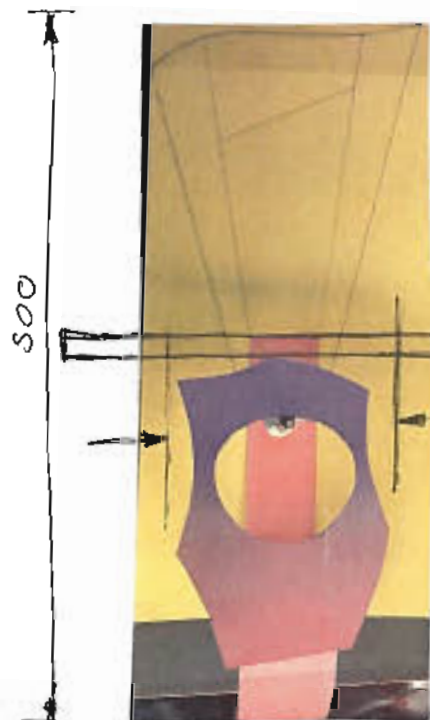
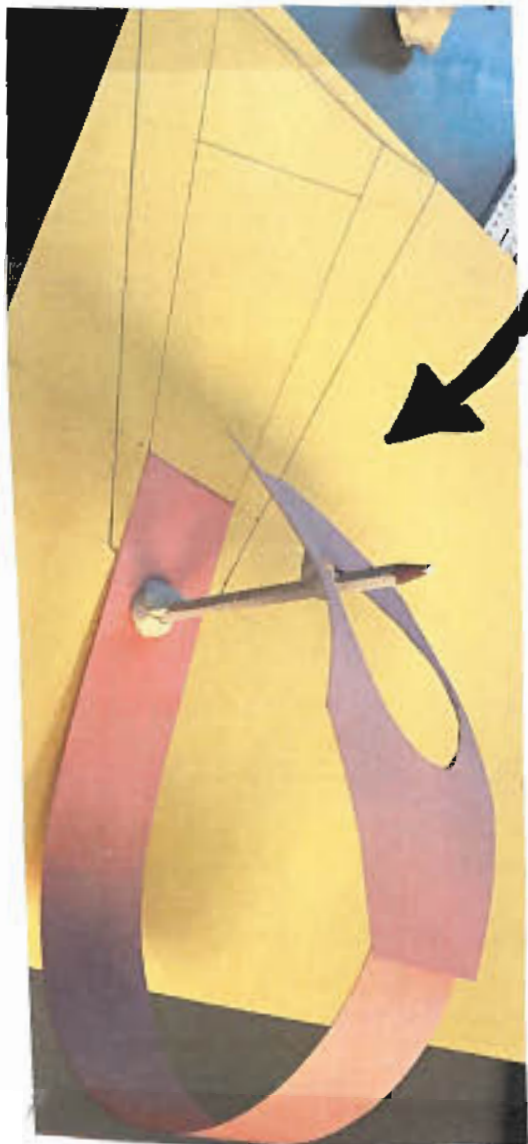




The hairdryer will need to be held in a slot close to 45°. I tried more vertical angles but the hairdryer kept falling out.

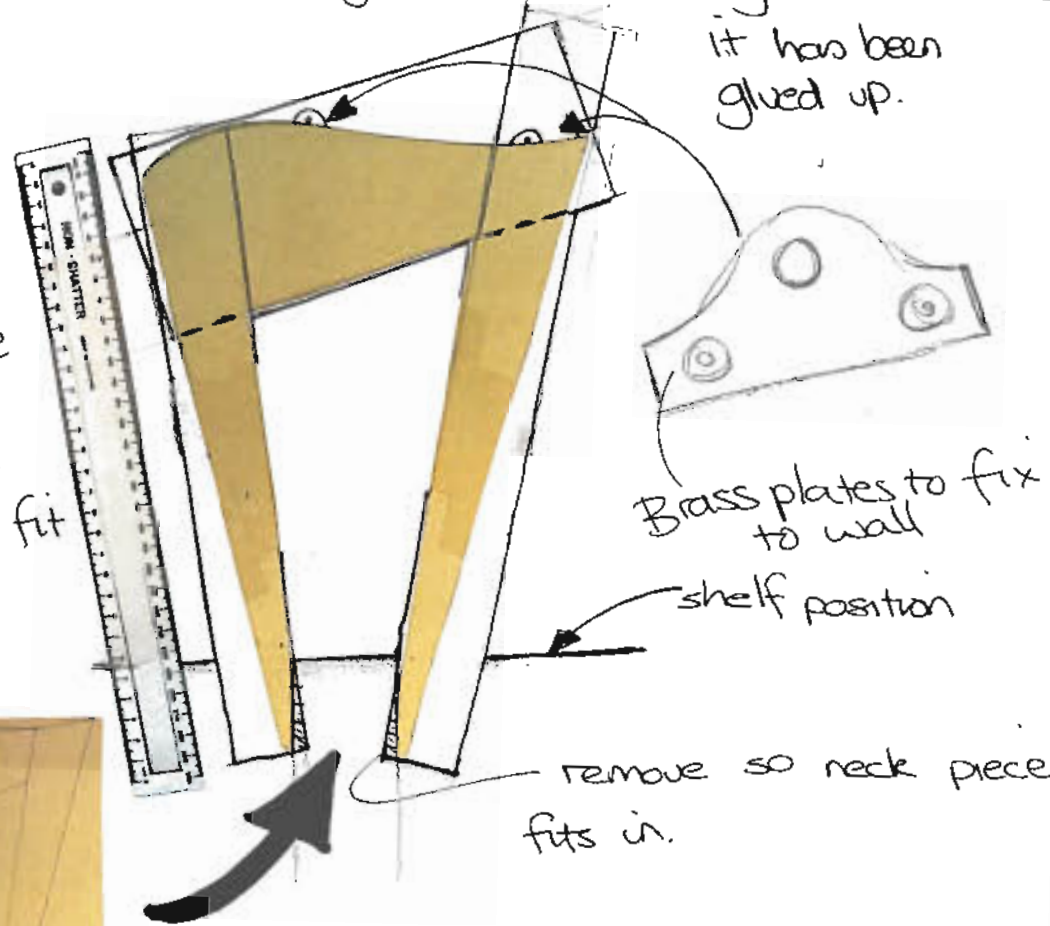
The angle on the model is suitable to hold the hairdryer. I can use sizes from the model to plan the manufacture

The full size model was made to be 500 tall to fit in the box.



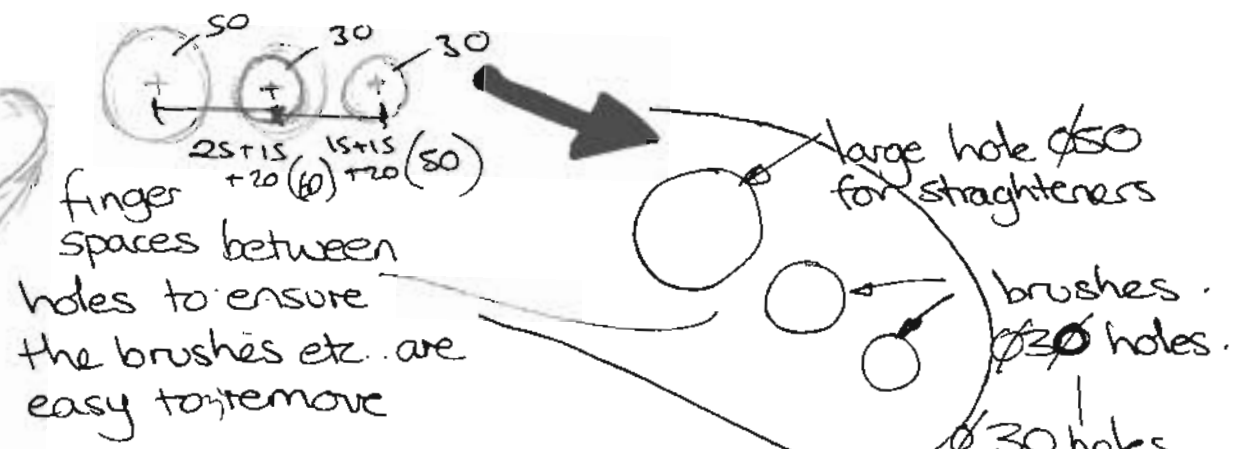
teacher can make to save me time

I think the easiest way to make the frame is marking the joints then shaping when it has been glued up.

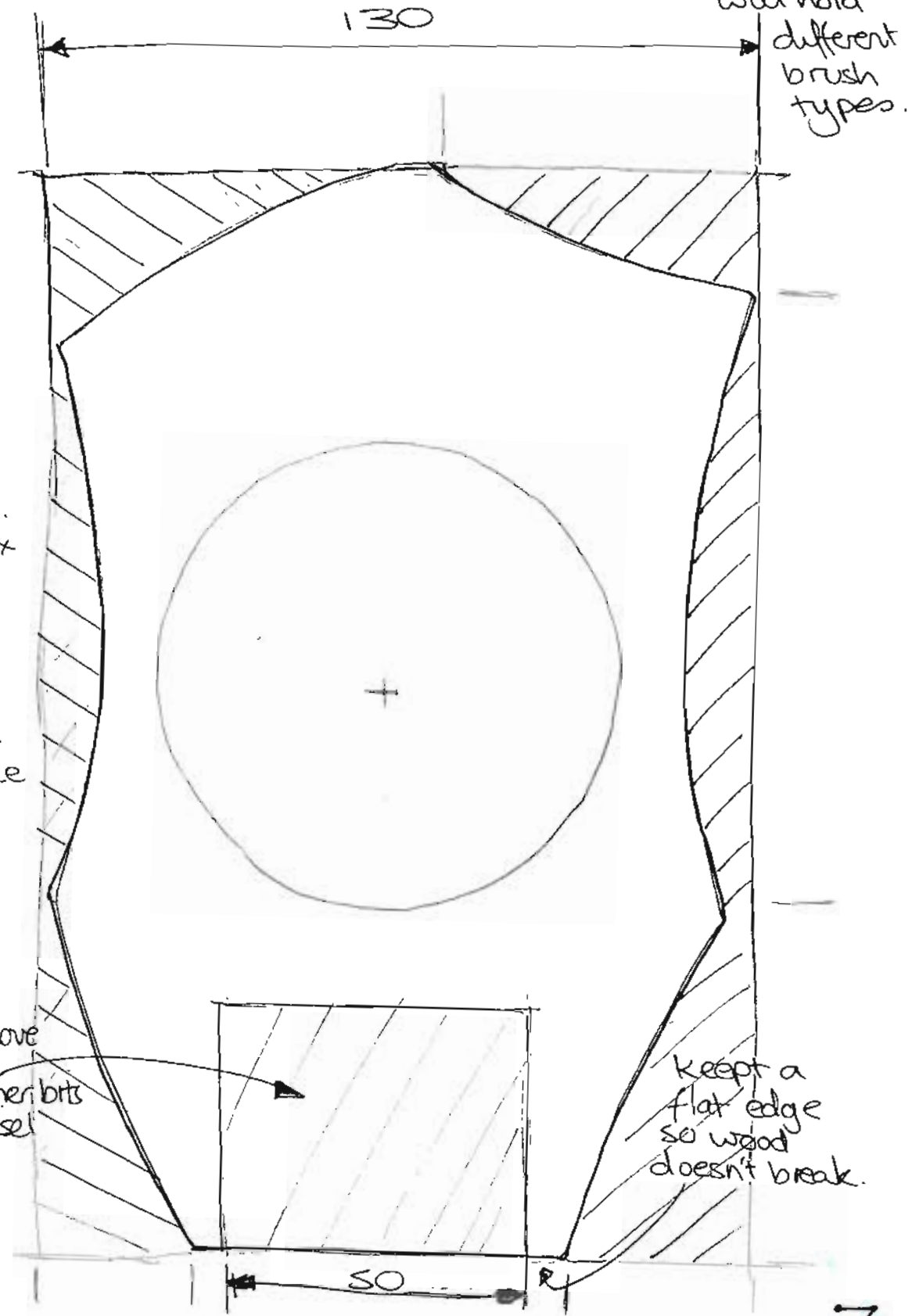


shelf positioned above the guitar head

holes for brushes & straighteners will not be in the area of the head as there wouldn't be enough space when the hairdryer is being stored.

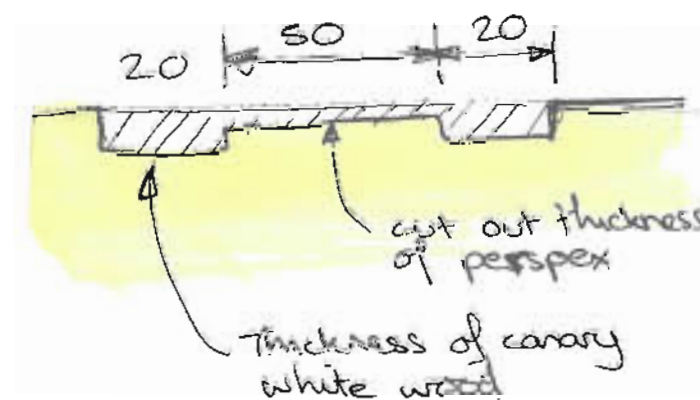
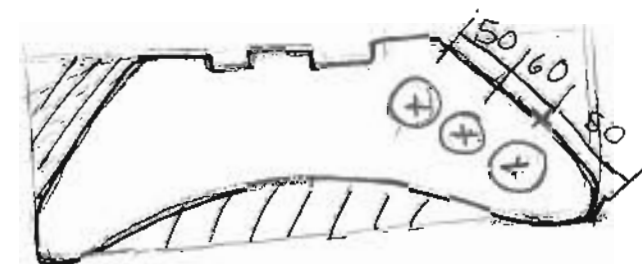
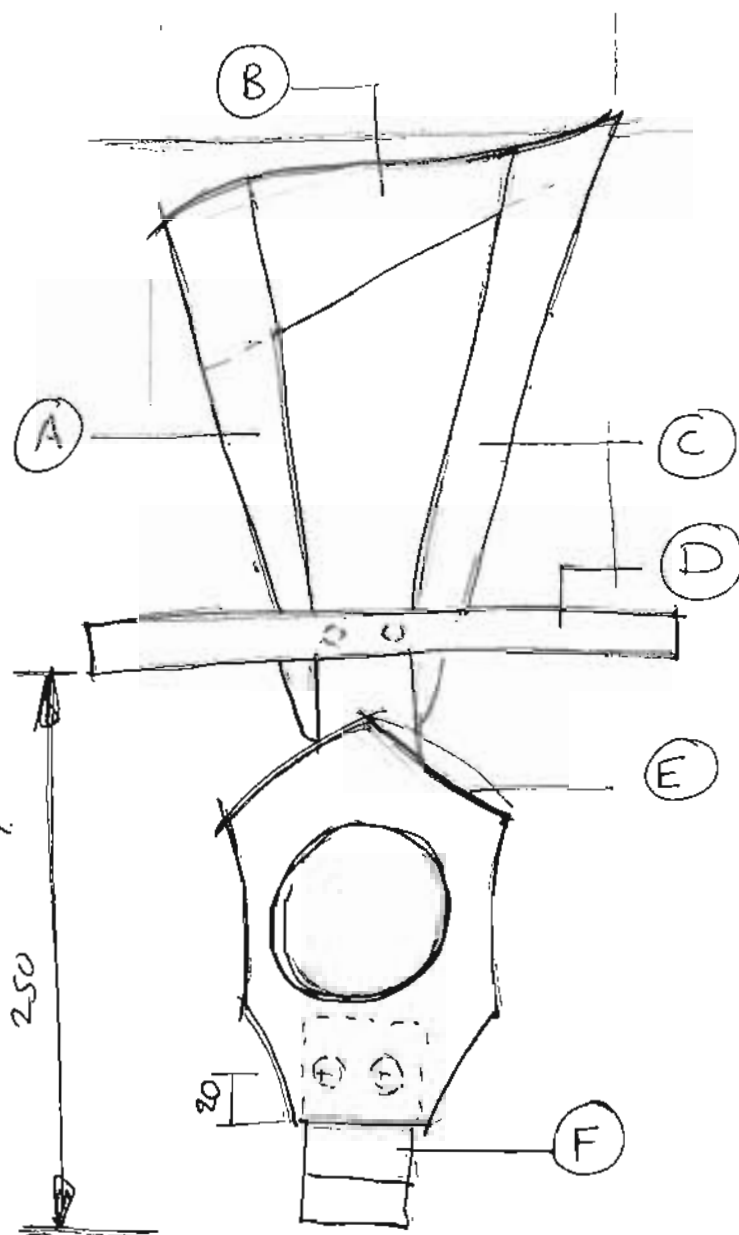


30 holes will hold different brush types.



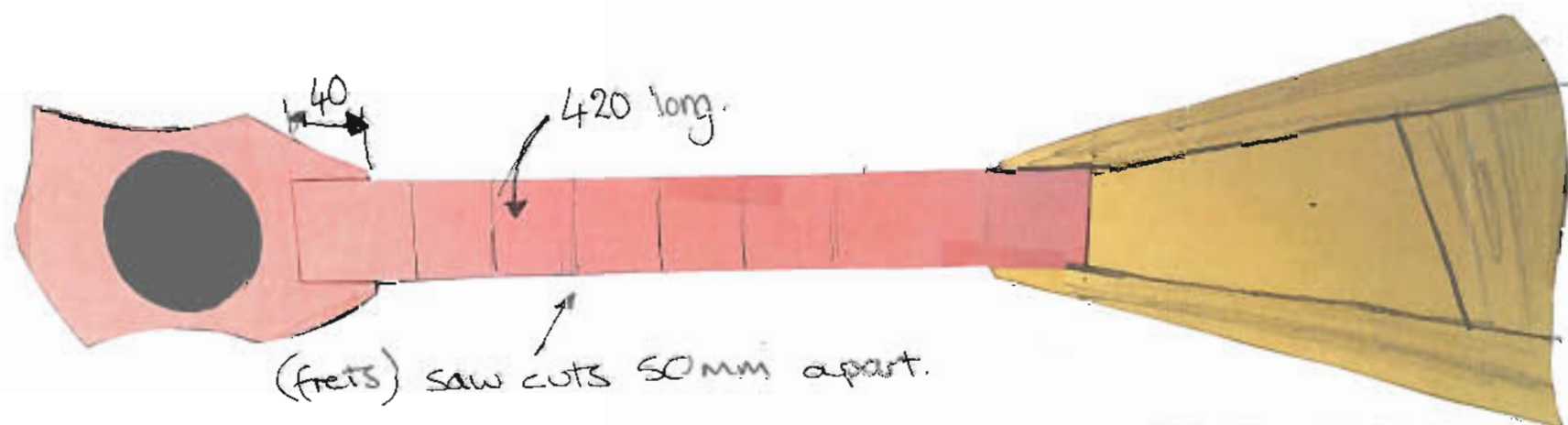
SEQUENCE OF OPERATIONS

STAGE	OPERATION	TOOLS/EQUIPMENT
	PERSPEX: Mark out holes and frets. Saw lines & drill finish edges then form.	steel rule, try square. drill and saw. file and wet and dry oven and former.
	FRAME: Mark joints and shape. Cut and fit. Sand and assemble	sliding bevel teron saw/chisel glue and clamps
	GITAR HEAD & SHELF: mark shape, holes and joint. cut and finish	Template / freehand. try square coping saw, sand & wax. <i>white wash wood</i>
	ASSEMBLY: • rivet head to neck. • screw neck onto shelf. • glue shelf to frame.	rivets and hammer screws and screwdriver PVA and clamps.



CUTTING LIST

PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
A	canary white wood	1	310	50	16
B	"	1	230	20	16
C	"	1	360	50	16
D	"	1	300	125	16
E	"	2	190	130	8
F	perspex.	1	420	50	6



NAME	CANDIDATE B - 8
------	-----------------

Candidate C

RESEARCH FINDINGS – You may use the other side of this sheet

IMAGE BOARD

Notes to candidates

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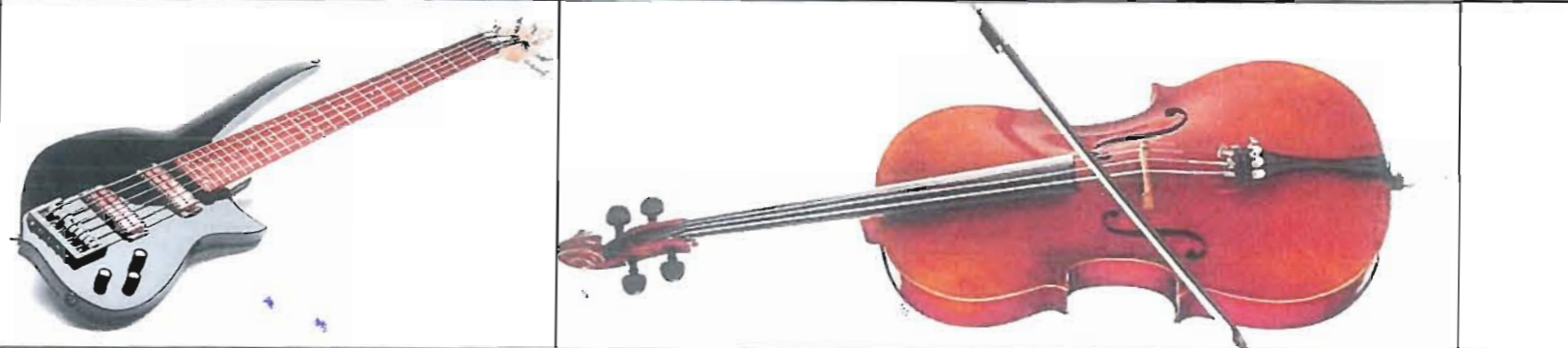
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You should use findings from your research to complete the specification below.

A small shelf – specification

The shelf must:

- Demonstrate a high level of craftsmanship
- Be mad of pine
- Be sahped like a musical instrument
- Be able to go on the wall
- Be well finished with varnish
- Be fixed well to the wall
- Be at right height for teenagers
- Look good



NAME	CANDIDATE CA - 1
------	------------------

MATERIALS

WOODS



Beech

Beech is a hard, strong and heavy wood. It has a fine, tight grain and even texture. Beech wood is very light in colour and has a high shock resistance. It is a popular wood for furniture and will give your room a warm feeling. With its smooth finish it is a great wood to polish.



Oak

Oak is a very popular wood. It is very hard wearing and heavy. It is known for having lovely open wood grain markings. Oak can be purchased in two shades: white oak, which is grey/brown in colour or red oak which is very similar but with a prominent reddish tint.



Maple

Maple wood is much more durable and heavier. As maple wood is so strong and moisture resistant it is the ideal wood to withstand years of wear and tear. Maple wood is pale in colour and has natural swirls and twists in the wood grain. It can easily accept any type of stain or paint.



Pine

Pine is very affordable and lightweight with a pale finish which is great for staining. It is less durable wood compared to hard woods such as maple or oak. Pine blends well with other woods, making it ideal if you are looking for furniture that will match existing pieces in your home.



Ash

Ash is a tough hardwood which is known for its excellent bending abilities. It is primarily used for bent pieces of furniture such as a chair with curved backrests. Ash is light brown in colour with a straight grain.



Mahogany

Mahogany is an expensive hardwood and varies in colour from a medium brown to a deep red brown, depending on its age. It is a very traditional, versatile and popular type of wood. It is also a popular choice for use on veneers.



Walnut

Walnut is a hardwood and is known for its strength, straight grain and its rich chocolate brown colour, however lighter shades are available. Walnut can be a very versatile wood, offering a range of shades and grains to complement your décor.

MANUFACTURED BOARDS



Fibreboard

Fibre board is an inexpensive manufactured wood made from the breaking down of hard or soft woods into fibres which are then bonded together with wax, resin and heat to create a dense piece of wood.

One of the most popular fibre boards is MDF - constructed of medium density fibres that are known for their strength and durability and lend themselves ideally to furniture products.



Particle Board (Chipboard)

Chipboard is a manufactured wood, made from wood chips and shavings that are bonded together with resin.

Chipboard is extremely popular when making furniture, especially Ikea furniture. It is a dense wood and is commonly used with a veneered surface which is used for flat-packed furniture and work surfaces.



MDF (Medium Density Fibreboard)

MDF is very strong and is considerably more popular than people think. In fact many will be surprised as to how much MDF furniture is around them.

With its strong/dense structure, your furniture is likely to last a lot longer than you expect, however it's no solid wood, but it's a fraction of the price of solid wood. MDF is extremely popular with Ikea, another leading furniture retailer.

In the majority of cases, furniture built with MDF will have a wooden veneer bonded to it to give it an expensive looking finishing touch.



Plywood

Plywood is a very strong manufactured wood as it is built-up of layers of wood veneers which are bonded together to create a flat smooth sheet of wood.

It is popular in the furniture and flooring industries due to its inherent strength and resistance to warping due to the bonded cross-ply construction.

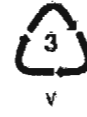
PLASTICS



Polyethylene Terephthalate sometimes absorbs odours and flavours from foods and drinks that are stored in them. Items made from this plastic are **commonly recycled**. PET(E) plastic is used to make many common household items like beverage bottles, medicine jars, rope, clothing and carpet fibre.



High-Density Polyethylene products are very safe and are not known to transmit any chemicals into foods or drinks. HDPE products are **commonly recycled**. Items made from this plastic include containers for milk, motor oil, shampoos and conditioners, soap bottles, detergents, and bleaches. It is **NEVER** safe to reuse an HDPE bottle as a food or drink container if it didn't originally contain food or drink.



Polyvinyl Chloride is **sometimes recycled**. PVC is used for all kinds of pipes and tiles, but is most commonly found in plumbing pipes. This kind of plastic should not come in contact with food items as it can be harmful if ingested.



Low Density Polyethylene is **sometimes recycled**. It is a very healthy plastic that tends to be both durable and flexible. Items such as cling film, sandwich bags, squeezable bottles, and plastic grocery bags are made from LDPE.



Polypropylene is **occasionally recycled**. PP is strong and can usually withstand higher temperatures. It is used to make lunch boxes, margarine containers, yogurt pots, syrup bottles, prescription bottles. Plastic bottle caps are often made from PP.



Polystyrene is **commonly recycled**, but is difficult to do. Items such as disposable coffee cups, plastic food boxes, plastic cutlery and packing foam are made from PS.

METALS

1. Aluminum



Aluminum is lightweight and corrosion resistant. It is used in a wide range of applications, from beverage cans to aircraft. It is also used in construction for window frames and doors. Aluminum is often used in modern furniture.

2. Brass



Brass is an alloy of copper and zinc. It is known for its strength and durability. It is used in a wide range of applications, from musical instruments to industrial machinery. Brass is also used in decorative items.

3. Copper



Copper is a soft metal that is highly conductive. It is used in a wide range of applications, from electrical wiring to plumbing. Copper is also used in decorative items and as a preservative for wood.

4. Stainless Steel



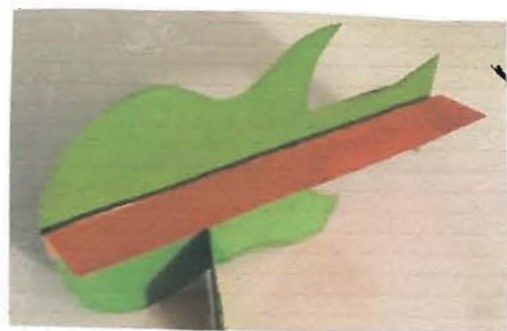
Stainless steel is an alloy of iron, chromium, and other metals. It is known for its strength and corrosion resistance. It is used in a wide range of applications, from kitchenware to industrial machinery.

5. Wrought Iron



Wrought iron is a form of iron that has been refined to remove most of its carbon content. It is known for its strength and durability. It is used in a wide range of applications, from construction to decorative items.

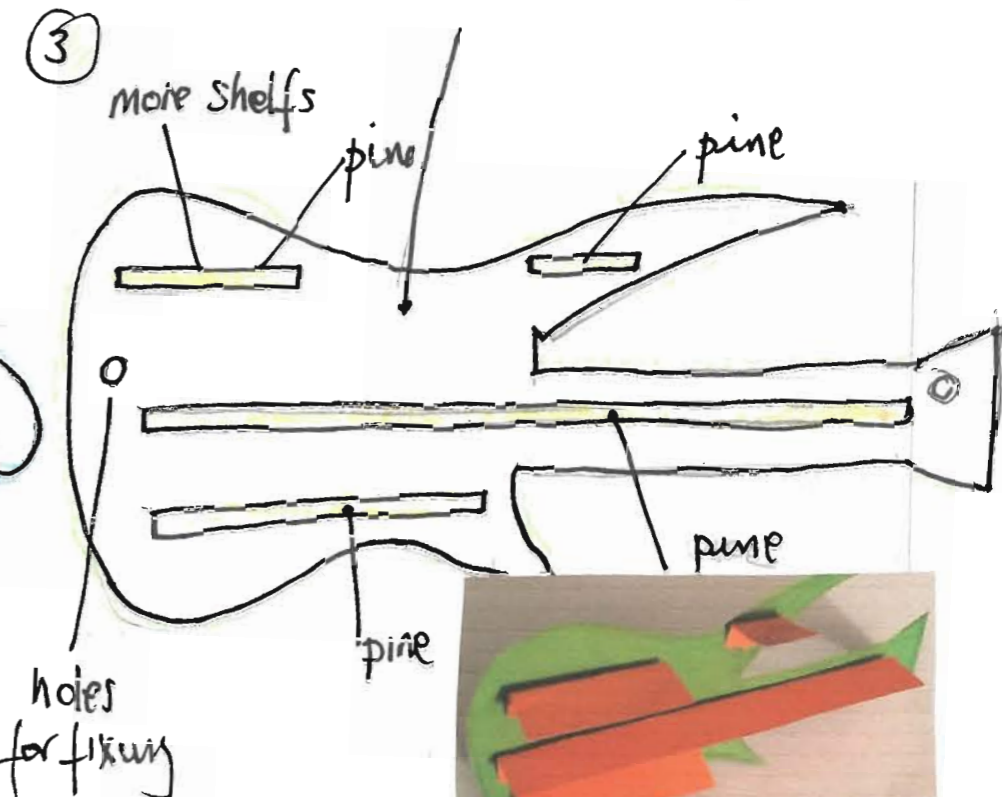
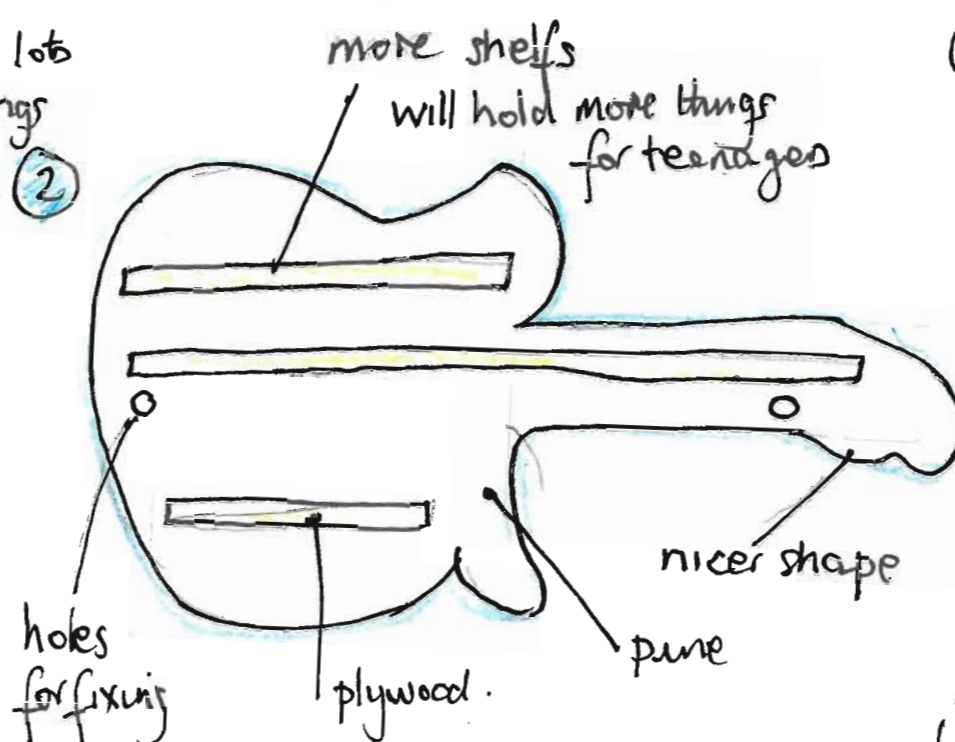
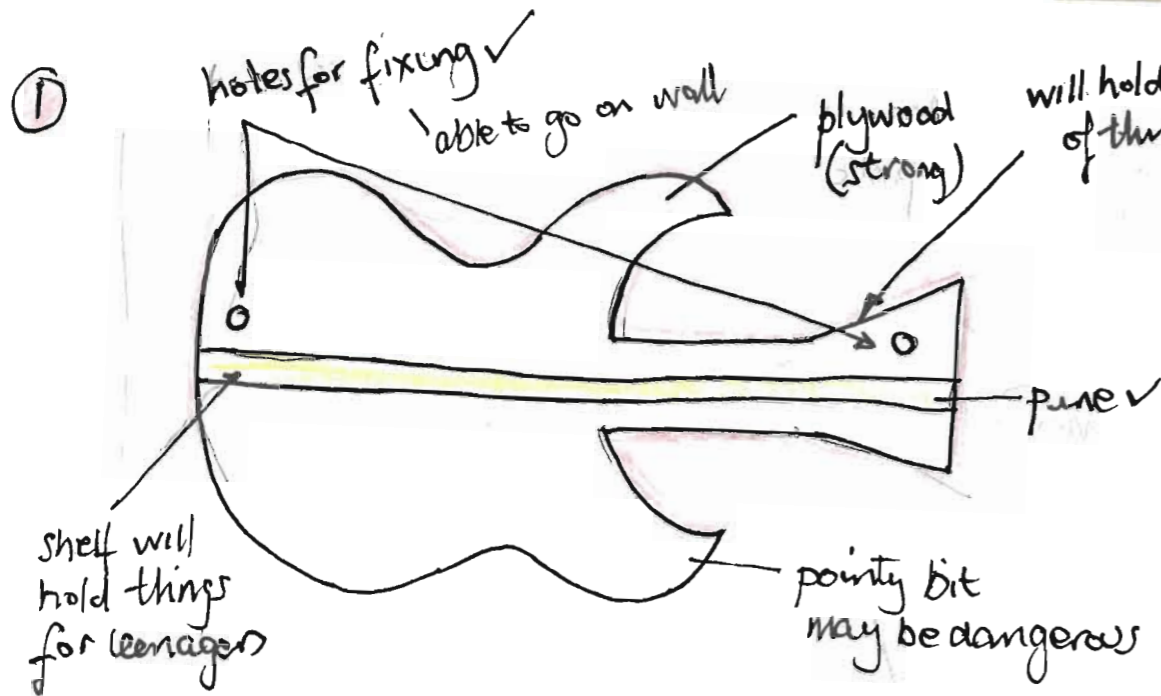
IDEAS



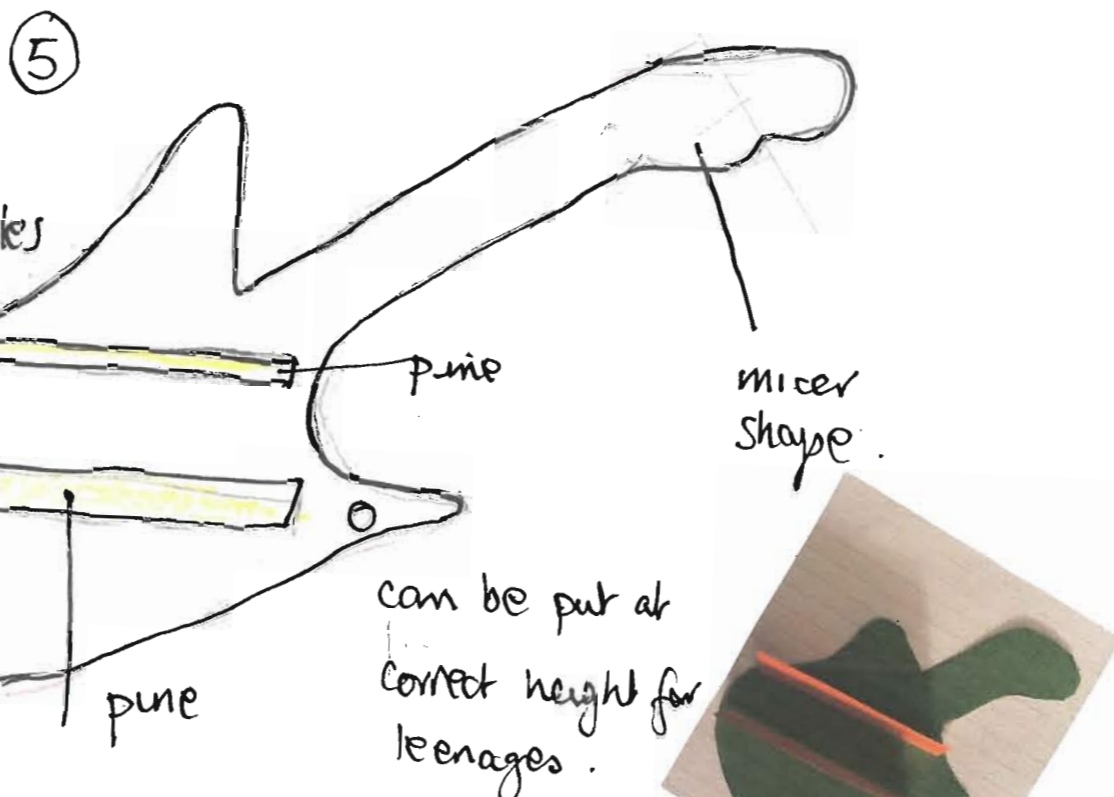
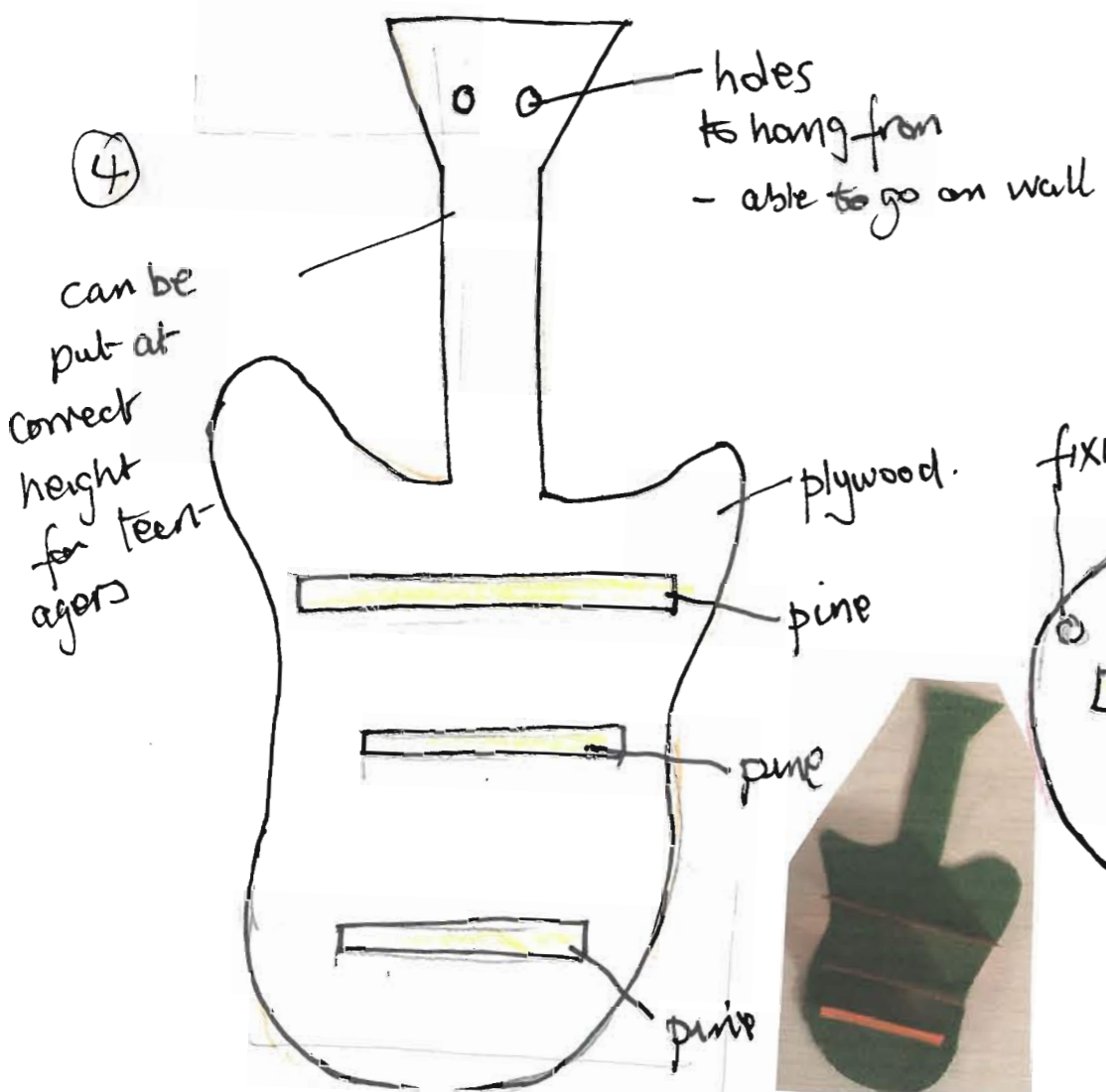
this is what it would look like



cool shape will appeal to teenagers



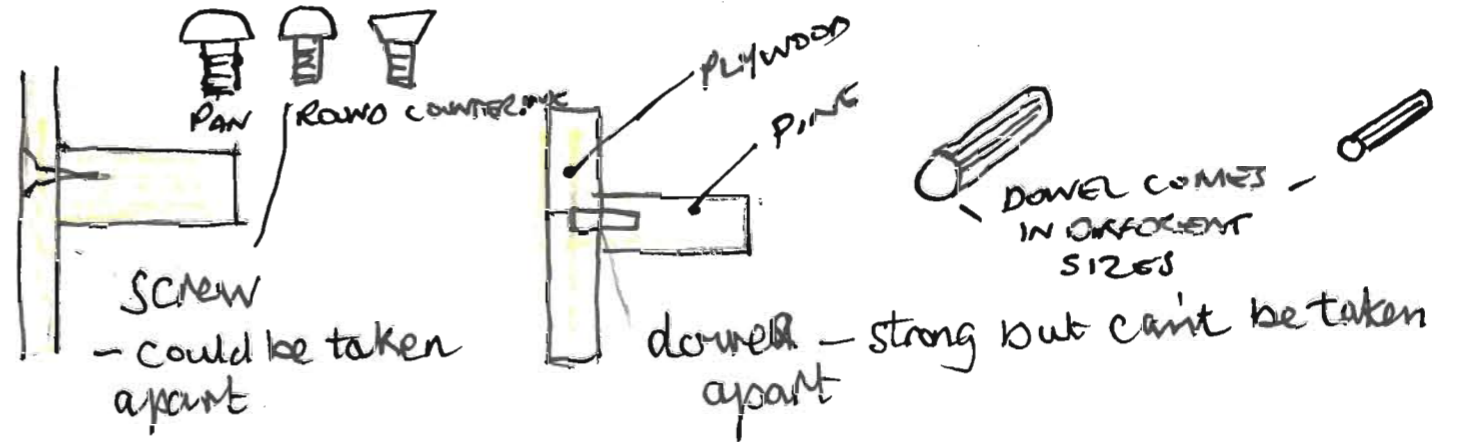
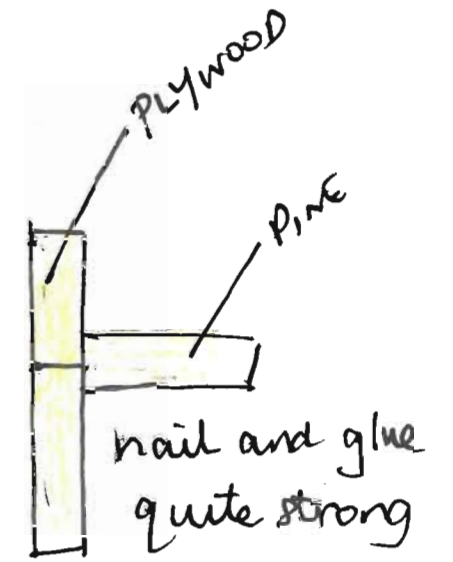
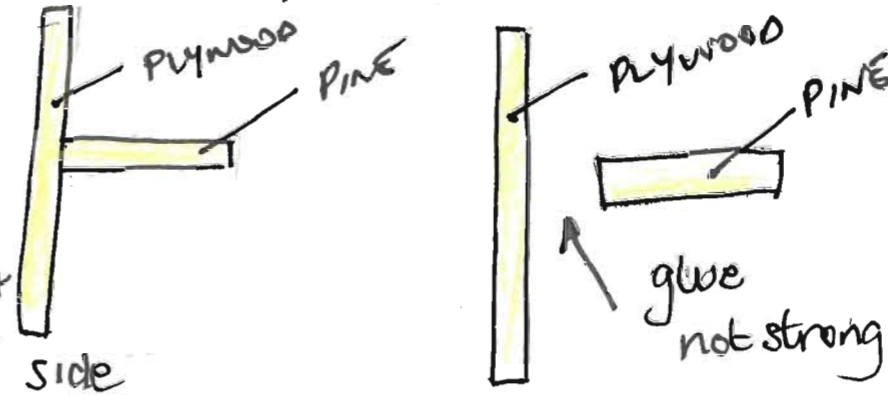
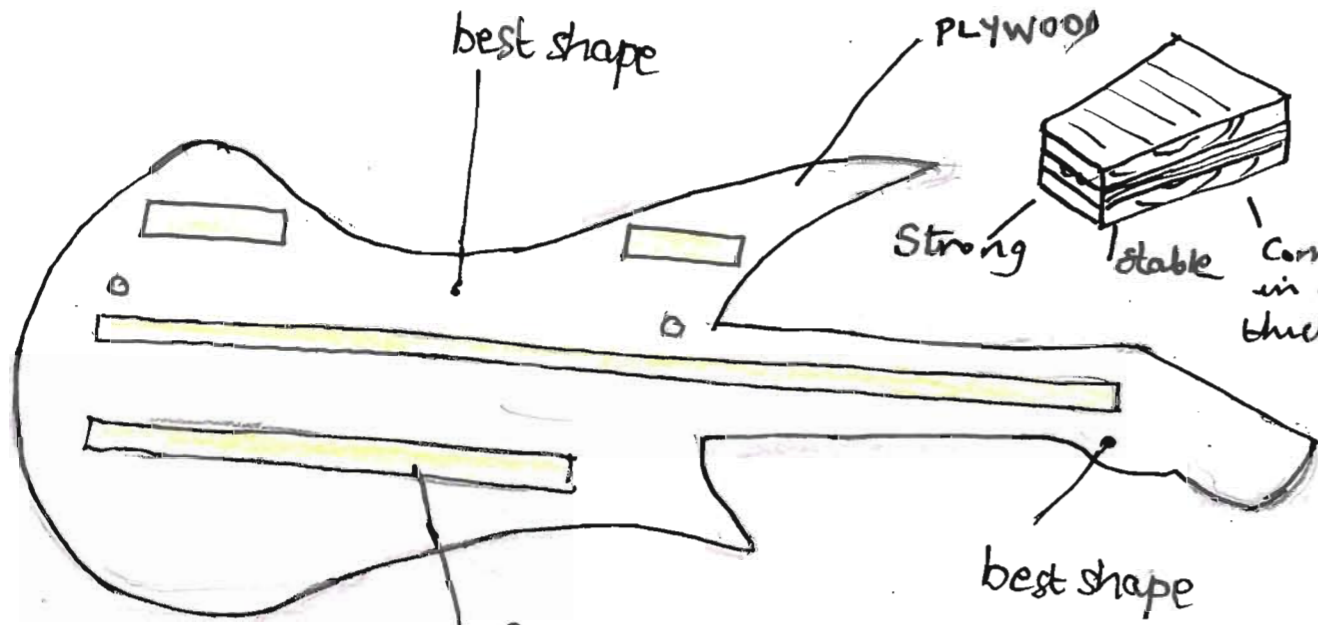
bad → good
* → ***



The shelf must:	1	2	3	4	5
have a music theme	***	***	***	***	***
fit into 500x400mm	***	***	***	***	***
be made of pine	***	***	***	***	***
be shaped as an utral	***	***	***	***	***
appear to teenagers	**	*	***	*	**
go on a wall	***	***	***	***	***
be finished with varnish	**	***	***	***	***
hold things for teens	***	***	***	***	***
have good joints	***	***	***	***	***
be fixed securely	***	***	***	***	***
be at correct height	***	***	***	***	***

DEVELOPMENT 1

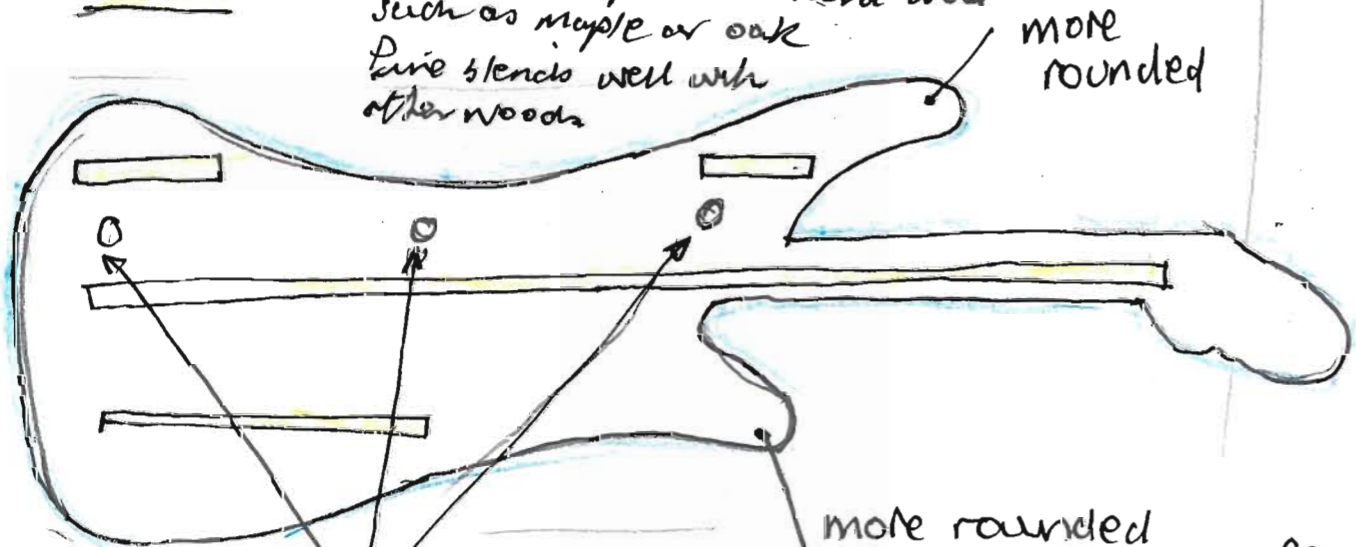
JOINTS - To fix shelf onto back



PINE

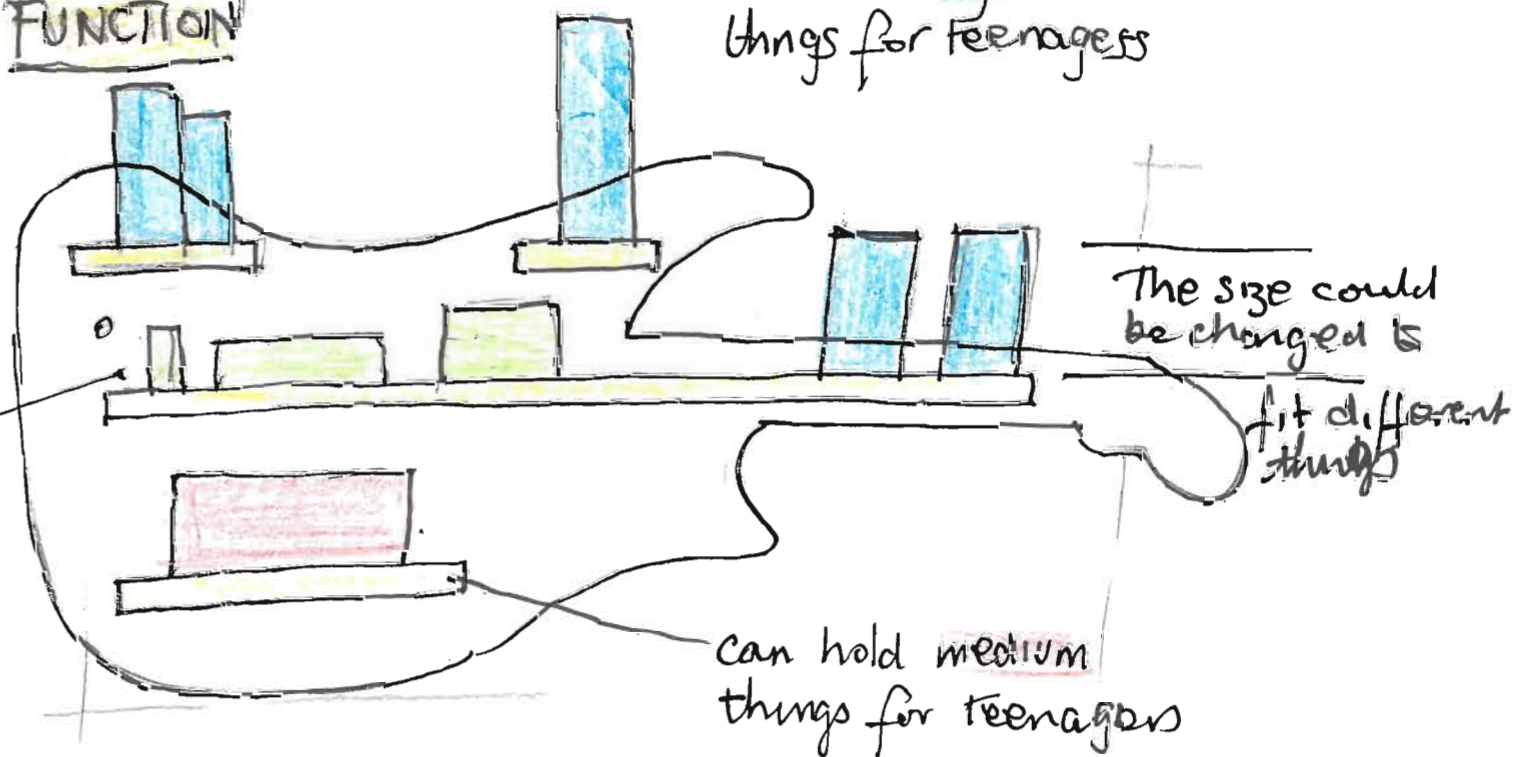
Very affordable and lightweight with a pale finish which is great for staining. It is less durable compared to hard wood such as maple or oak. Pine blends well with other woods.

SAFETY



FUNCTION

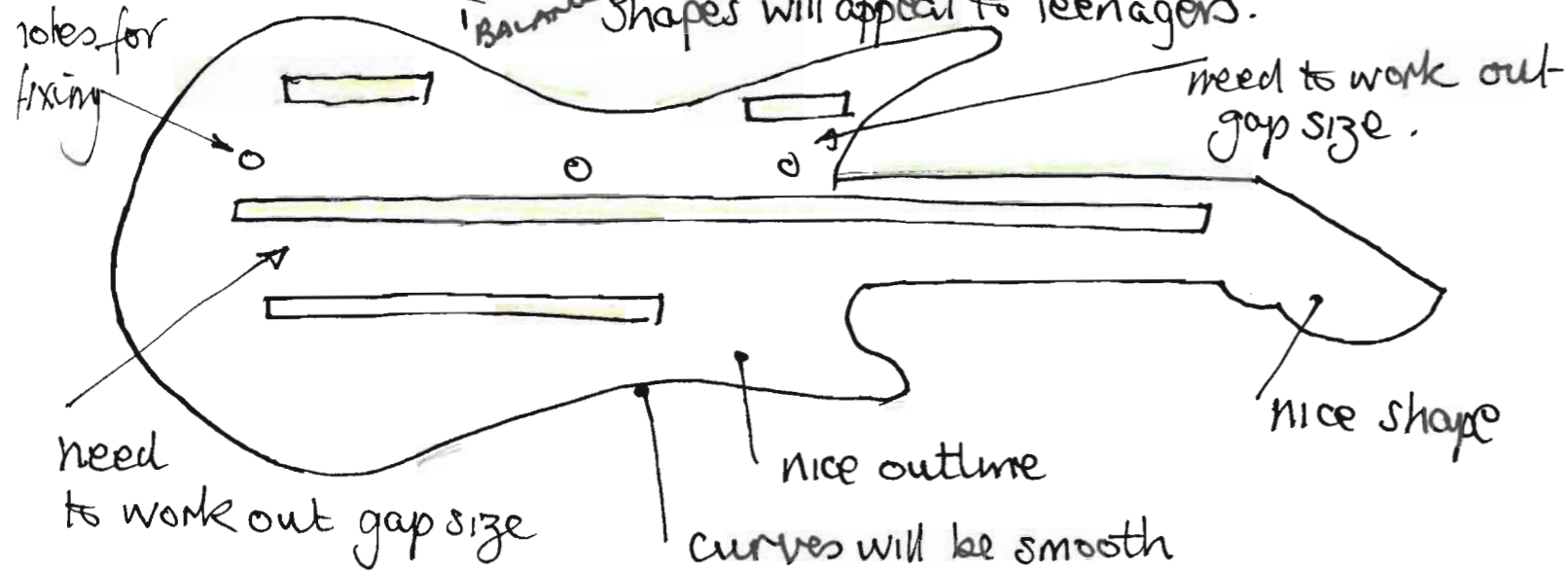
Can hold small things for teenagers



DEVELOPMENT 2

LINE
PATTERN
FORM
SHAPE
COLOUR
TEXTURE
AESTHETICS

BALANCE Shapes will appeal to teenagers.



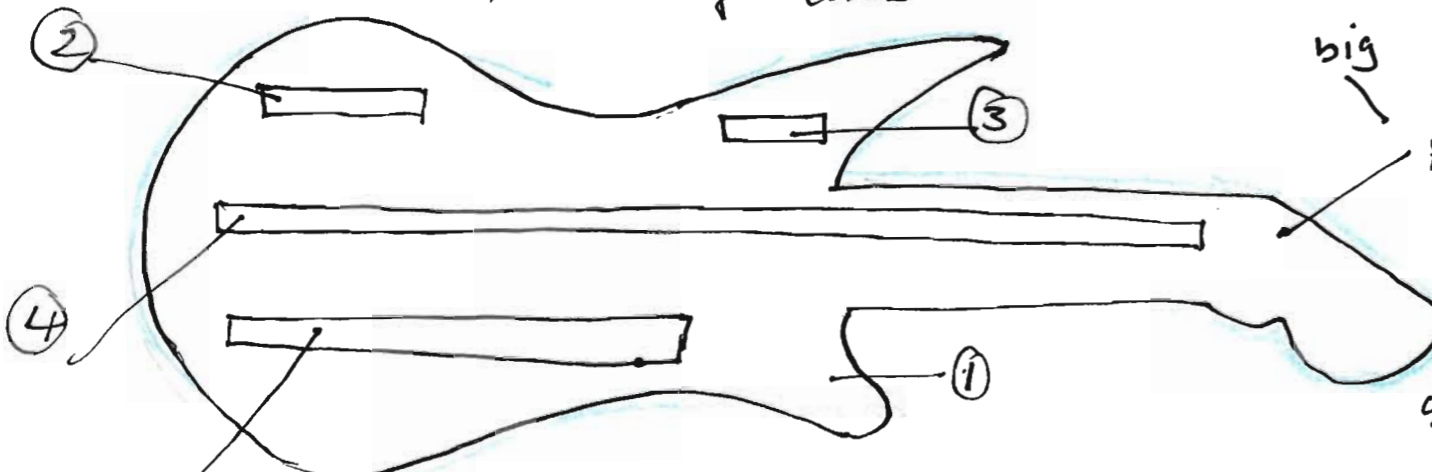
I could improve the aesthetics by using colour.

SCORE * → *****

* Too similar	Red	Orange
***** Good contrast	Yellow	Red
***** Good contrast	Blue	Yellow
**** Not bad	Light Green	Light Green
*** OK	Light Green	Blue
*** OK	Red	Yellow

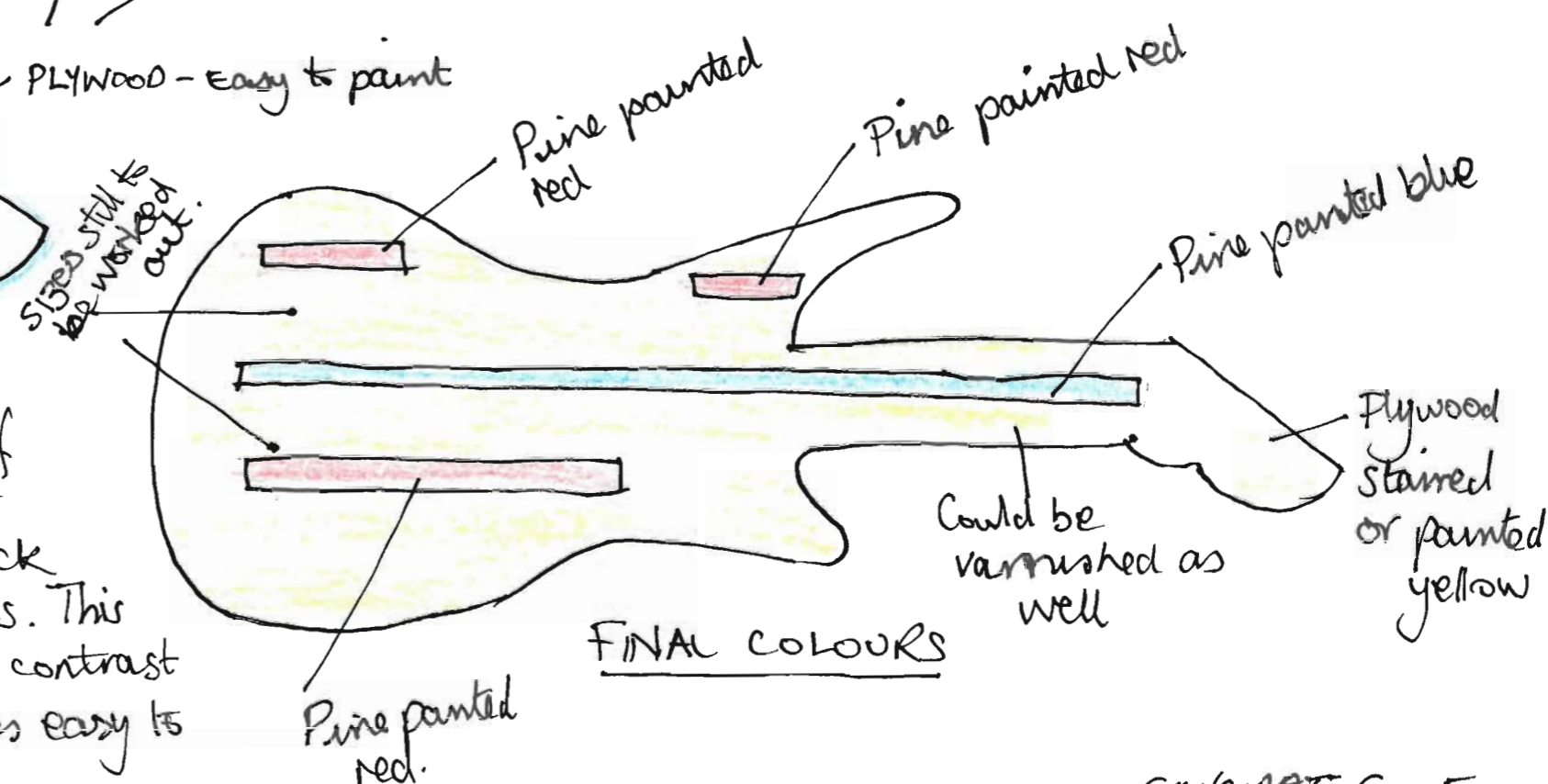
These are the colours of paint I have.

I could mix colour of shelves



1	2	3	4	5
Yellow	Red	Red	Blue	Red
Blue	Yellow	Blue	Red	Light Green
Light Green	Yellow	Yellow	Red	Blue
Blue	Yellow	Yellow	Yellow	Blue
Light Green	Blue	Yellow	Yellow	Yellow

I think the shelf would look best with a light back and dark shelves. This would give a nice contrast and make shelves easy to keep clean.



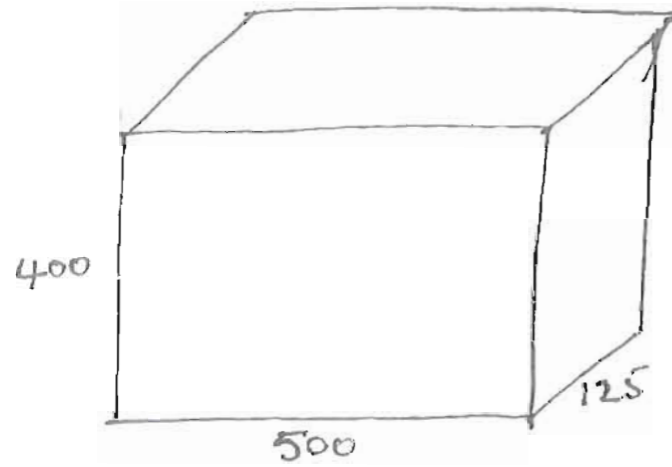
FINAL COLOURS

DEVELOPMENT 3

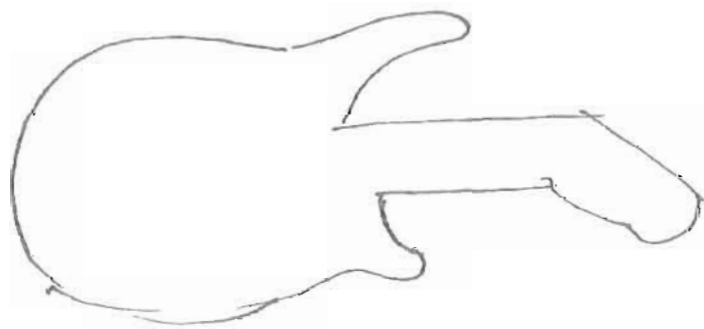
SIZES

I need to work out sizes.

Maximum size of box



← MAXIMUM 500 →

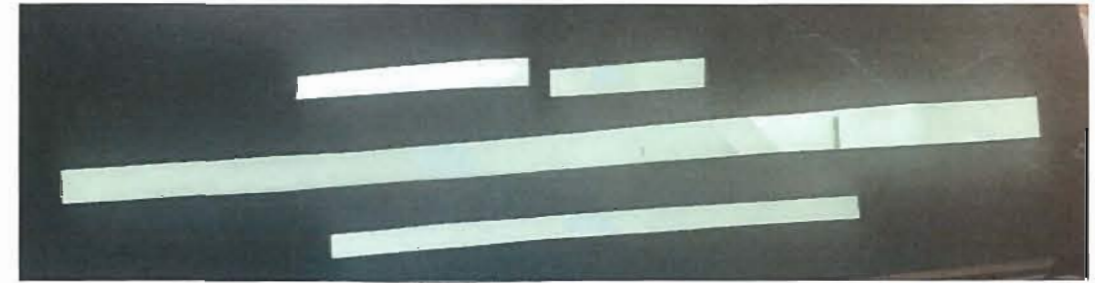


↑ MAXIMUM 125
400

I will make a model to work out sizes.



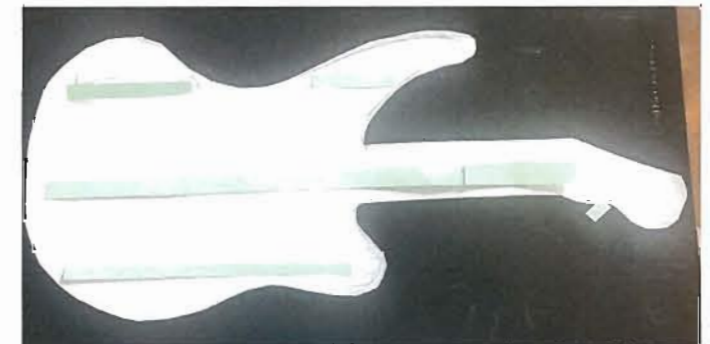
① I sketched different shapes until I got one that looked the right size and proportion - I cut it out of paper.



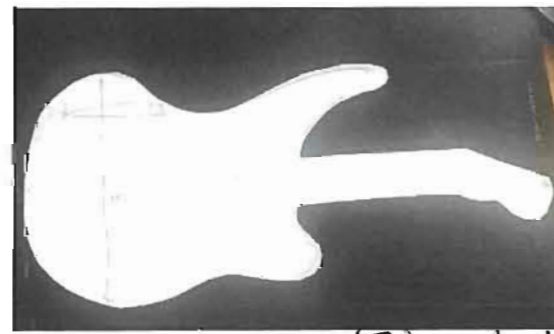
② I then cut the shelves out of paper



③ I positioned shelves to work out positions



④ From this I found that the top shelves could go higher and bottom one could be longer.

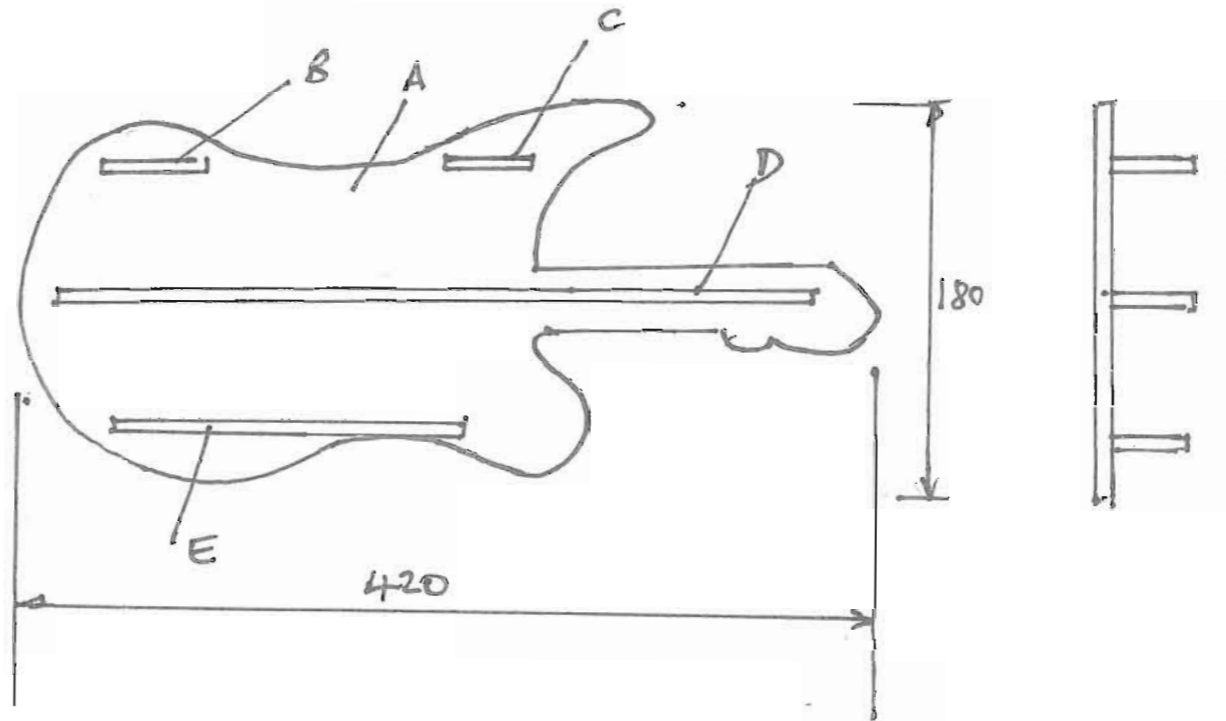


⑤ I then had all the sizes and positions I can also use the model as a template.



SEQUENCE OF OPERATIONS

STAGE	OPERATION	TOOLS/EQUIPMENT
1.	Mark outline on plywood	Pencil, template
2.	Cut out guitar shape	Coping saw
3.	Mark lines for shelves on guitar	Pencil, steel rule
4.	Mark positions of holes on lines	Pencil, steel rule
5.	Drill holes on guitar	Drill
6.	Mark holes in shelves	Pencil
7.	Drill holes	Drill
8.	Glue and clamp together	Glue, G-clamps



See template for outline shape

CUTTING LIST

PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
A	Plywood	1	420	180	18
B	Pine	1	80	125	18
C	Pine	1	55	125	18
D	Pine	1	340	125	18
E	Pine	1	180	125	18

Candidate D

NOTES TO CANDIDATES

Before you start the research you should have read the instructions for candidates and be familiar with:

- the brief
- the skills which you have to demonstrate
- the type of evidence you have to provide

You should speak to your assessor if you are not familiar with the areas above.

RESEARCH

The company have carried out research and identified a few requirements for the shelf. You should gather further information to ensure the proposal is suitable for the company and the teenagers you know.

You should record your research information on this sheet (you can use both sides).

You should use findings from your research to complete the specification below.

A small shelf—SPECIFICATION

The shelf must:

- demonstrate a high level craftsmanship
- The shelf must hold the earphones securely
- It must fit on the window sill
- The shelf must be strong enough to hold headphones
- The self must be attractive to teenagers
- The shelf must have a music theme
- The headphones must be easy to reach not too high or low
- The self must be small enough to fit in a 500 x 400 x 125mm box
- The self must have a way of keeping the wires tidy
- The shelf must not damage the earphones
- The must be a suitable size for to hold the earphones 19x16cm



Shelf could go here in my room. It will be easy to find my headphones.
Height = 60cm width = 45cm

Shelf could go here in my room. It will be easy to find my headphones.
length = 44cm width = 180cm

The walls in my room are painted a neutral colour.



I have measured the important sizes of my headphones
Height = 19cm Width = 16cm



I could use these in my design



I have found a major problem with earphones. The wires gets messy and tangled.



I like this earphone holder. It is made from plywood using a bag press. Feet could be turned on the lathe.



I like the simpleness of this design

IDEA 1

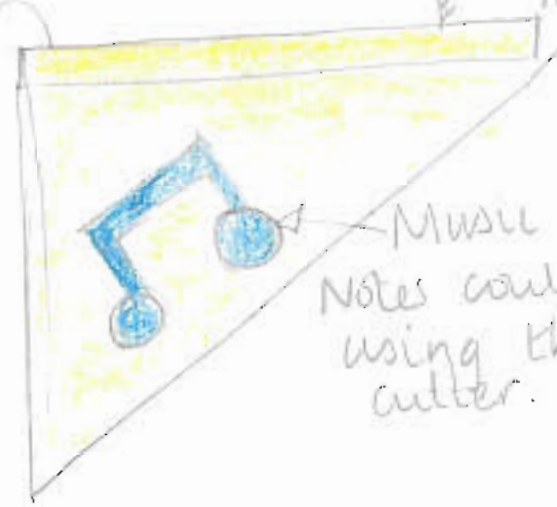


Acrylic for the headphone holder as it is easily bent and manipulated. It also comes in a range of colours.

MDF for the base as it is strong cheap and easily cut into shape

Top made from pine

IDEA 3



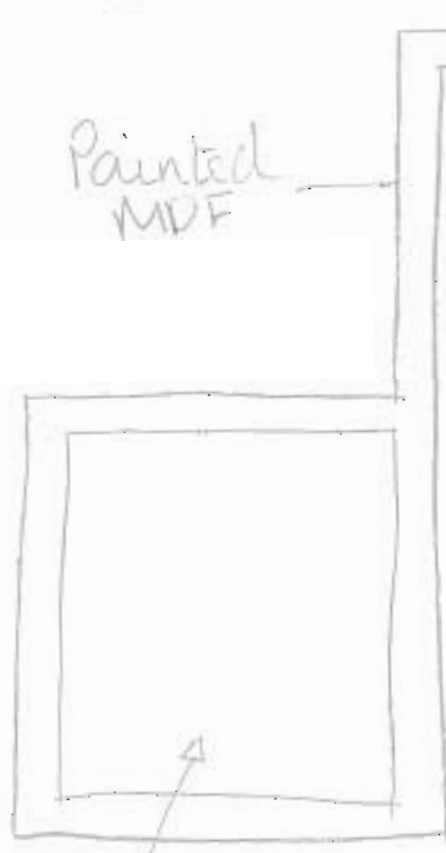
Small shelf to hold headphones

Music theme. Notes could be cut out using the laser cutter.

IDEA 2

Painted MDF

NOT the most secure



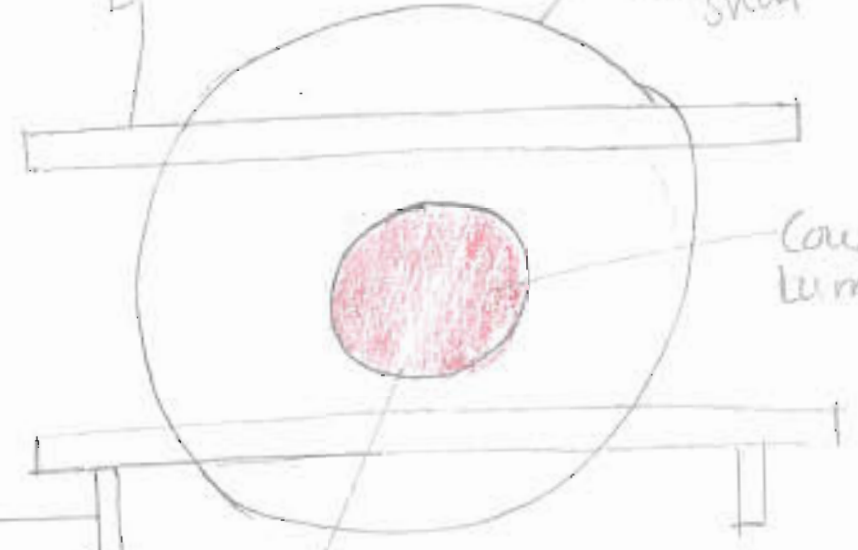
Storage for charger cables etc.

headphones will be able to be stored easily.

IDEA 4

Extra shelf

MDF - easy to cut and shape.



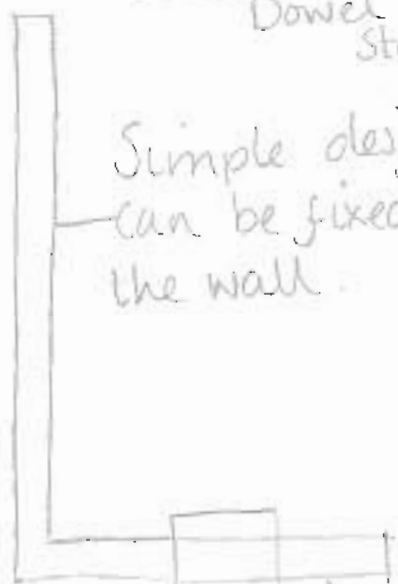
Could be turned.

Headphones could be hung up on the cylinder.

IDEAS

Dowel feet for stability

Simple design can be fixed to the wall.

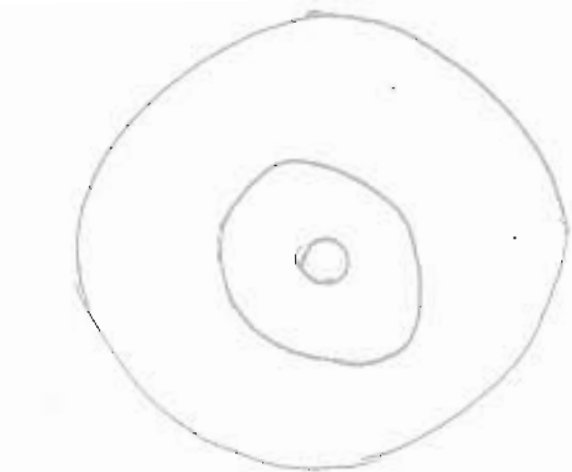


Could be made from acrylic



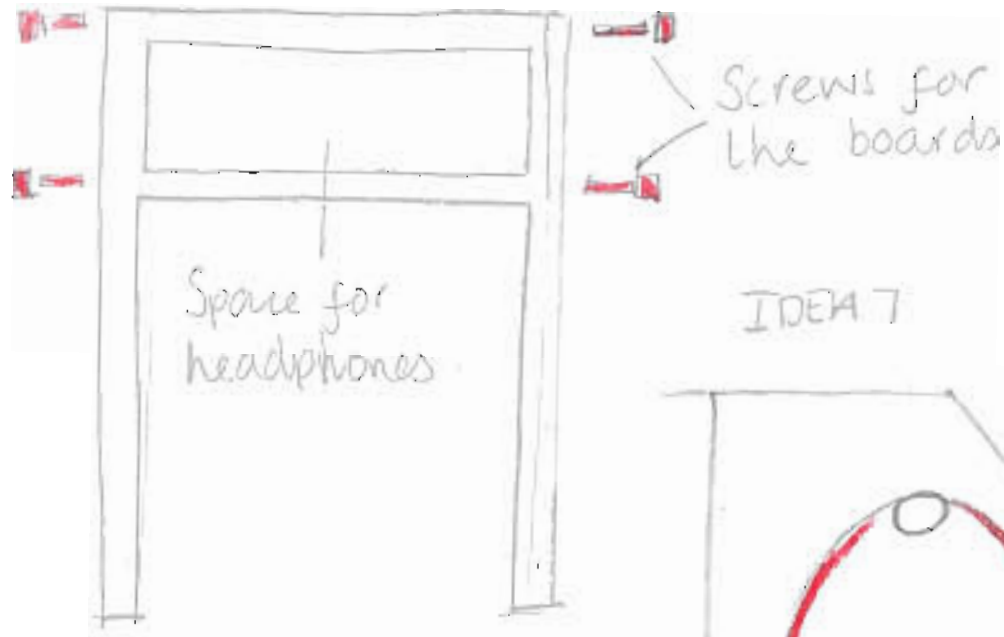
Top view.

bits cut out to fit headphones.

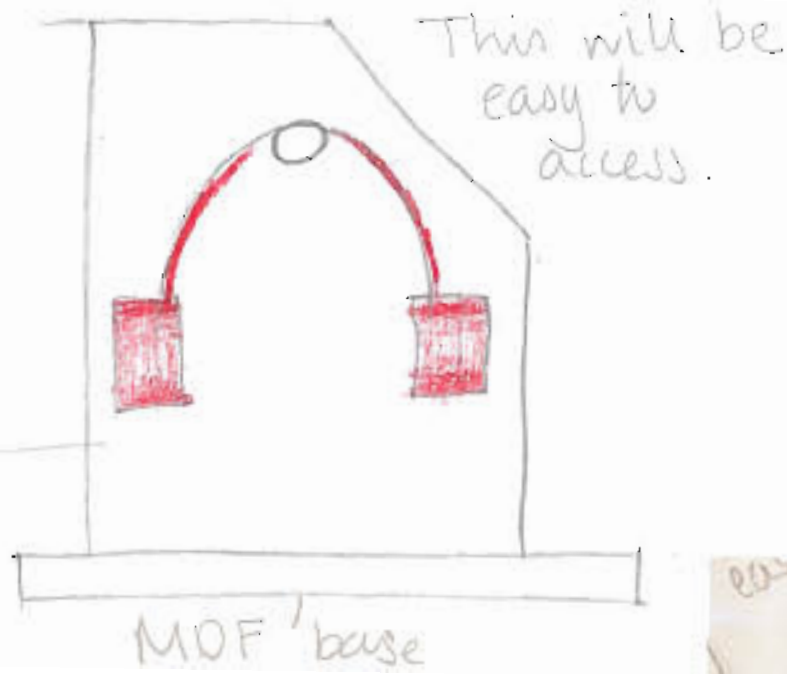


Base could be made to look like an old record or even a CD.

IDEA 6

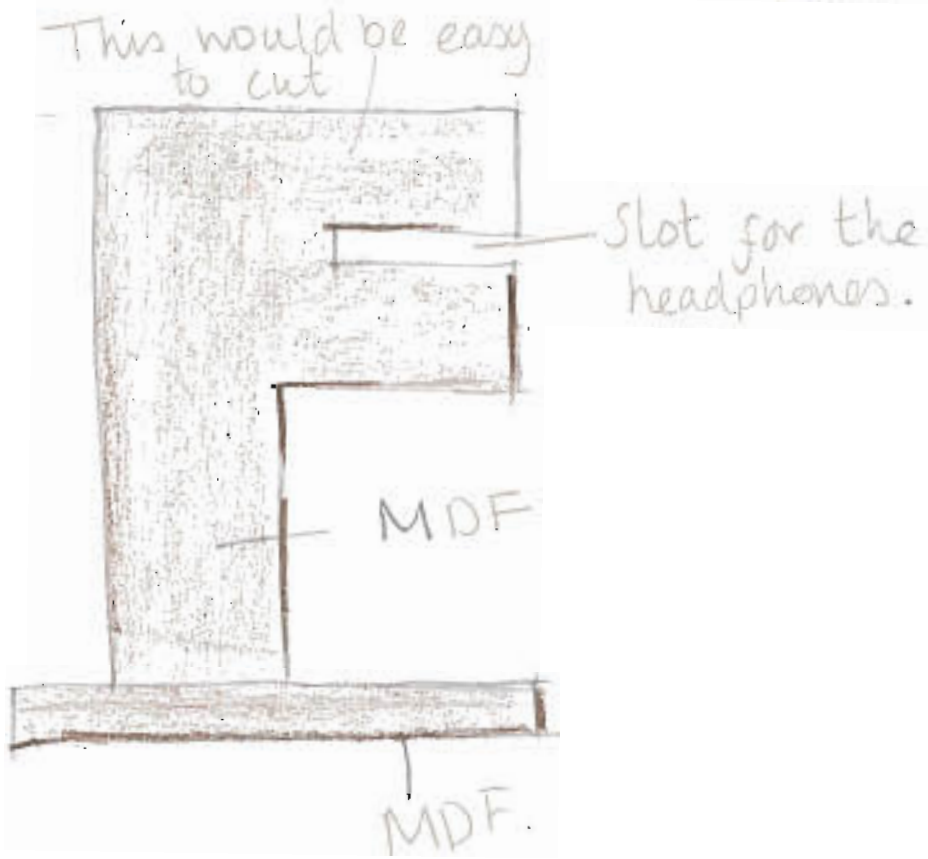


IDEA 7



Isn't very attractive looks boring.

IDEA 8



No place for the wires.

Dirt trap! Difficult to clean.

Not sure how to fix the top to the base.

This design could look more interesting upside-down. No place for the wires.

Base could be bigger to make it more stable.

IDEA 1



IDEA 4

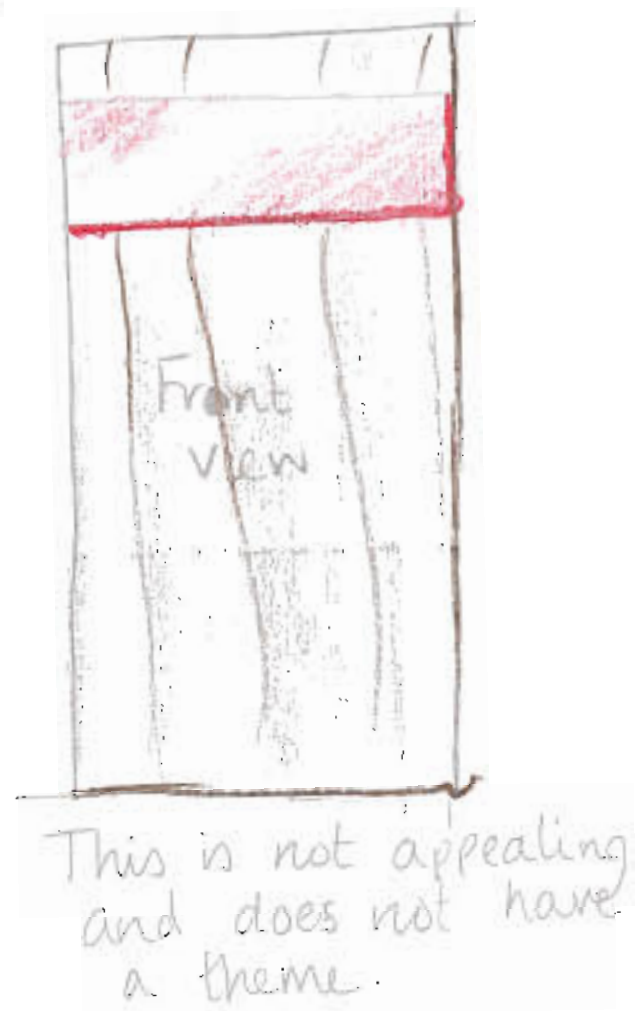
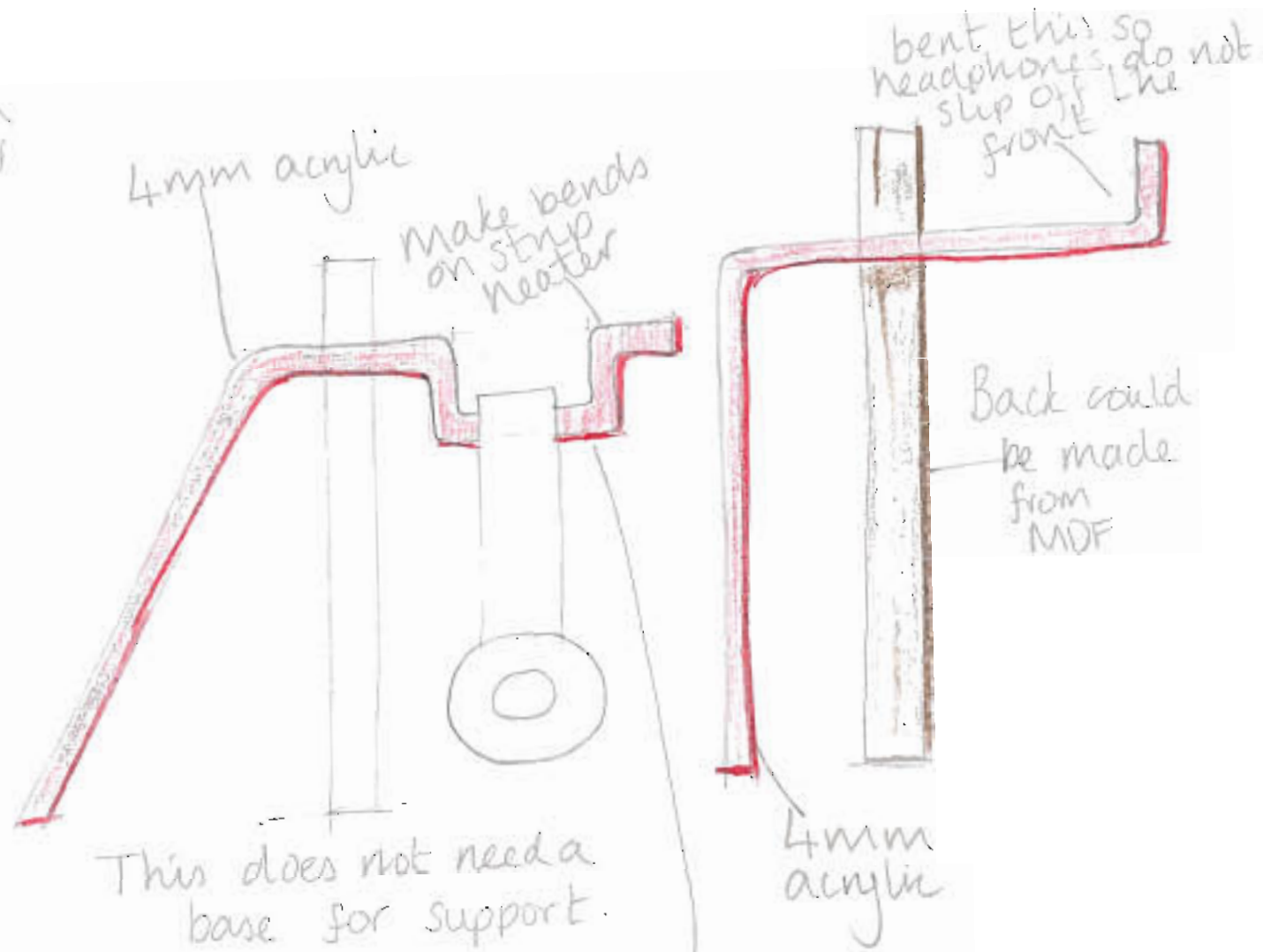
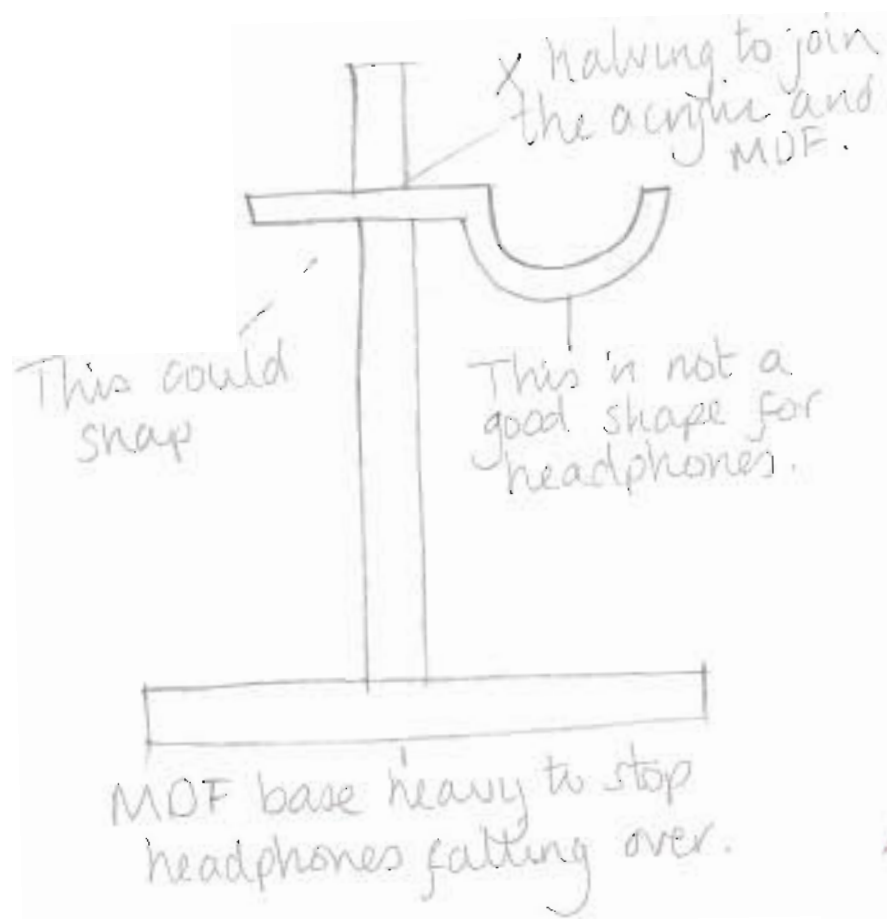
Storage for cables etc.

Simple can be the worst.

IDEA 5.

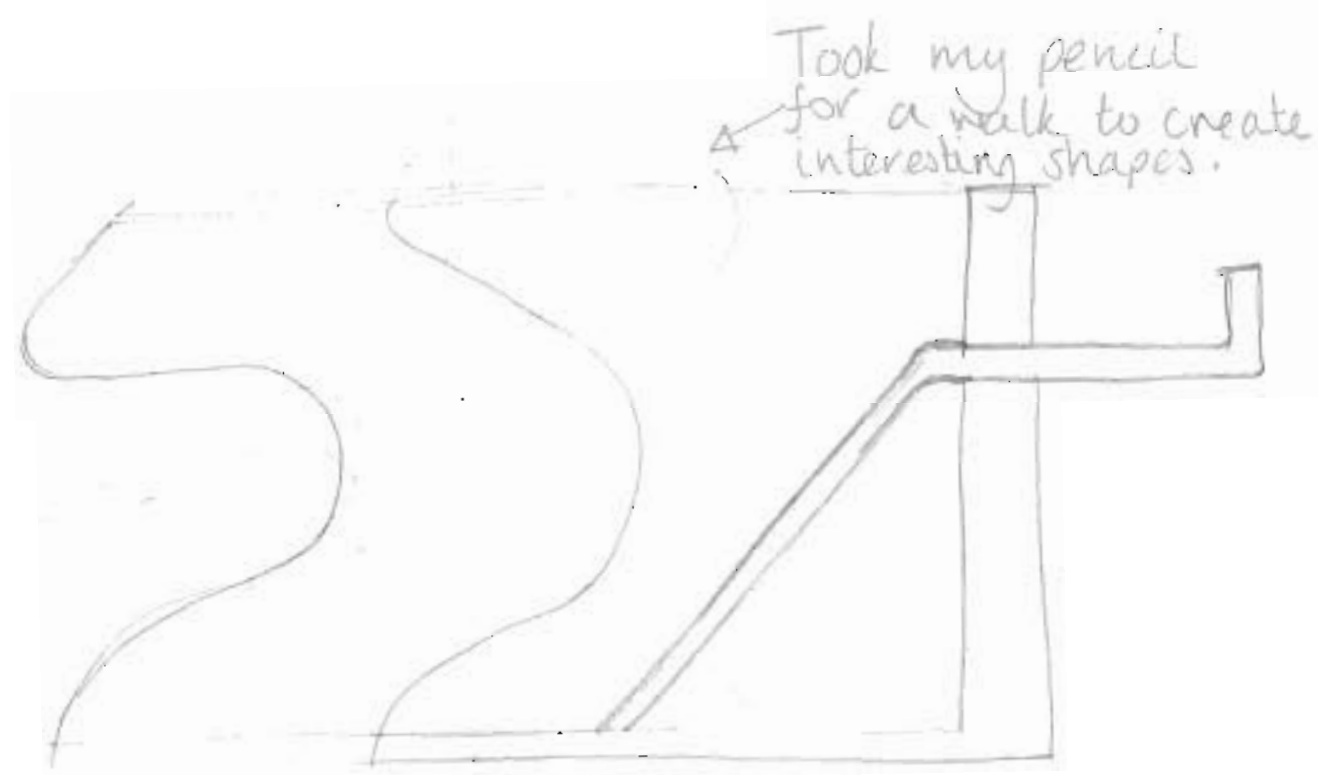
This design in 3D won't hold the headphones.

Might break



This does not need a base for support.

headphones wont slip off



Shapes will be easy to cut out.

This one looks a bit messy.

I like this shape better.

This could be a more appealing shape for the back.



All bent out of acrylic



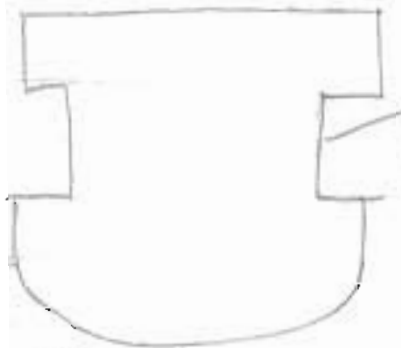
Like this shape looks like it's moving

This base will be too small and unstable.



Top view

Cut out for headphones to stop sliding off.



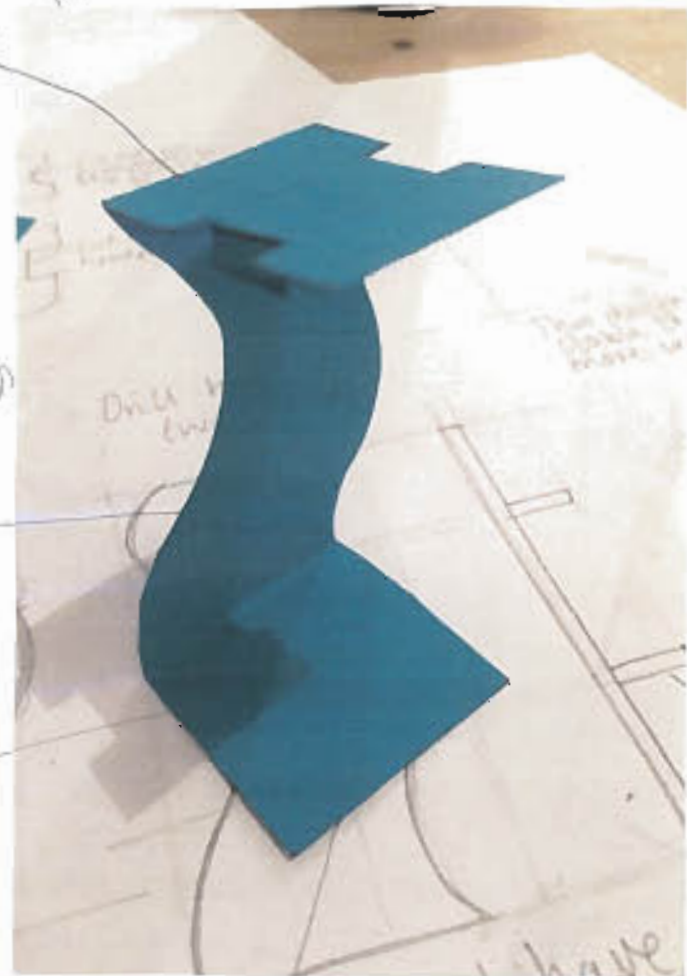
Top View

Cut out for headphones

Have to create somewhere for wires.

Have to make sure the headphones will be able to hang.

This design keeps falling backwards.



This design is much more stable than I thought and more interesting in 3D.

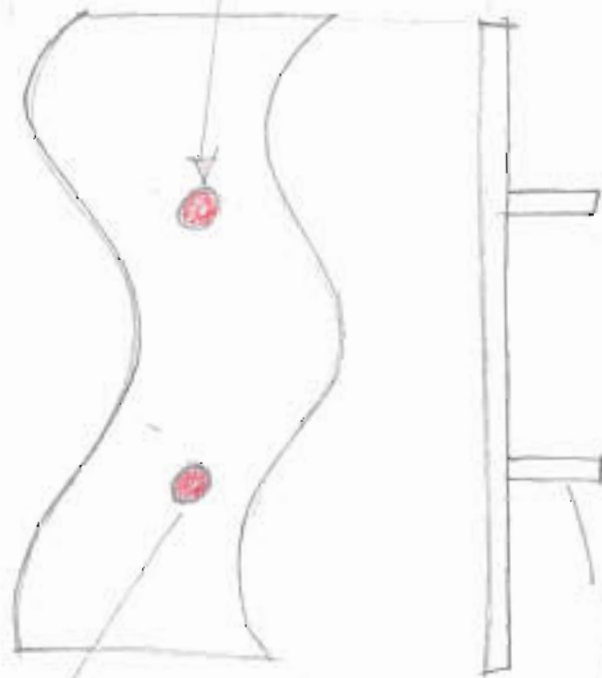
I like how this leans backwards.

Was going to cut these off, but design works better with them.

Drill bits at the sides for wires.

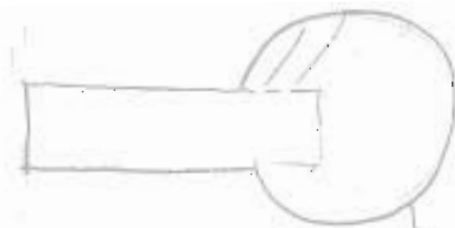


Drill holes with twist drill.



Dowel will have to be glued with PVA glue.

Dowel could be used for the wires.



Wood sphere could be added to stop the wires from coming off.



Making the model has made me realise the base can bend backwards and forwards.

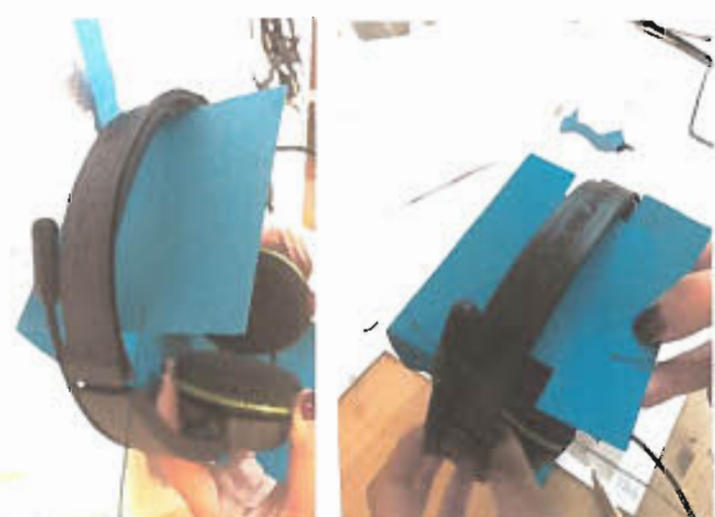
Bending acrylic at the back and front makes it very stable.

Has to be bigger than headphones.

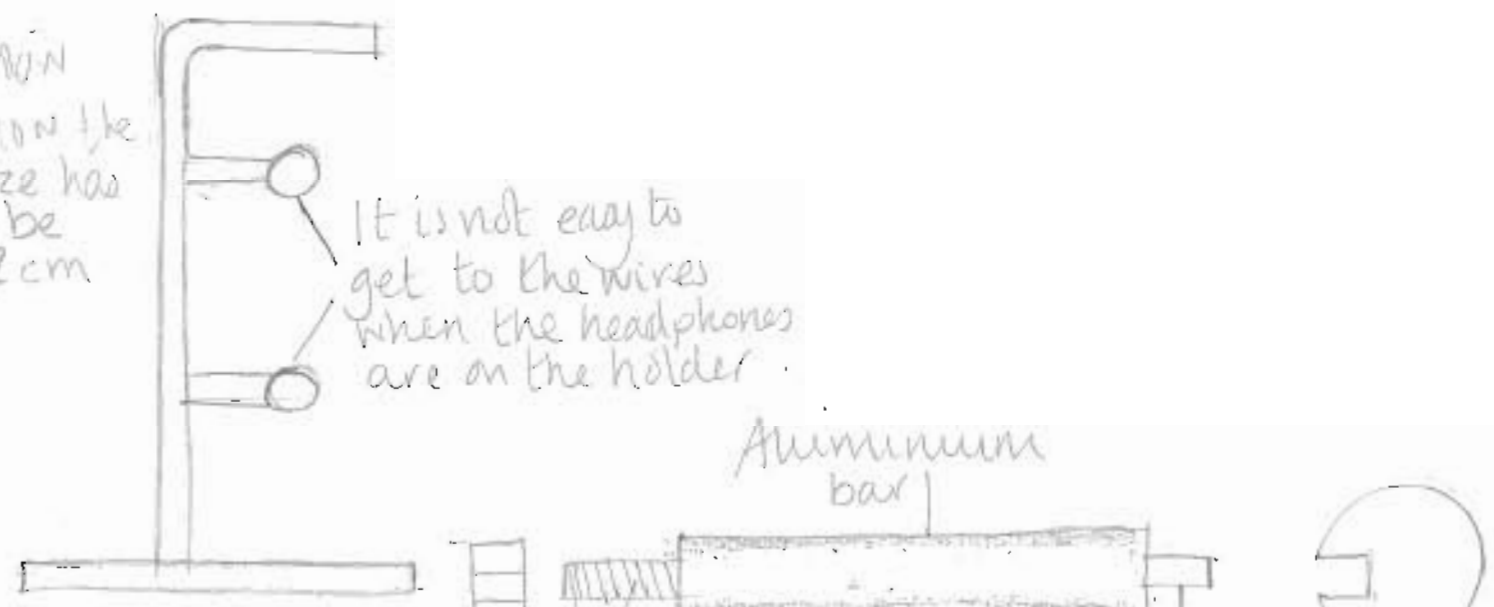
has to be big enough for headphones.
bend on the strip heater.



1 mm
210 mm
The size has to be 22 cm



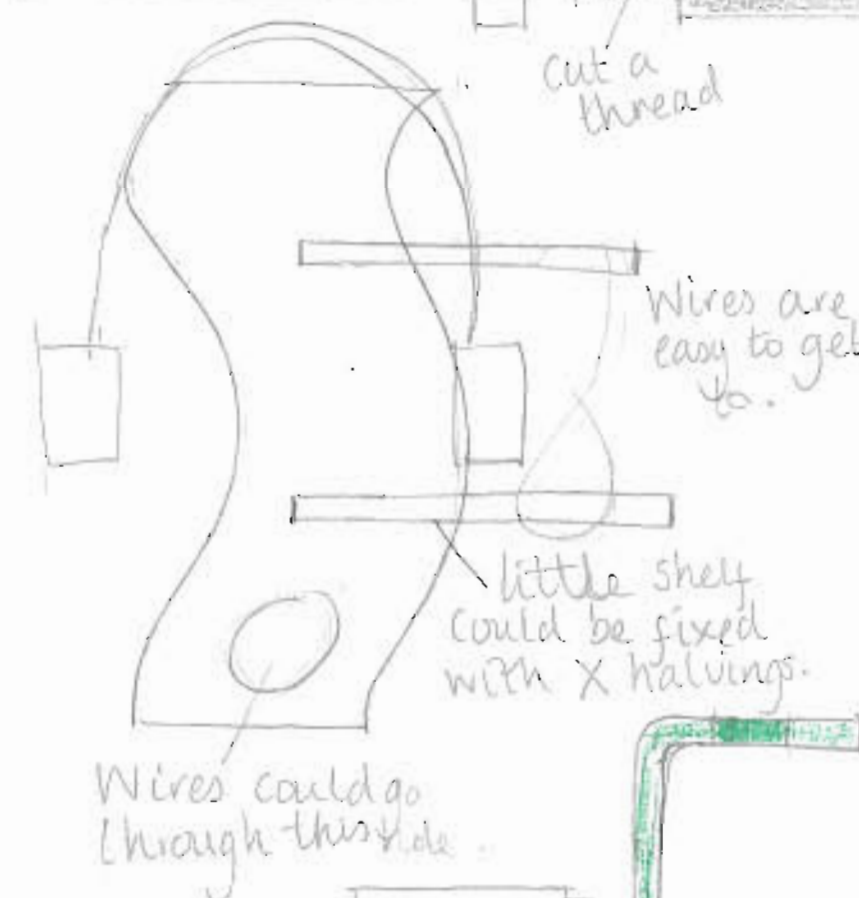
Had to make this bit smaller to hold headphones



Aluminium bar

cut a thread

Step turn on the lathe



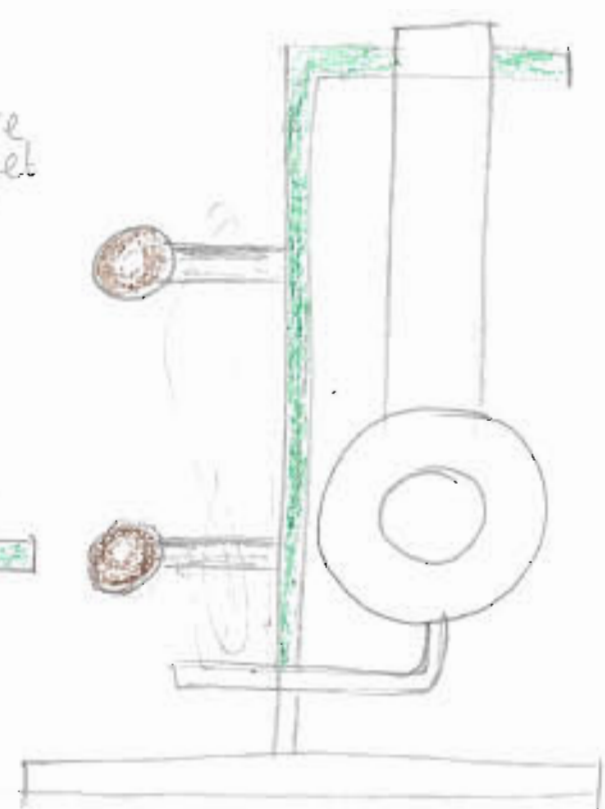
Wires are easy to get to.

little shelf could be fixed with X halvings.

Wires could go through this side.

Aluminium dowels

Cut grooves for the headphones which have to be 3cm



I like this simple design
It holds the headphones and stores the wires.

Good wide base for stability.

This size allows headphones to not touch the table

N5

Design and Manufacture
 Planning for manufacture pro forma
 Design brief 1: a small shelf



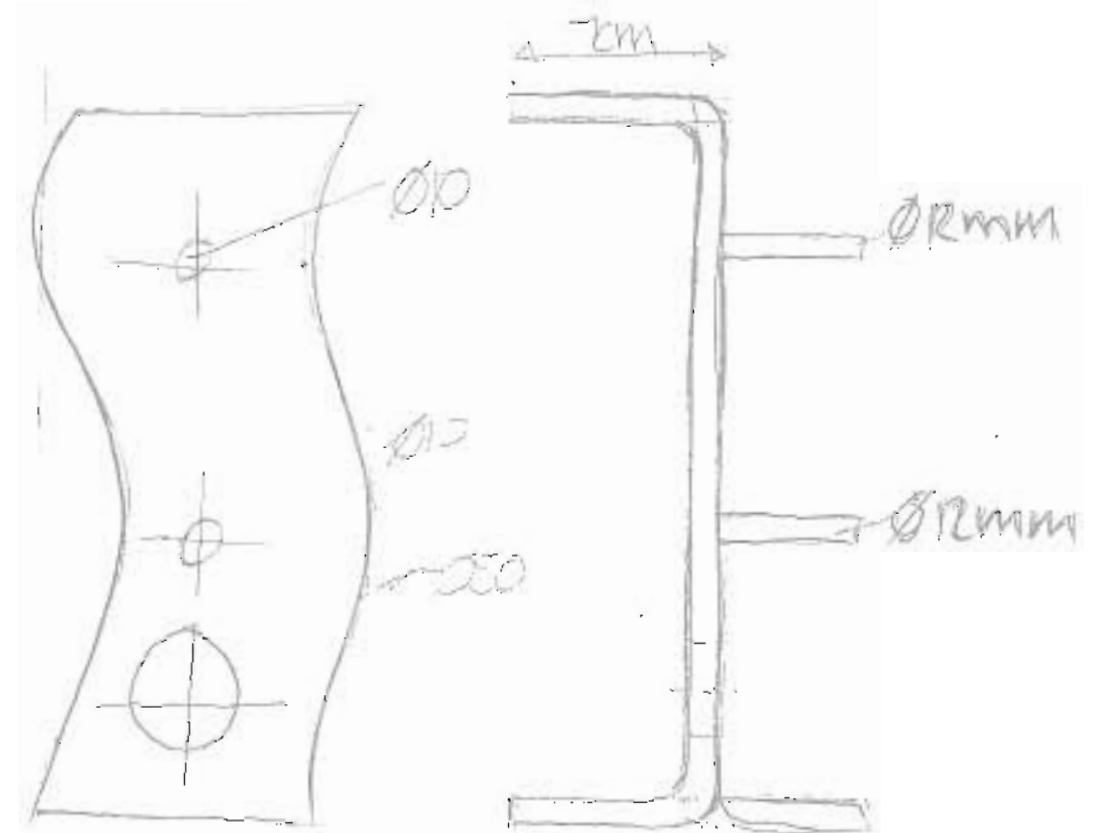
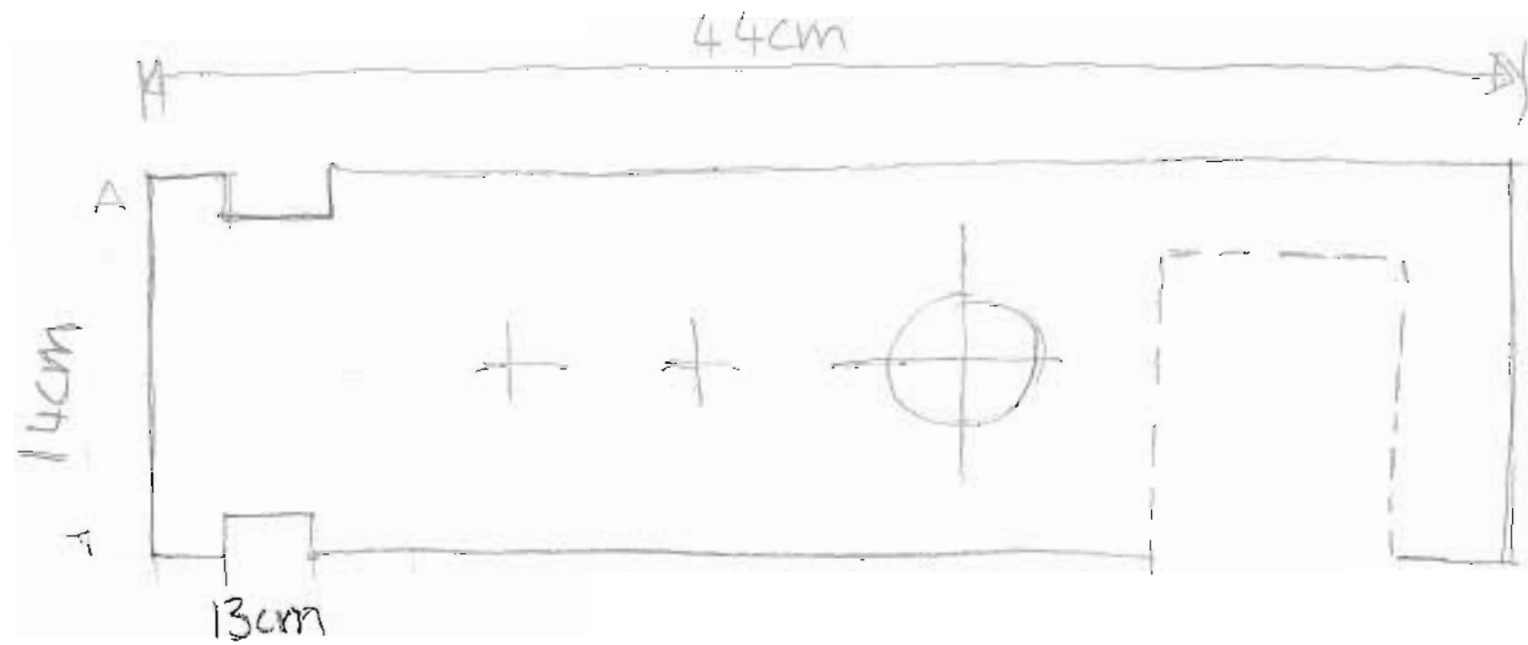
WORKING DRAWING/SKETCH

Sequence of operations

Stage	Operation	Tools/equipment
	Make template use it to draw curves	Card, ruler, scissors and pencil, fibre tip pen, try square and template
	Mark holes & Drill holes	Pillar drill, twist drill and hole saw
	Cut acrylic to size and shape	Scroll saw
	Finish edges	Half round file, vice, wet and dry paper polish and paper towels
	Mark bends & Bend acrylic to shape	Ruler, fibre tip pen, try square & Strip heater
	Mark out and cut aluminium to length	Scriber and rule & Engineers vice and hacksaw
	Turn step aluminium bar & Polish aluminium	Centre lathe Emery cloth, wet and dry and polish
	Drill holes in wooden spheres	Pillar drill forstner and twist drills
	Assemble acrylic, aluminium and wooden spheres.	Glue, masking tape, try square

Cutting list

Part	Material	Qty	Length(mm)	Breadth(mm)	Thickness(mm)
Main body	Acrylic	1	44cm	11cm	4mm
Cable tidy	Aluminium	2	7cm	12mm	12mm
End caps	Beech	2	3cm	3cm	3cm



NAME

CANDIDATE ■ - 7A

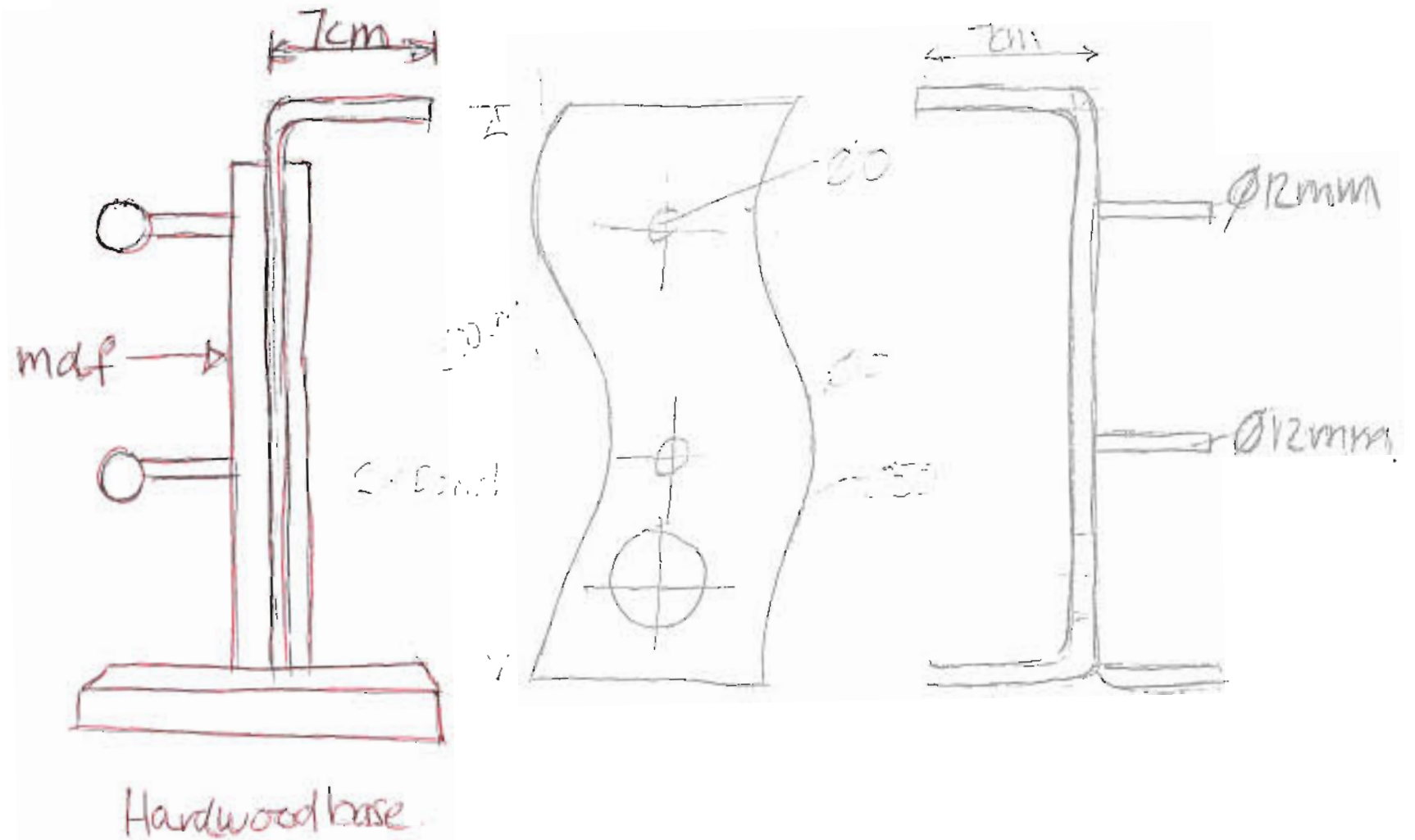
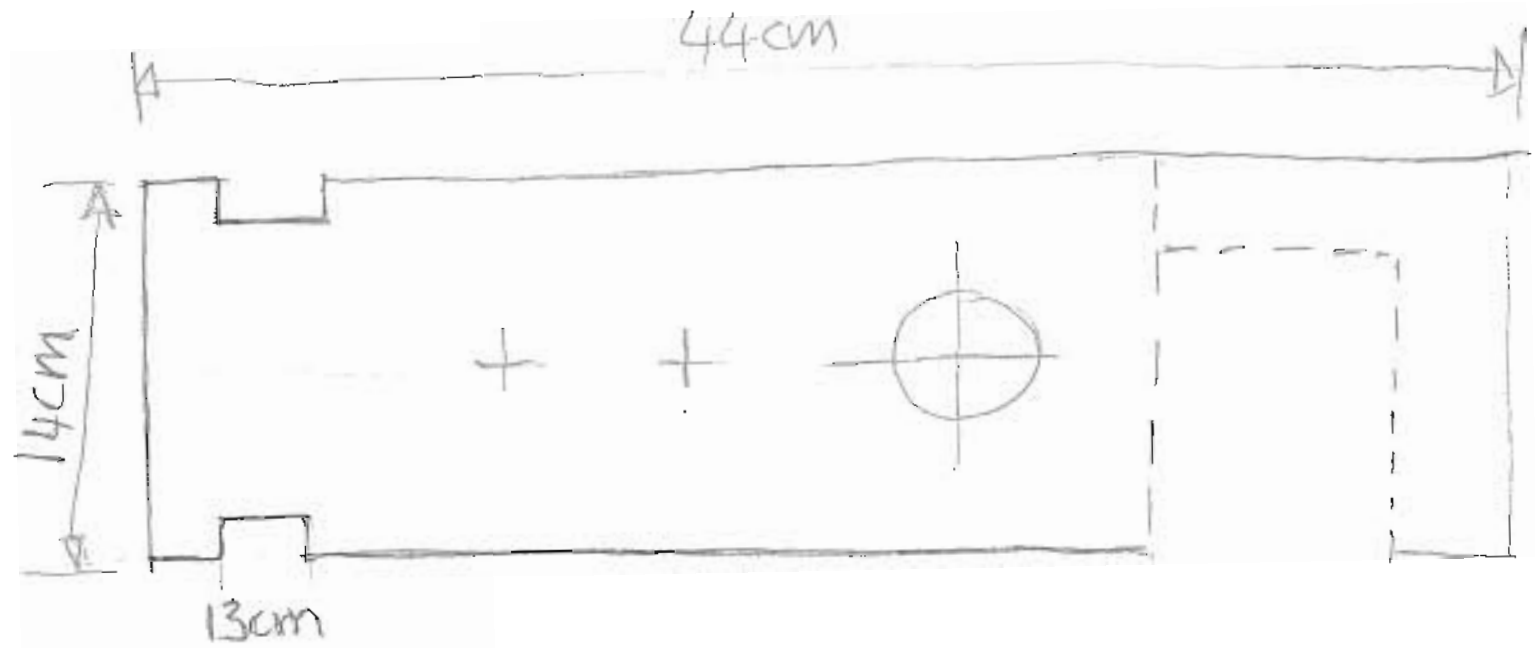
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Main body	Acrylic	1	44cm	11cm	4mm
Cable tidy	Aluminium	2	7cm	12mm	12mm
End caps	Beech	2	3cm	3cm	3cm



Candidate E

Notes to candidates

Before you start the research you should have read the instructions for candidates and be familiar with:

- ◆ the brief
- ◆ the skills you have to demonstrate
- ◆ the type of evidence you have to provide

You should speak to your teacher or lecturer if you are unsure about the areas above.

Research

The company has carried out research and identified a few requirements for the shelf. You should gather further information to ensure the proposal is suitable for the company and the teenagers you know.

You should record your research information on this sheet (you can use both sides).

You should use findings from your research to complete the specification below.

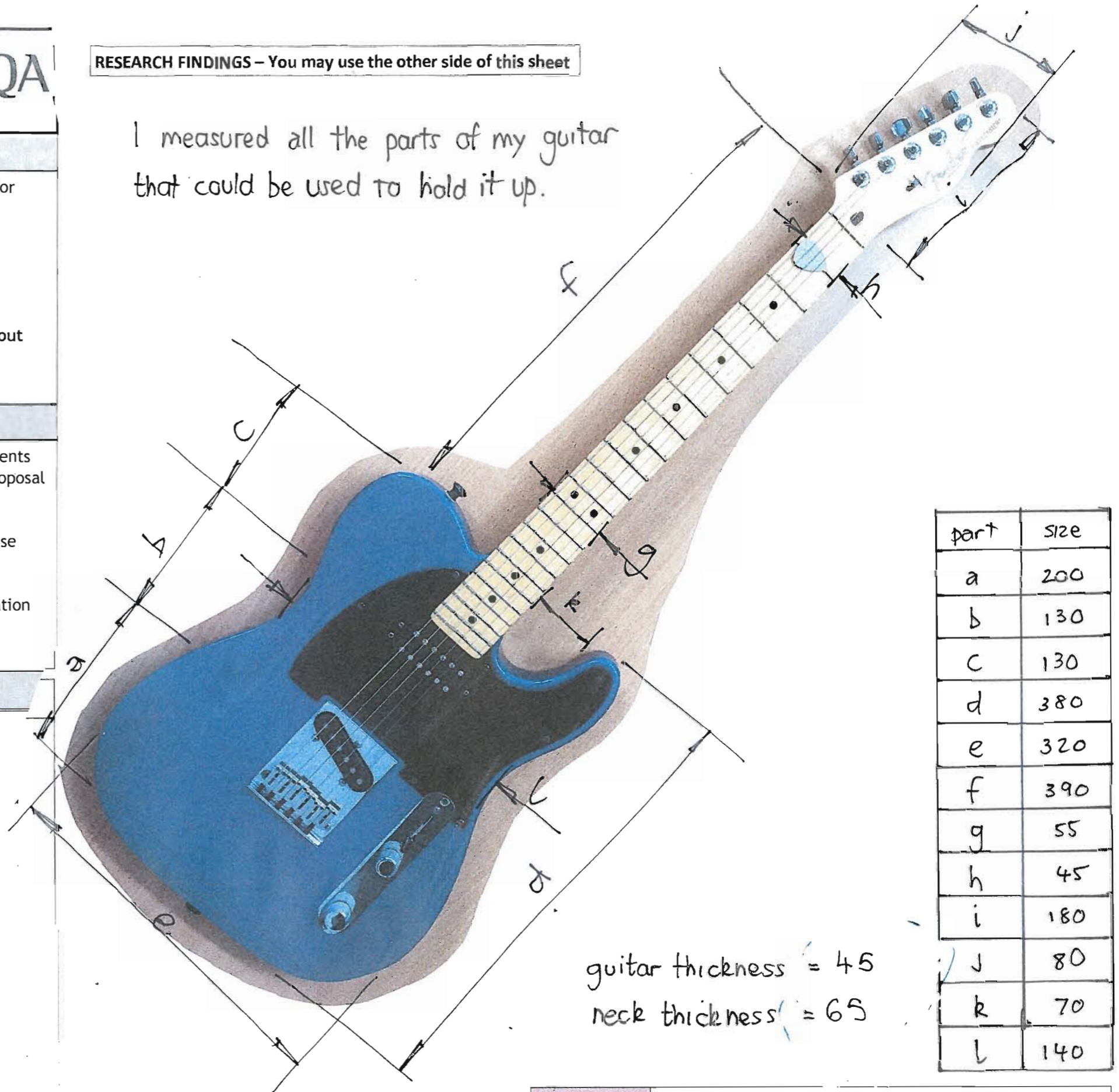
A small shelf – specification

The shelf must:

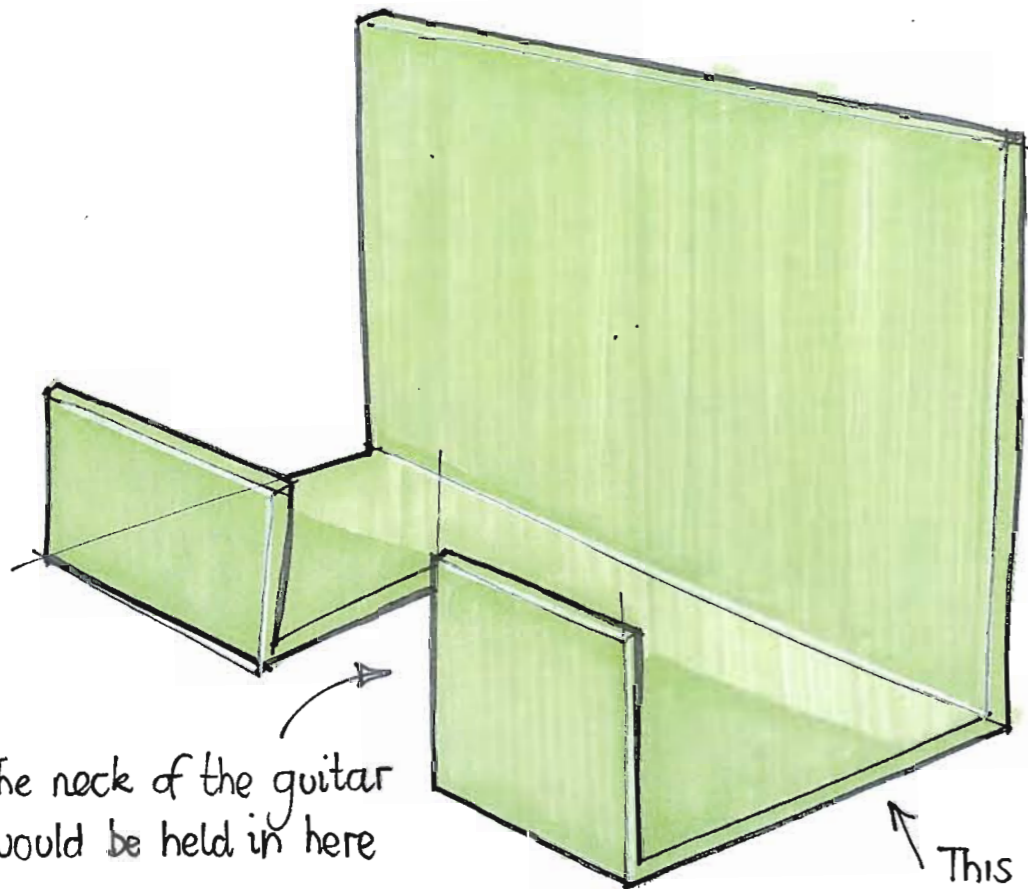
- ◆ demonstrate a high level of craftsmanship
- be wall mounted
- be safe
- look good
- have no sharp edges
- be easy to clean

RESEARCH FINDINGS – You may use the other side of this sheet

I measured all the parts of my guitar that could be used to hold it up.



NAME CANDIDATE E - 1

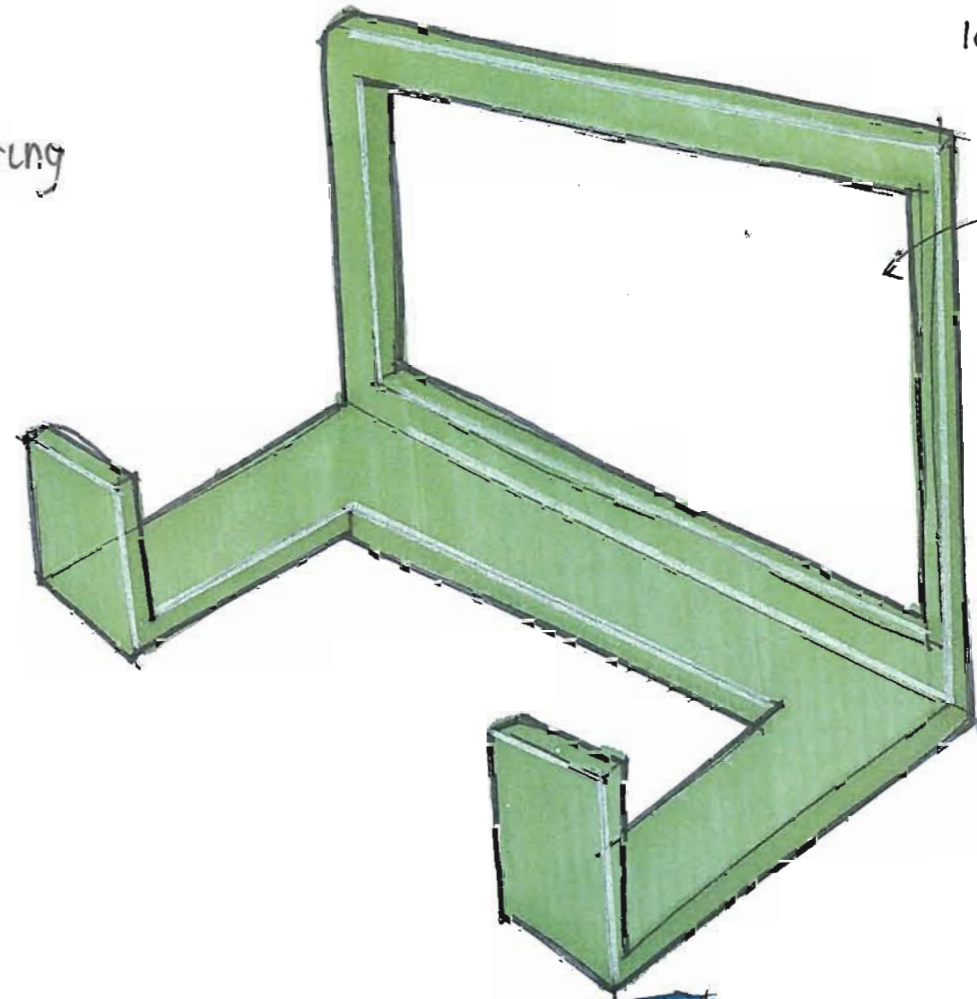


Idea 1

← This is a bit plain and boring looking.

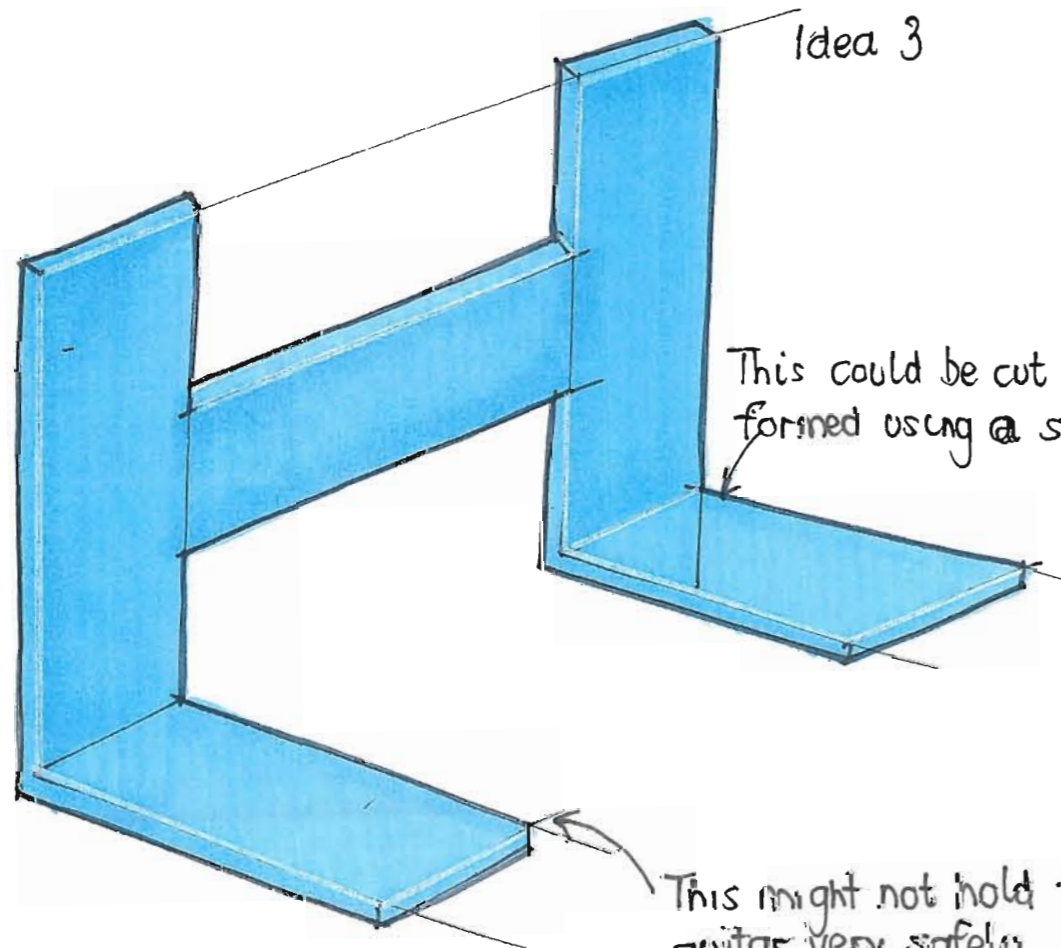
→ The neck of the guitar would be held in here

← This could be cut and formed from acrylic



Idea 2

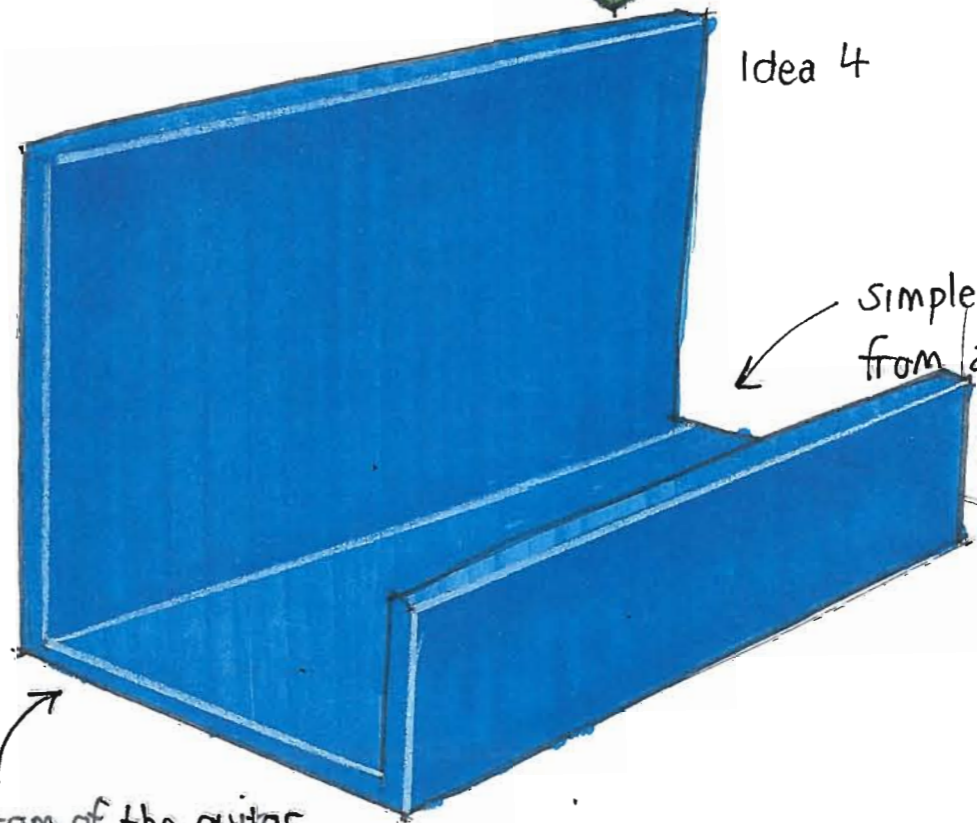
← This window makes it look for more interesting but it would be hard to cut out.



Idea 3

← This could be cut out of acrylic and formed using a strip heater.

← This might not hold the guitar very safely.

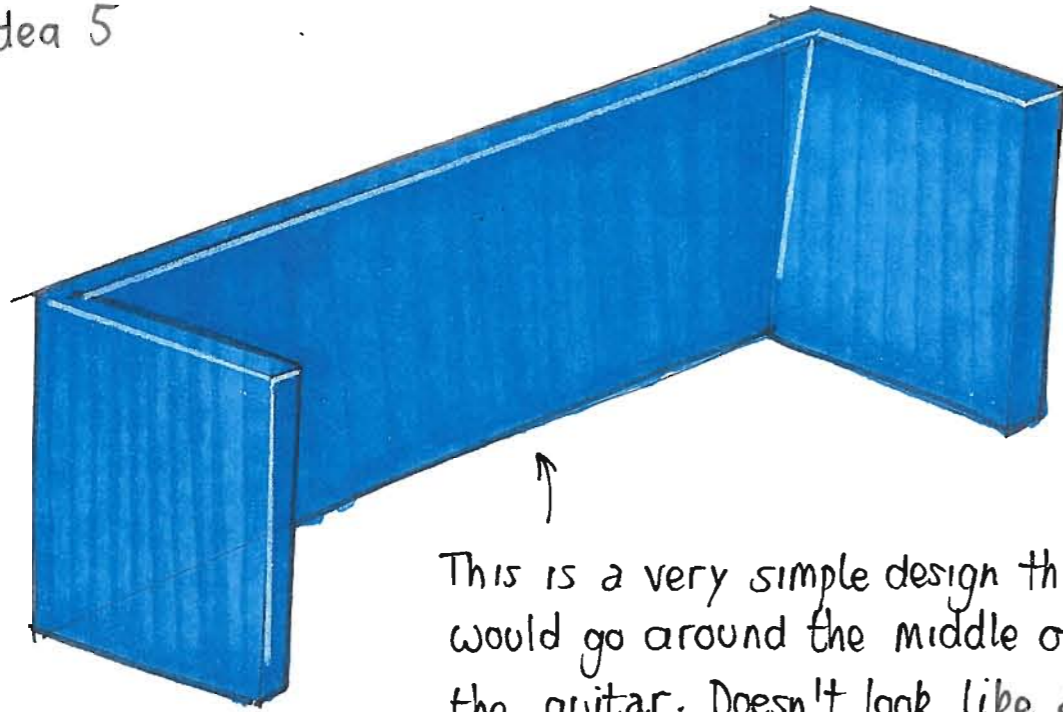


Idea 4

← Simple design could be folded from a bit of acrylic.

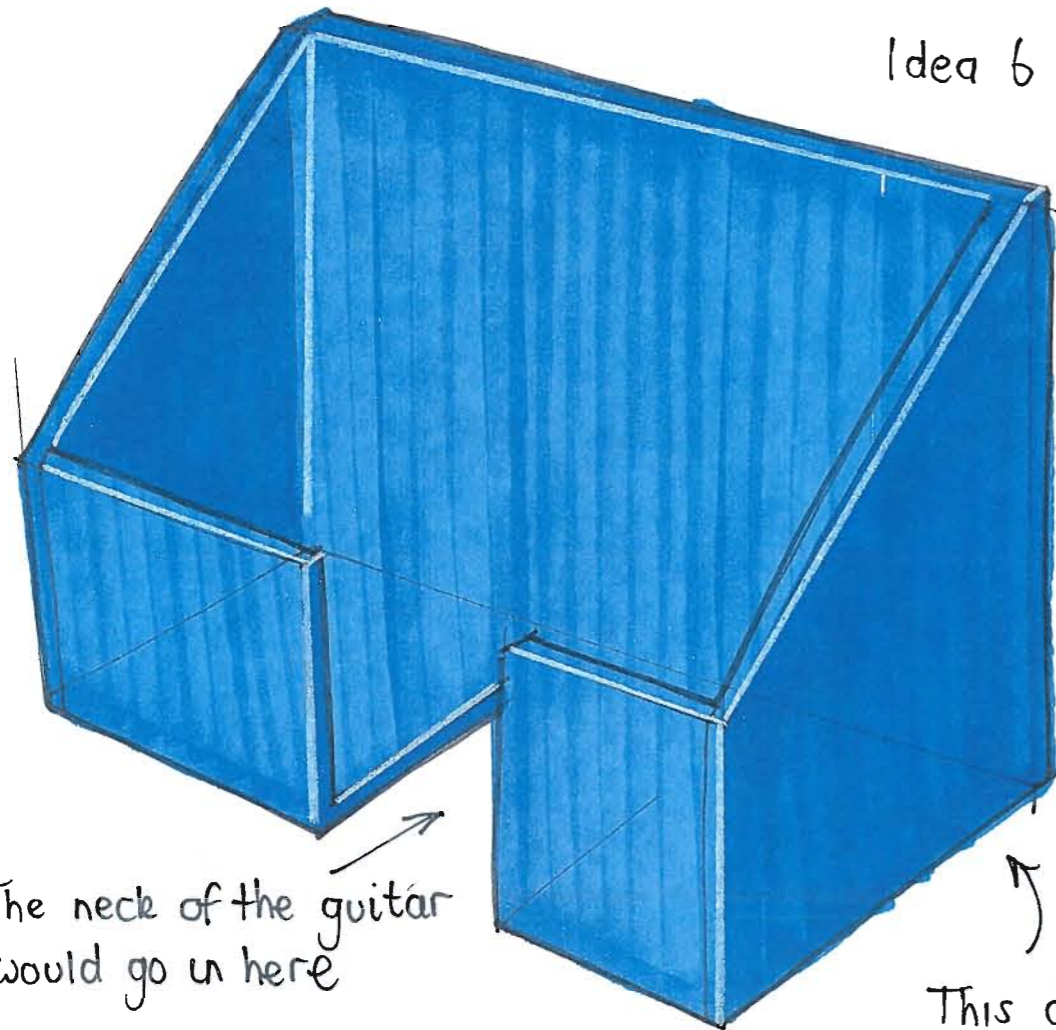
← The bottom of the guitar could sit on here

Idea 5



↑
This is a very simple design that would go around the middle of the guitar. Doesn't look like a shelf at all.

Idea 6



↖
The neck of the guitar would go in here

↖
This design looks very sturdy and strong

↖
I think that this design could be cut from a few pieces of acrylic and stuck together with liquid cement.

Idea 1

Idea 1 looks like it would work very well and would be good enough to do its job of holding a guitar on a shelf. It would have enough things on it to mark out then cut and form to make sure I get top marks for practical.

Idea 2

I like idea 2 but cutting out the window bit will be really, really difficult to get right and not make the lines that I cut really wobbly. It could be made from a bit of green acrylic which I used a lot this year already.

Idea 3

This idea looks like the letter H which I think is very interesting indeed. I don't think that it would do its job very well though because it would just fall off. I think it would be difficult to cut it too.

Idea 4

This is a very boring and plain design and wouldn't really need much cutting out. The acrylic wouldn't really hold in the guitar.

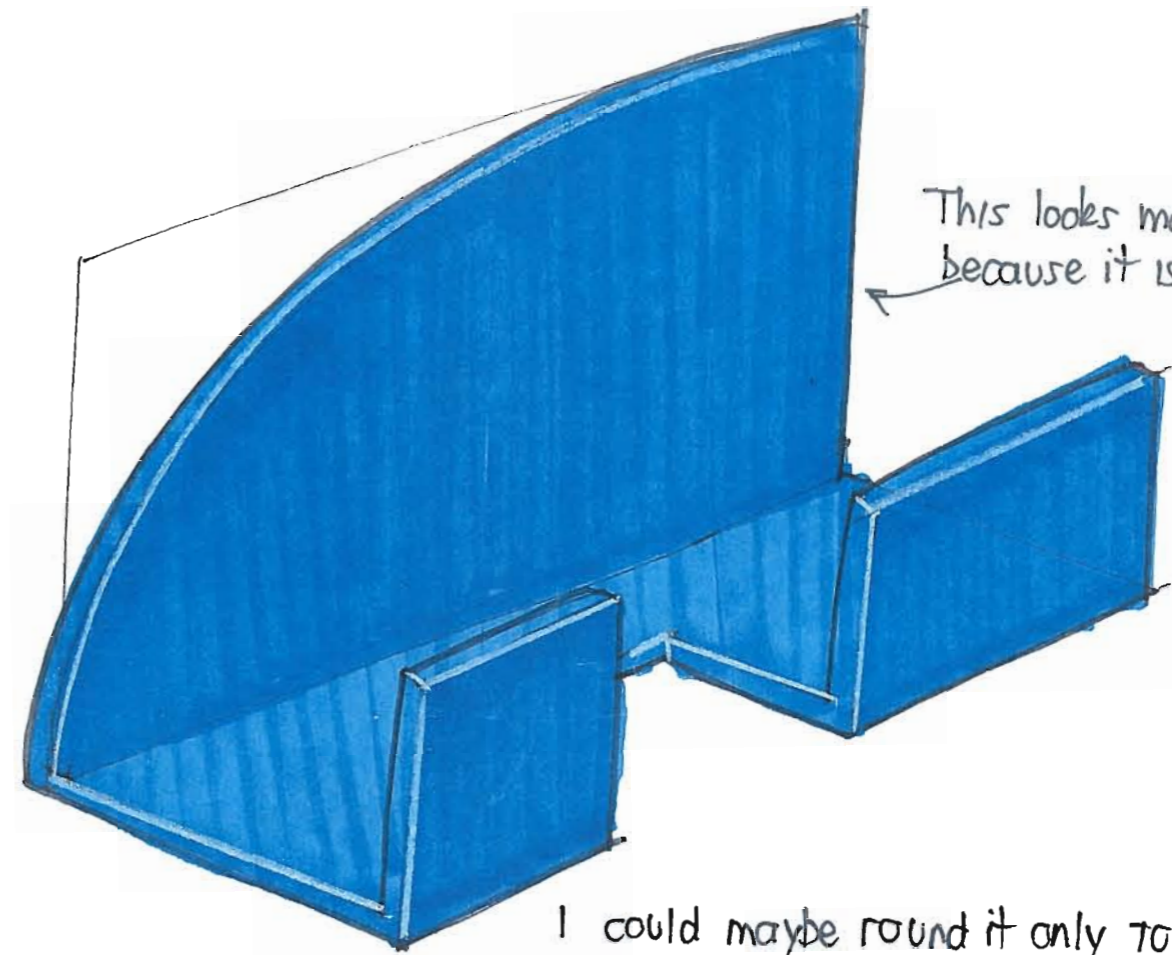
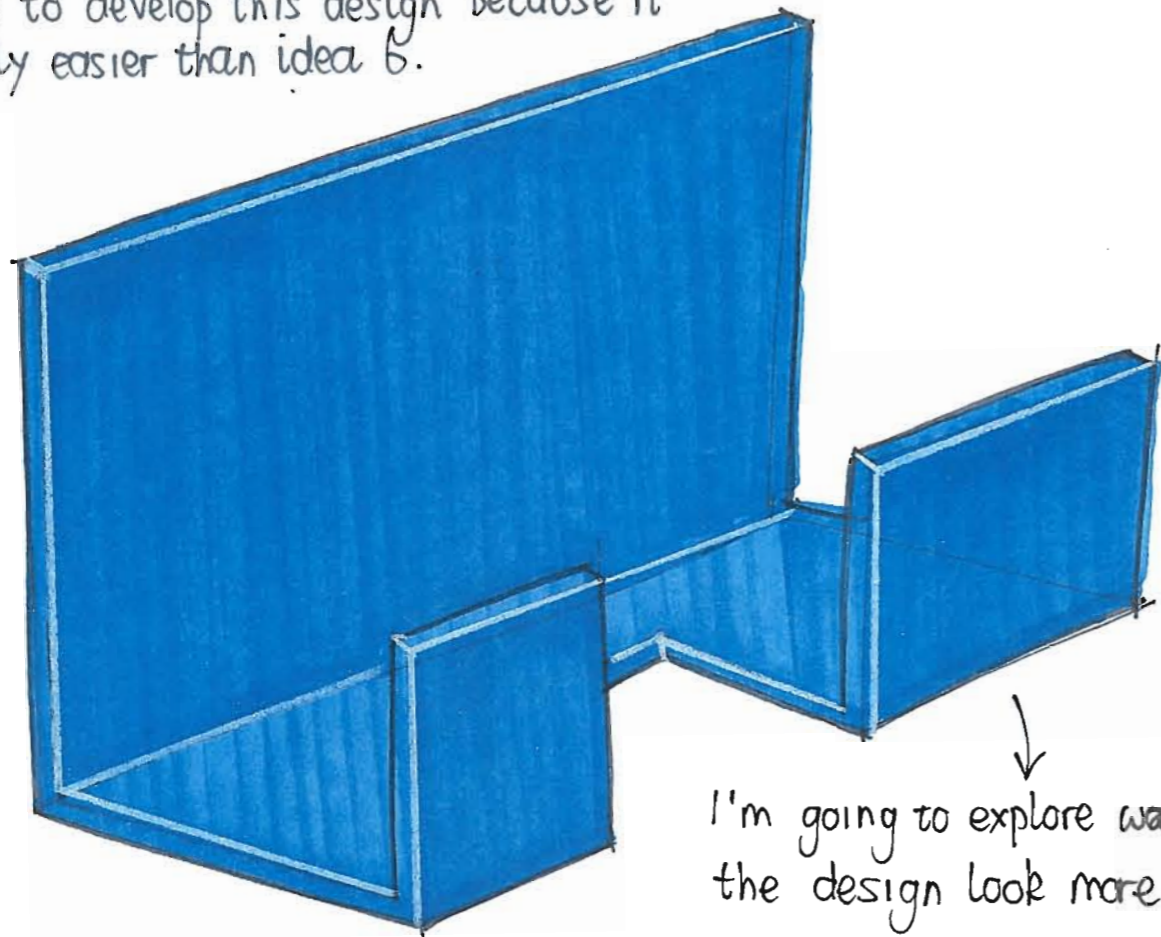
Idea 5

Idea 5 is very boring and simple. It wouldn't give me much to do when I go into the workshop to make it. I'm not sure it would hold the guitar or work as a shelf either.

Idea 6

Idea 6 is my most complicated design and my favourite. It has lots of cutting and forming to do to help demonstrate my fantastic craft skills. It looks big and strong enough to hold a guitar.

I decided to develop this design because it is slightly easier than idea 6.

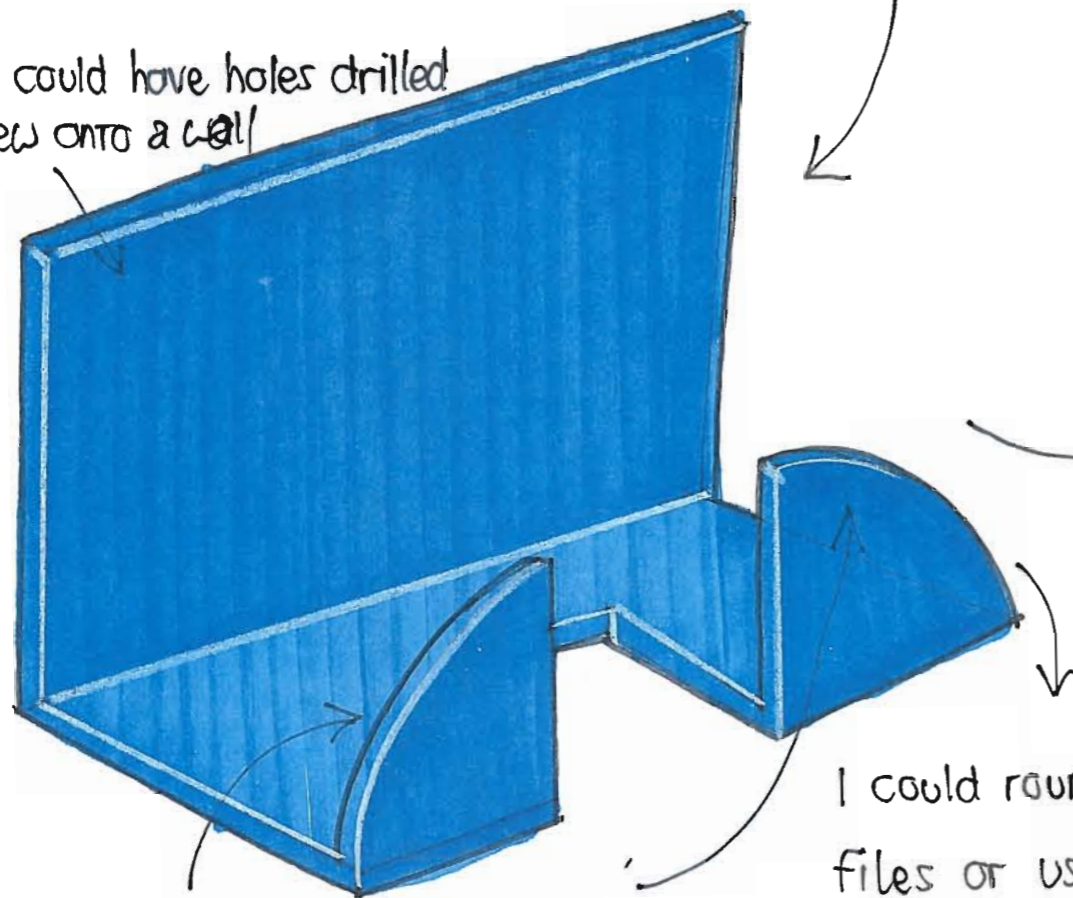


This looks more interesting because it isn't symmetrical.

I'm going to explore ways to make the design look more interesting

I could maybe round it only to one side

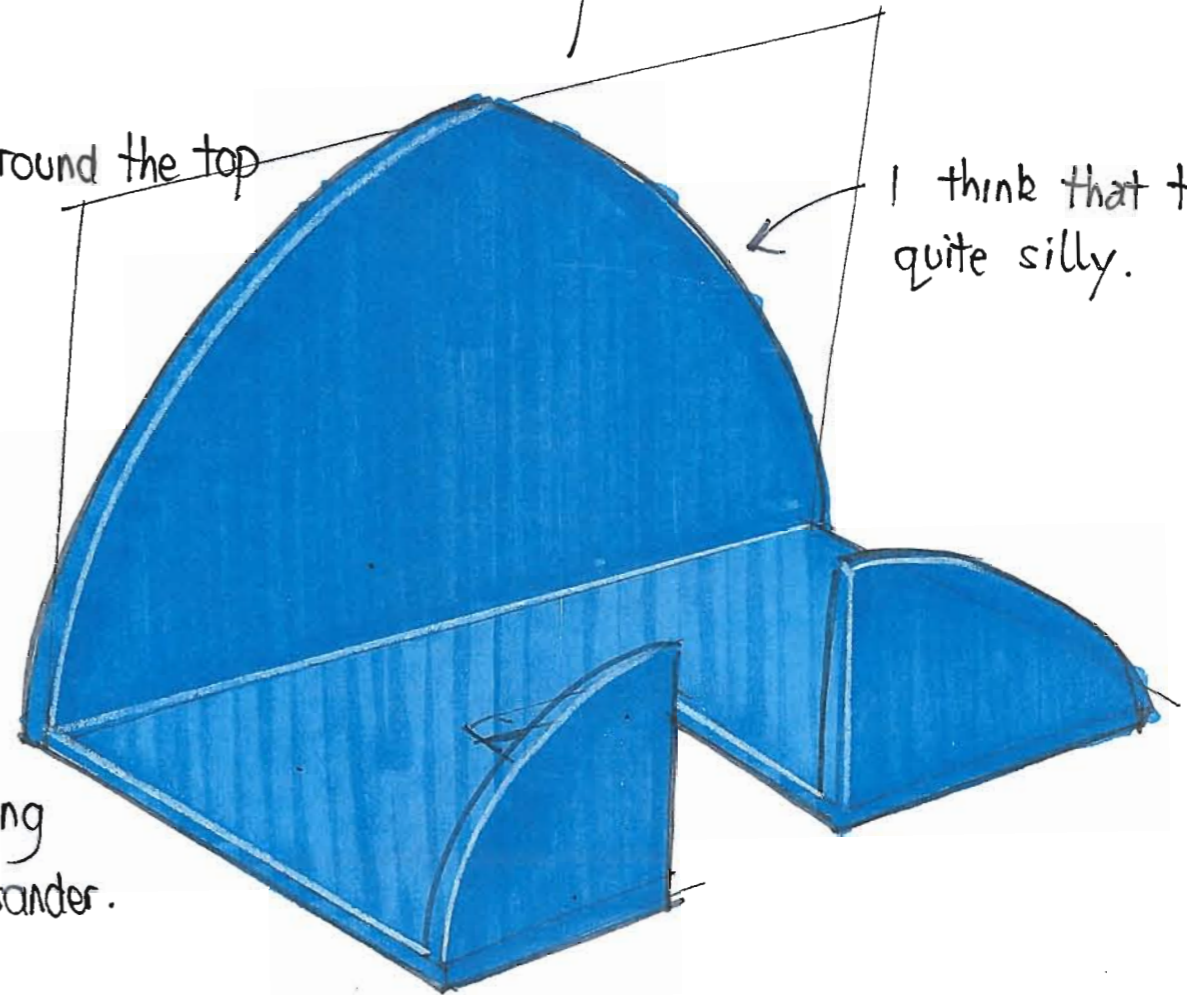
This part here could have holes drilled so it can screw onto a wall



I could also round the top side.

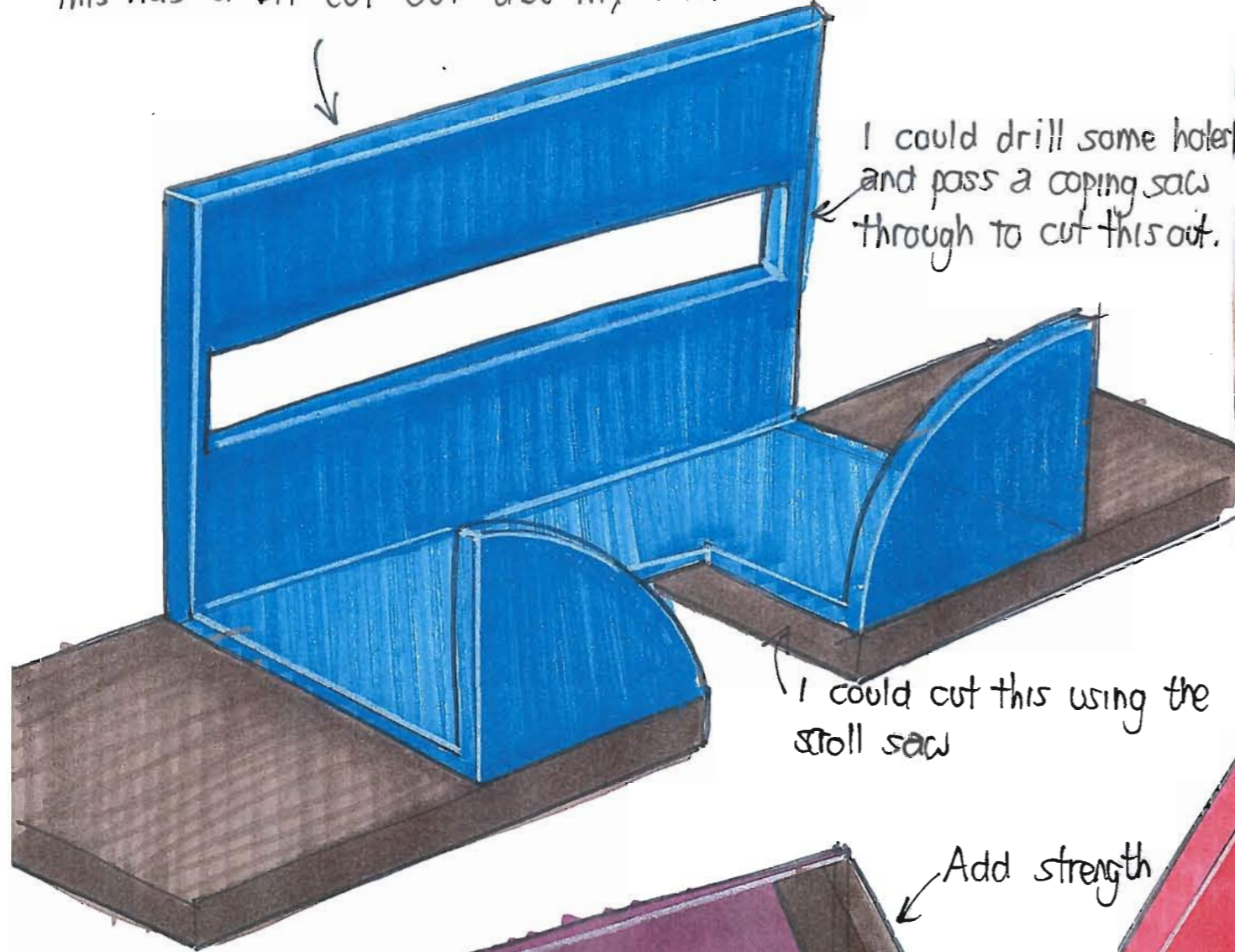
I think that this looks quite silly.

I could round this part using files or using the belt sander.



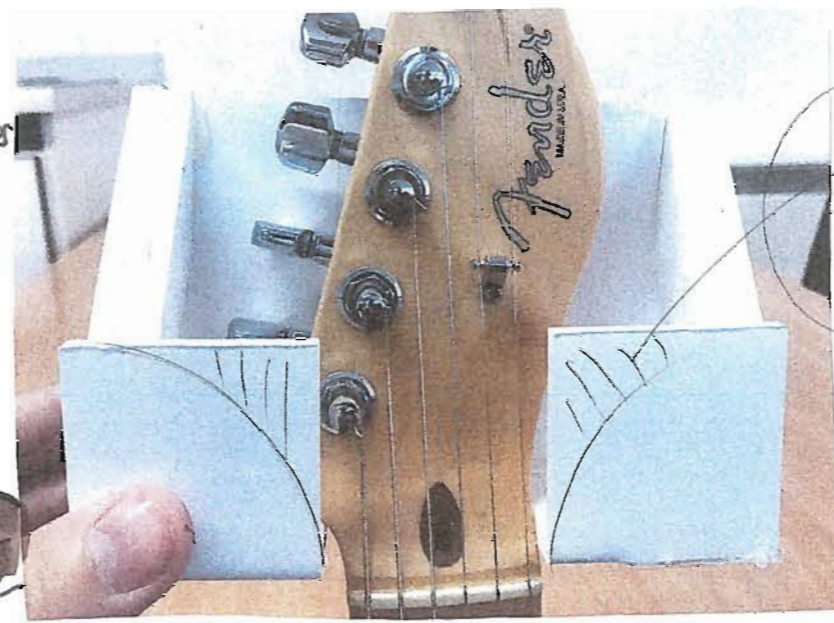
I could round these two corners to add curves. This would also make the design safer with less pointy corners

This has a bit cut out like my initial ideas



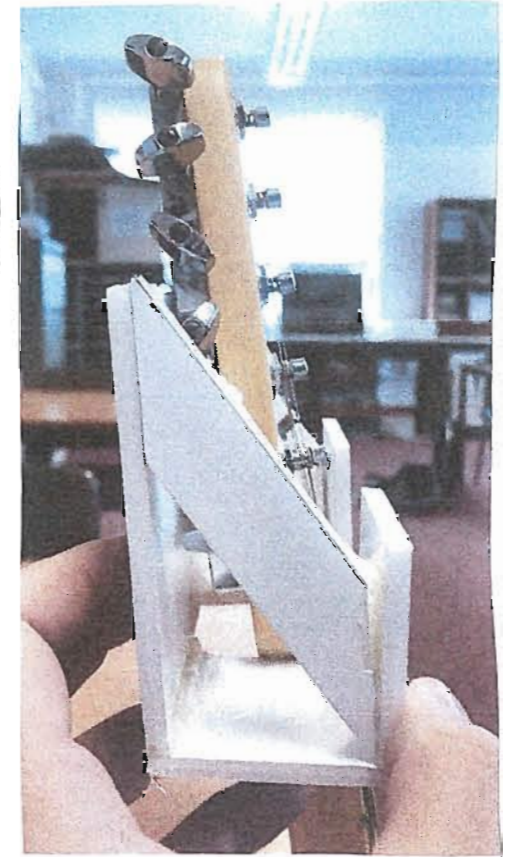
I could drill some holes and pass a coping saw through to cut this out.

I could cut this using the scroll saw

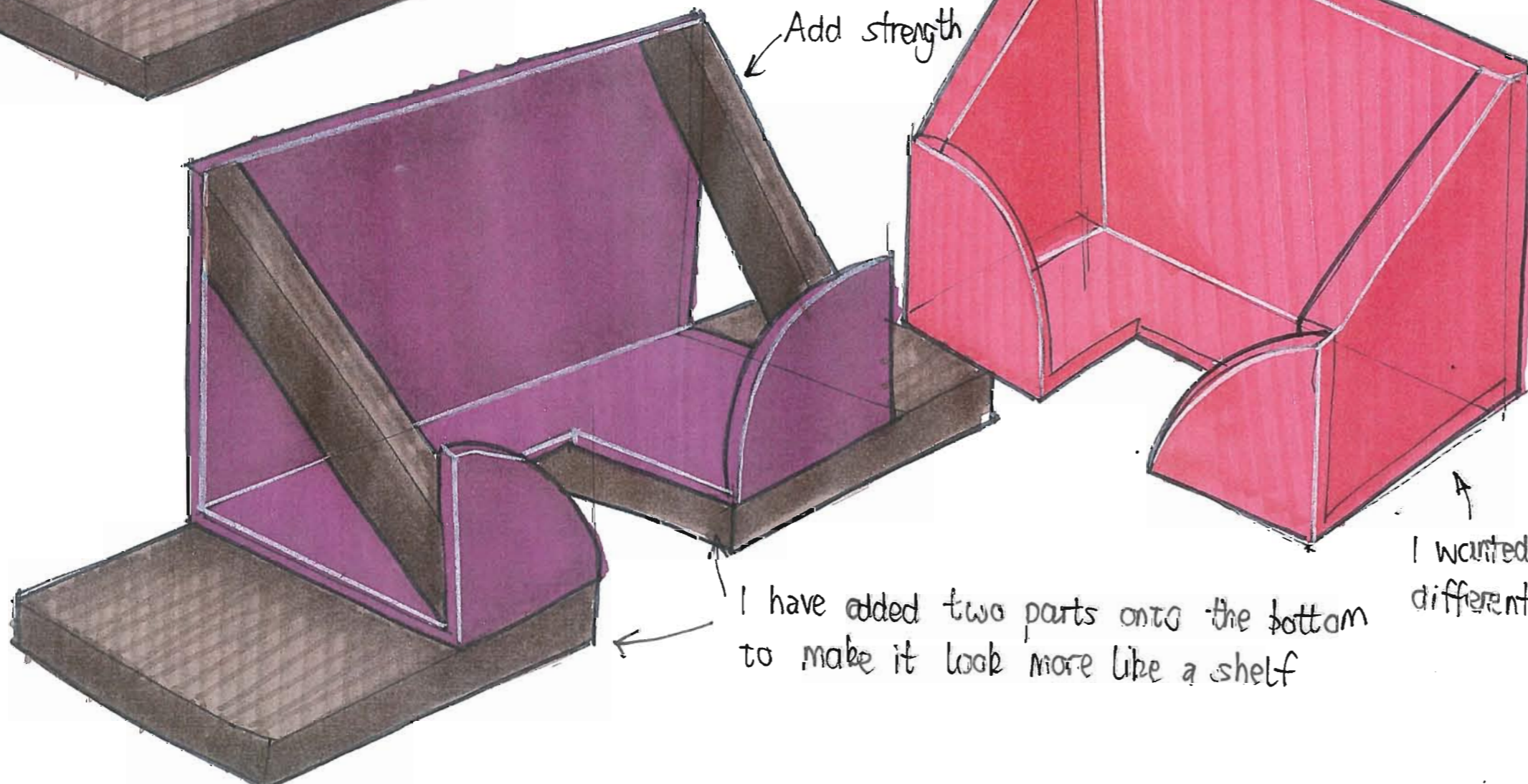


note about remaining corners.

I used the neck of the guitar to model around to get the correct sizes for my final model. I have recorded the sizes on the next page.



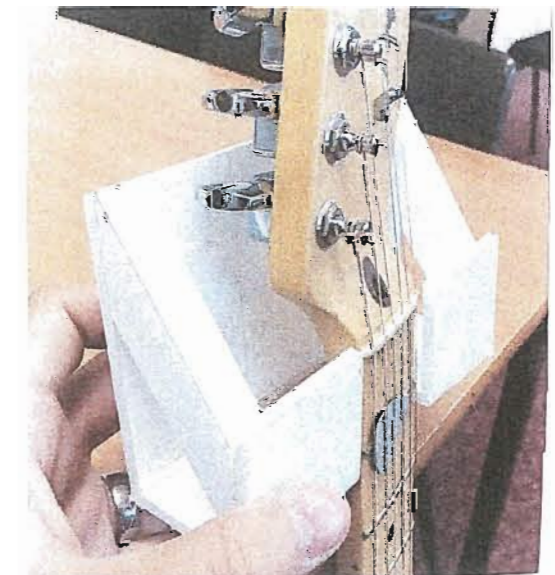
This model also helped me to test how well the design held the neck of the guitar.



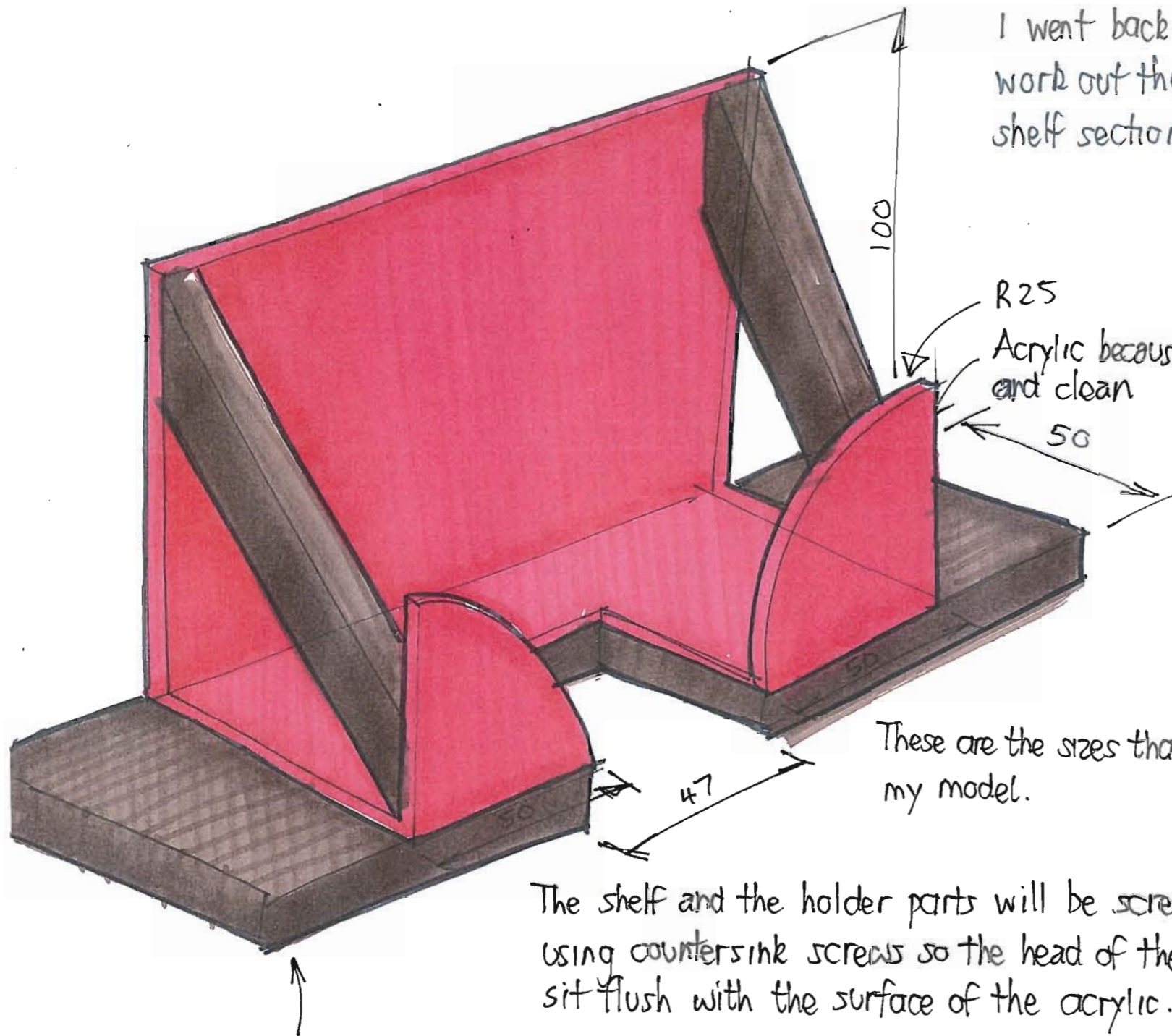
Add strength

I have added two parts onto the bottom to make it look more like a shelf

I wanted to try different colours



It held the neck of the guitar really well and safely.



I went back and used my model to work out the proportions for the shelf section.

R25
Acrylic because it is easy to form and clean

50

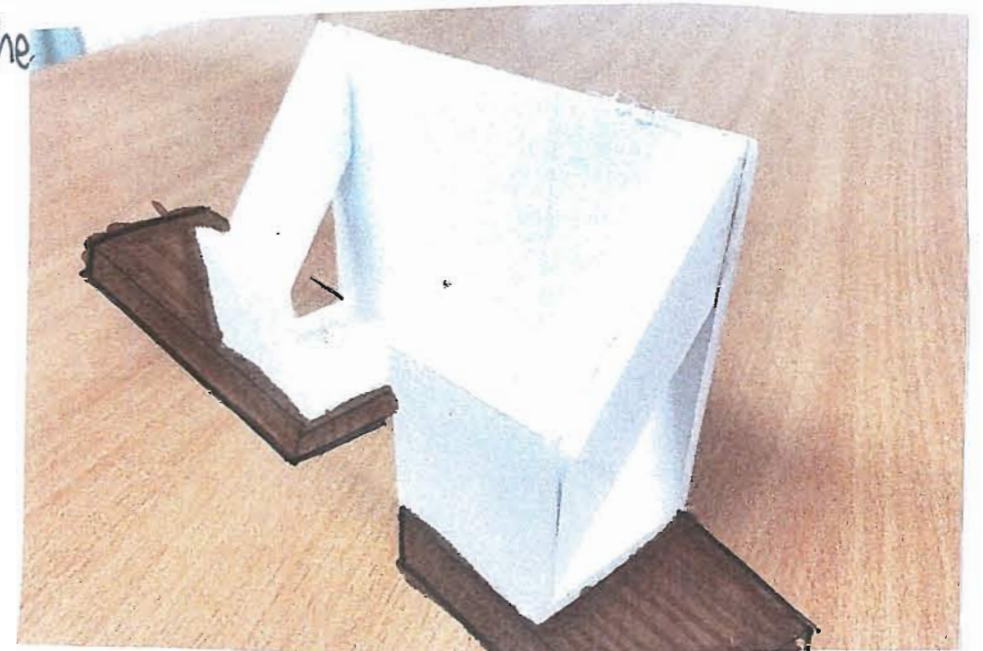
These are the sizes that I found from my model.

The shelf and the holder parts will be screwed together using countersink screws so the head of the screw will sit flush with the surface of the acrylic.

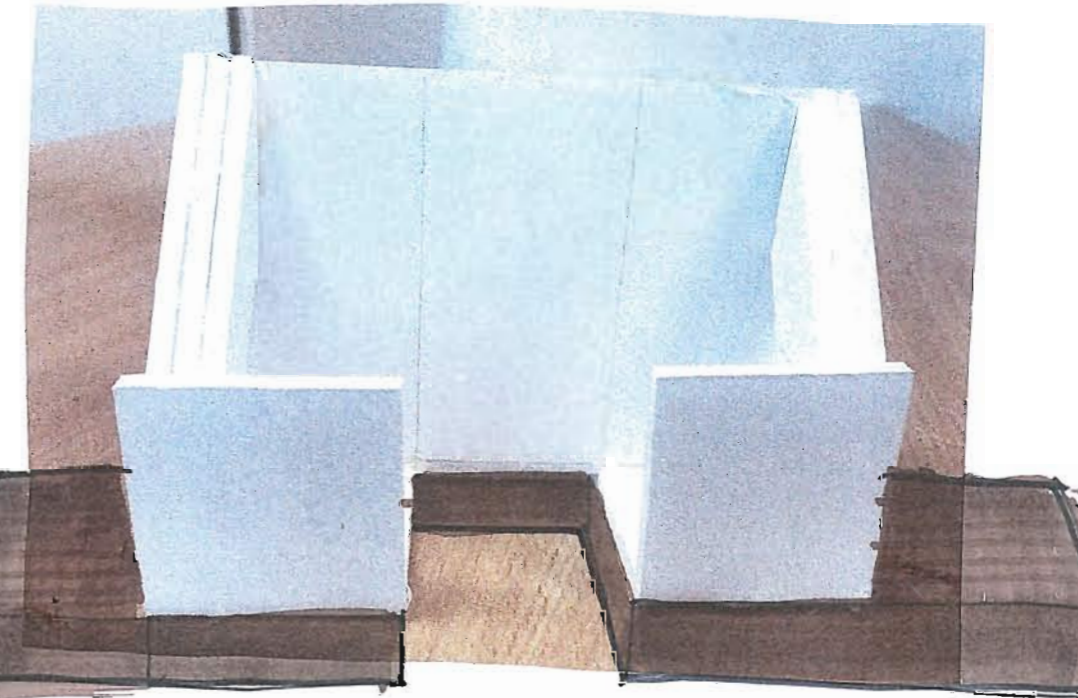
I am going to make this part from walnut because I think the dark colours contrast really nicely with the red acrylic

The walnut can be cut with a tenon or gent saw because it is simple straight cuts.

The walnut will lend some strength to the shelf so it can hold the guitar



50mm long looks very proportional and good.



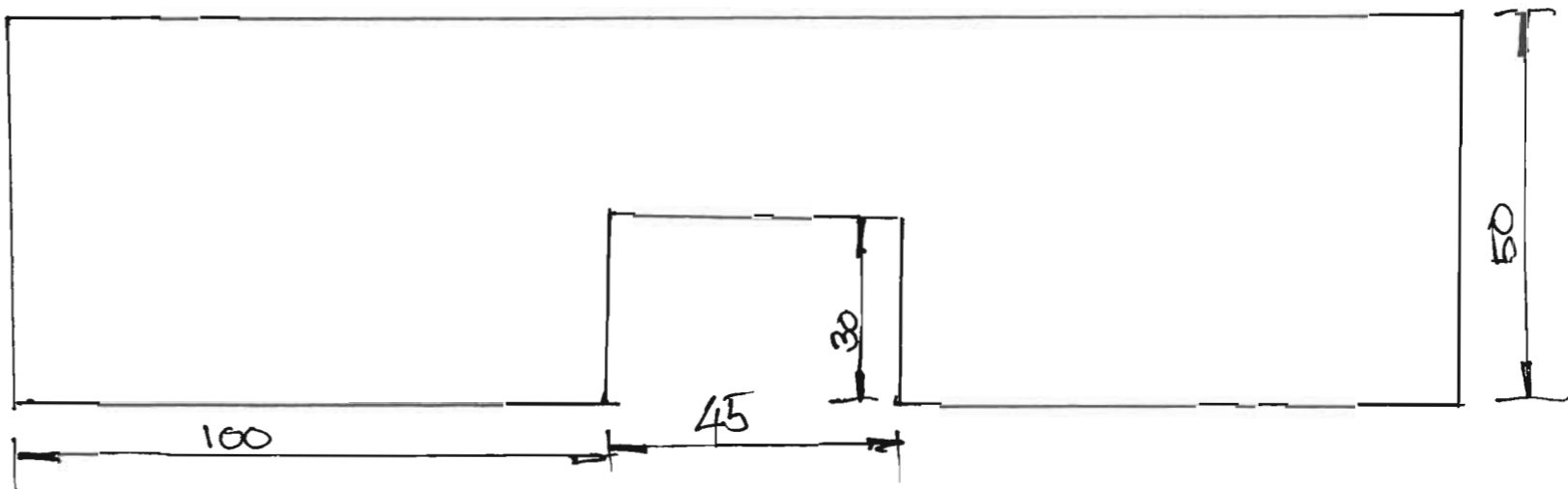
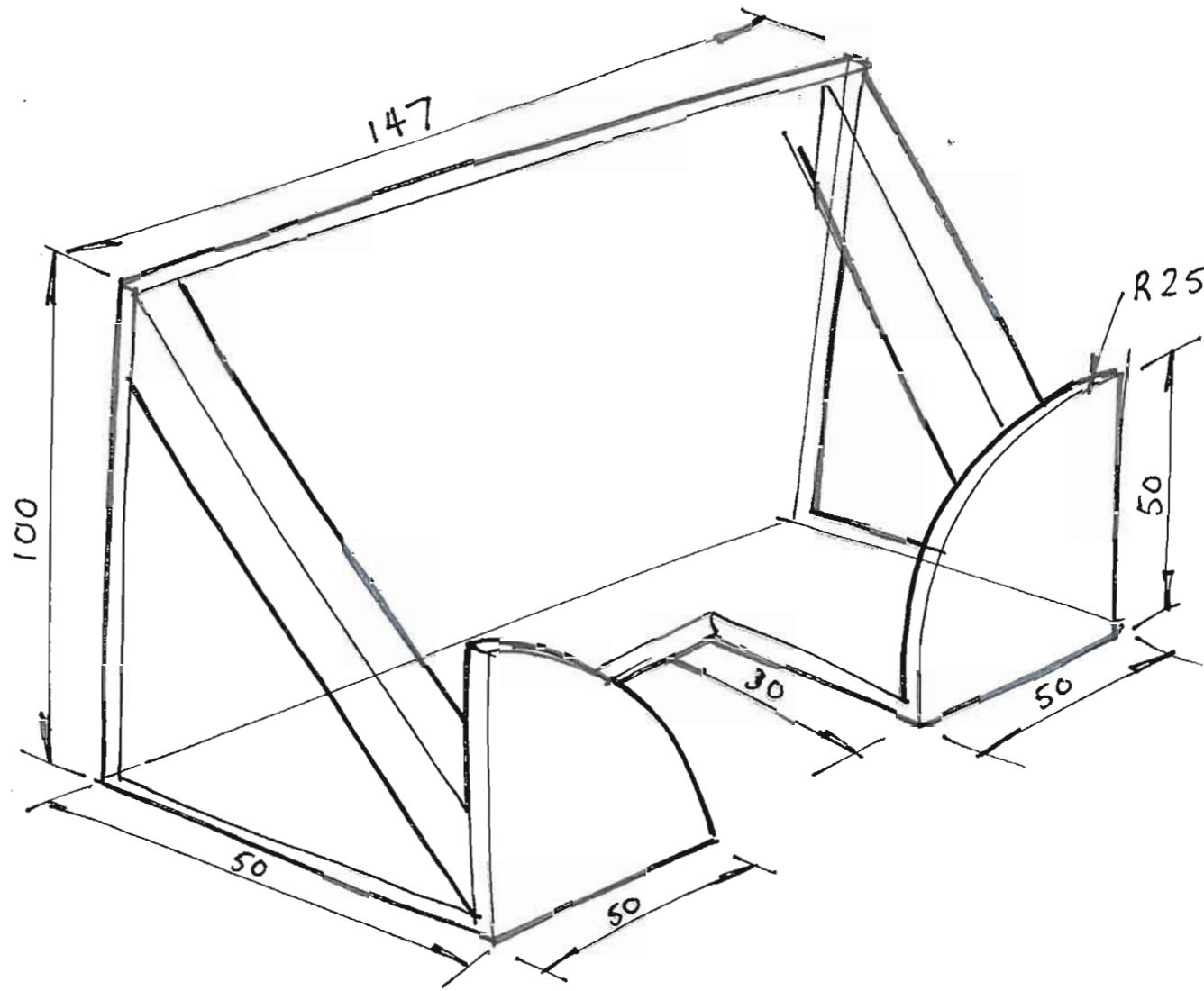
This view of the models helps me to communicate the sizes of the shelf part.

SEQUENCE OF OPERATIONS

STAGE	OPERATION	TOOLS/EQUIPMENT
1.	Mark out wood	Try square, marking gauge
2.	Make a template and stick it on the acrylic.	Drawing board and set squares
3.	Cut wood	Gents saw
4.	Cut plastic	Scroll saw
5.	Finish plastic edge	files and polish
6.	Sand wood	Sand paper
7.	Form acrylic	Strip heater
9.	Assemble	screws

CUTTING LIST

PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
Shelf	walnut	1	250	50	18
holder	acrylic	1	200	147	3



Candidate F

NOTES TO CANDIDATES

Before you start the research you should have read the instructions for candidates and be familiar with:

- the brief
- the skills which you have to demonstrate
- the type of evidence you have to provide

You should speak to your assessor if you are not familiar with the areas above.

RESEARCH

The company have carried out research and identified a few requirements for the shelf. You should gather further information to ensure the proposal is suitable for the company and the teenagers you know.

You should record your research information on this sheet (you can use both sides).

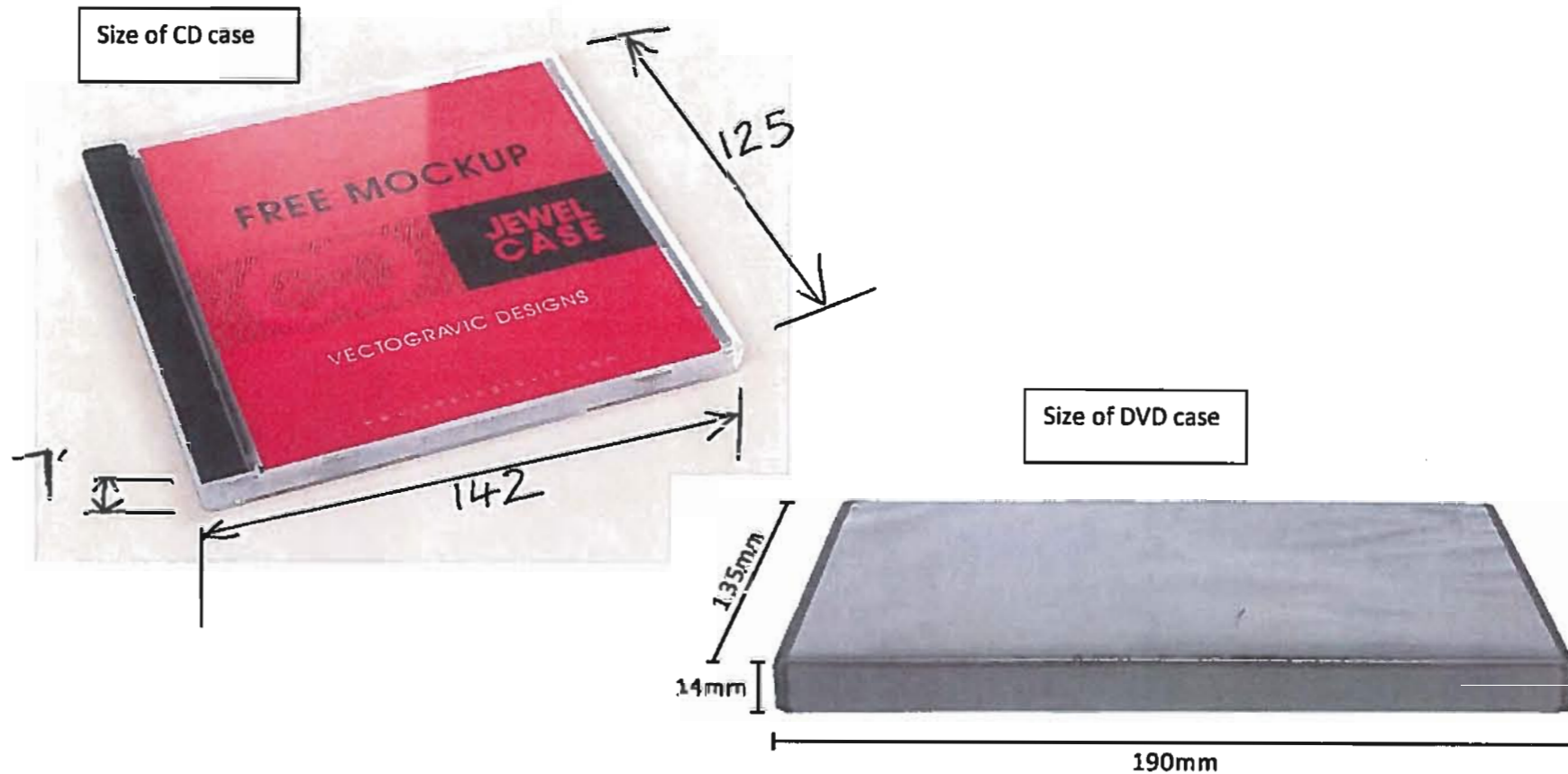
You should use findings from your research to complete the specification below.

A small shelf—SPECIFICATION

The shelf must:

- have a music theme
- fit into box which measures 500 x 400 x 125mm when assembled
- demonstrate a high level of craftsmanship
- hold 10 CD's (142mm x 125mm x 7mm)
- hold 10 DVD's (190mm x 135mm x 19mm)
- be fixed to a wall
- be safe
- have a punk music theme
- fit in with my bedroom

RESEARCH FINDINGS – You may use the other side of this sheet



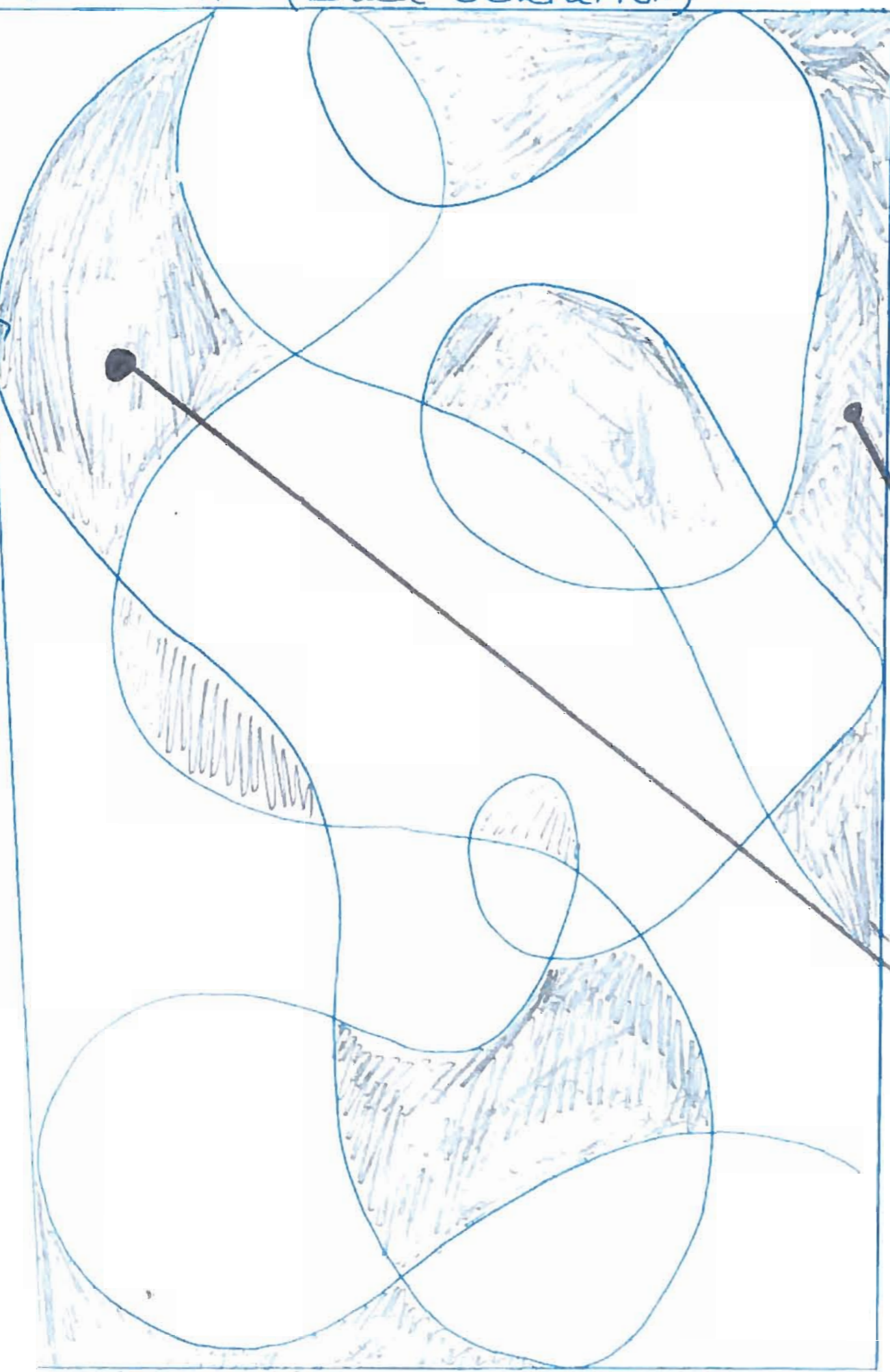
Shelf goes here
(Punk style bedroom)

My bedroom

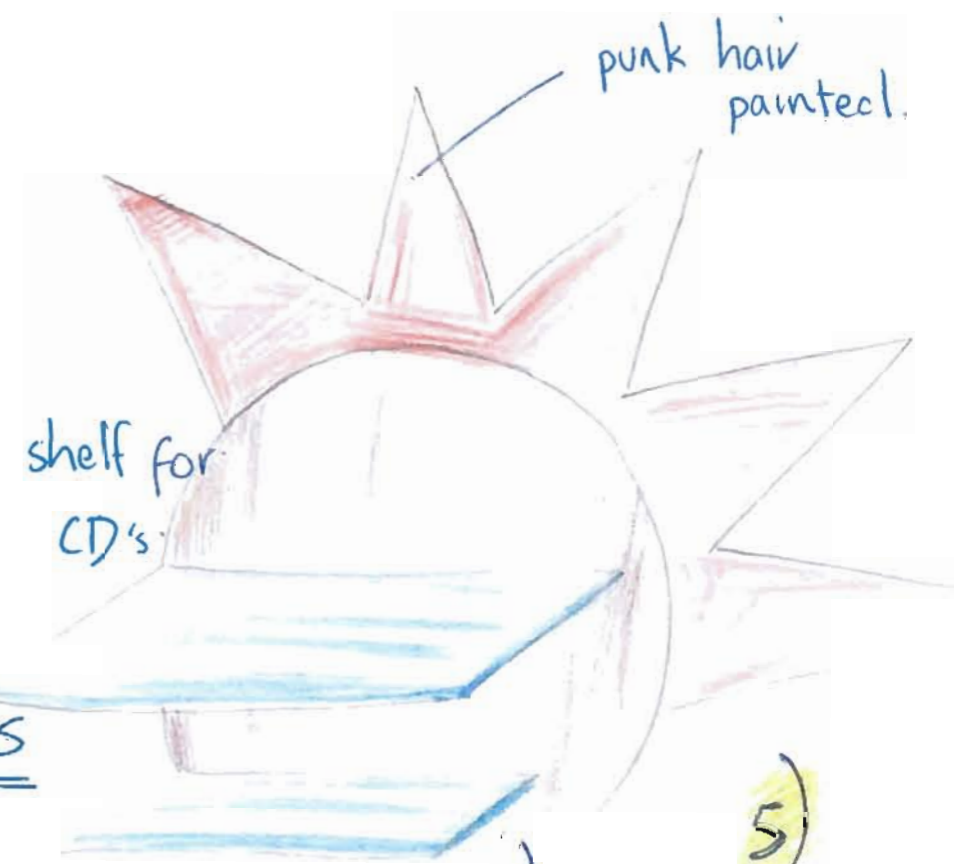
NAME	CANDIDATE F - 1
------	-----------------

Taking Pencil For

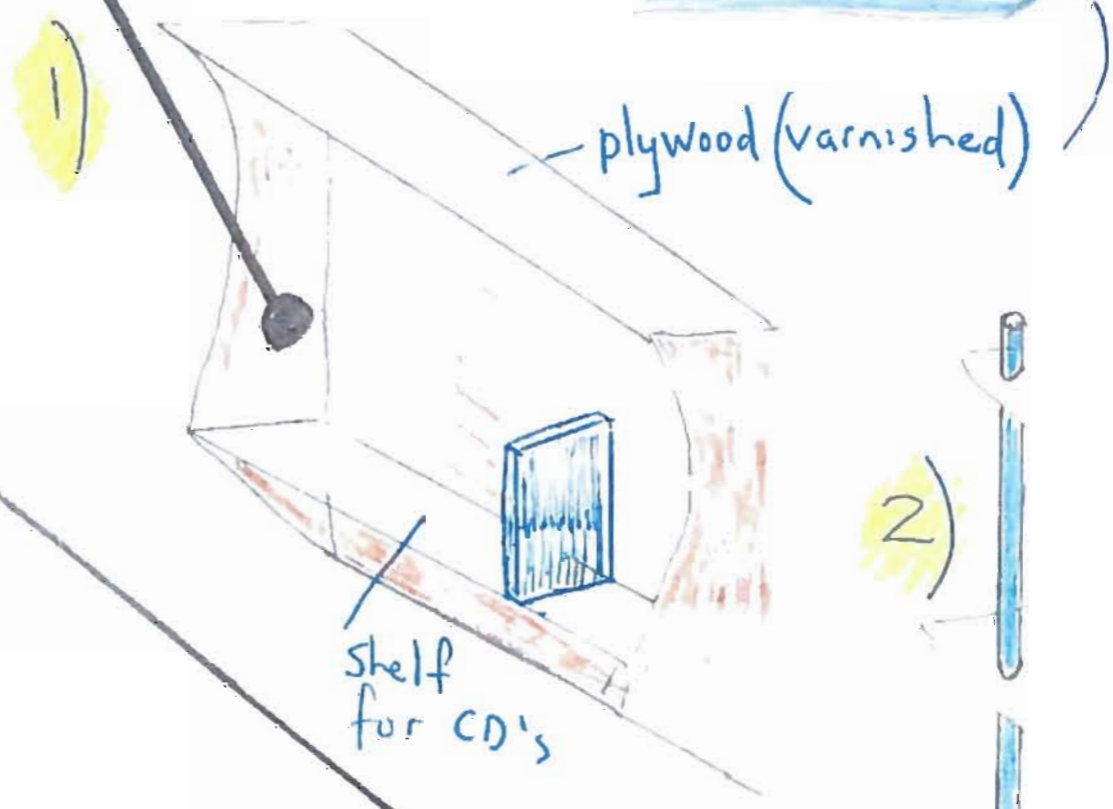
IDEAS (Idea Generation)



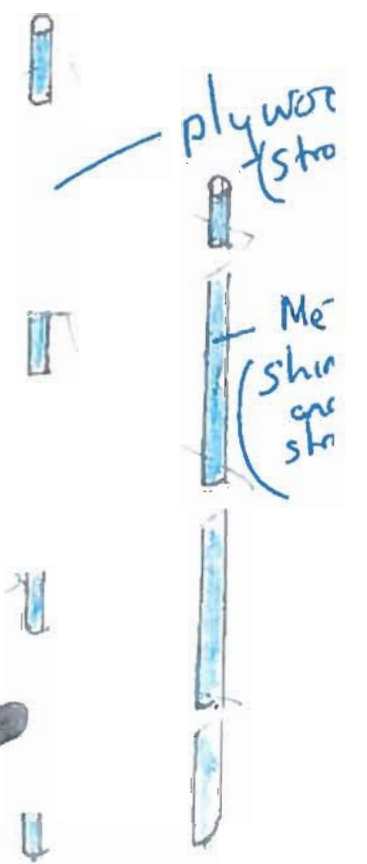
Existing Shelves



IDEAS



2)

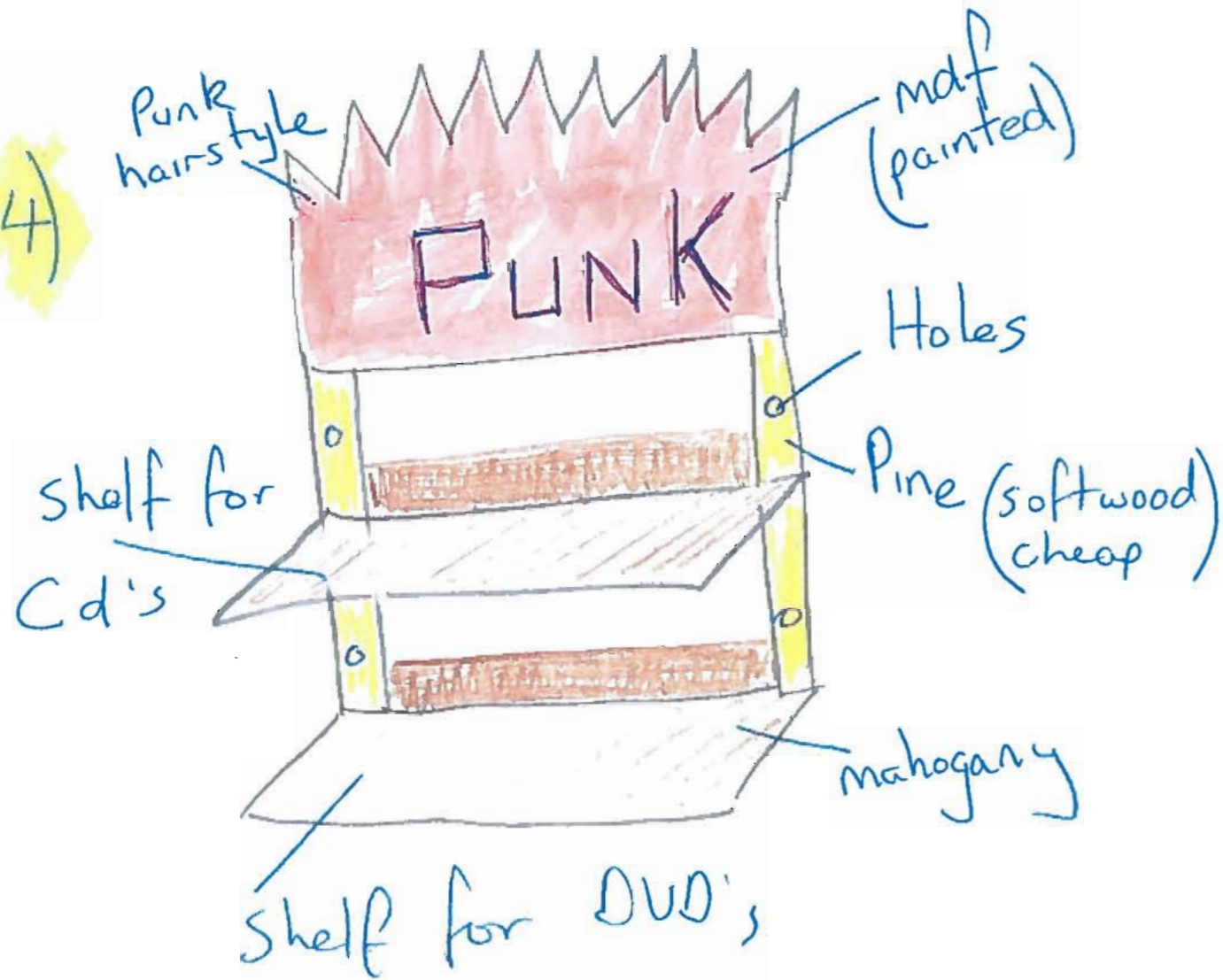


5)

3)

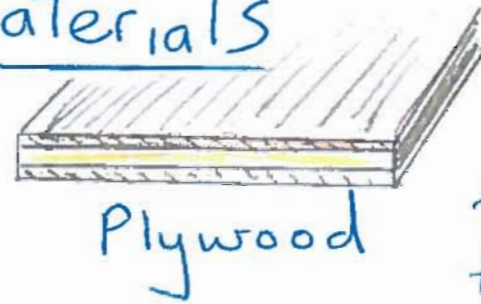


4)



Developments

Materials



This is made from layers of wood glued together to make big sizes of wood that are very strong.



Red pine

This is a softwood that is strong and durable. Used for general construction and woodturning.



mahogany

This is a hardwood which is strong and durable. Used for furniture and construction.

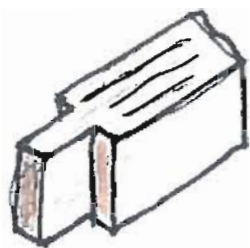


Beech

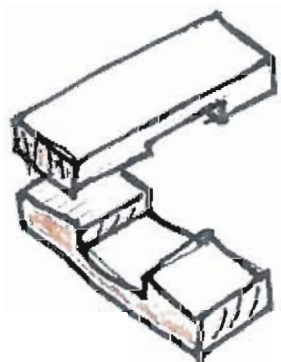
A hardwood that is hard, tough, very strong. The close grain polishes very well. Used for furniture and wooden toys.

DEVELOPMENTS

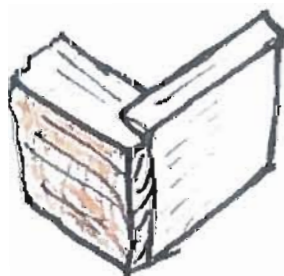
Joints



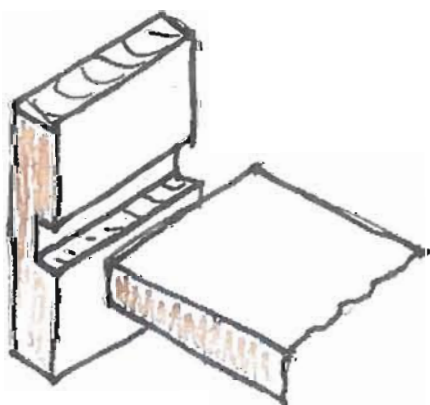
Mortise and Tenon is a strong joint.



Cross-halving is used to join two parts.

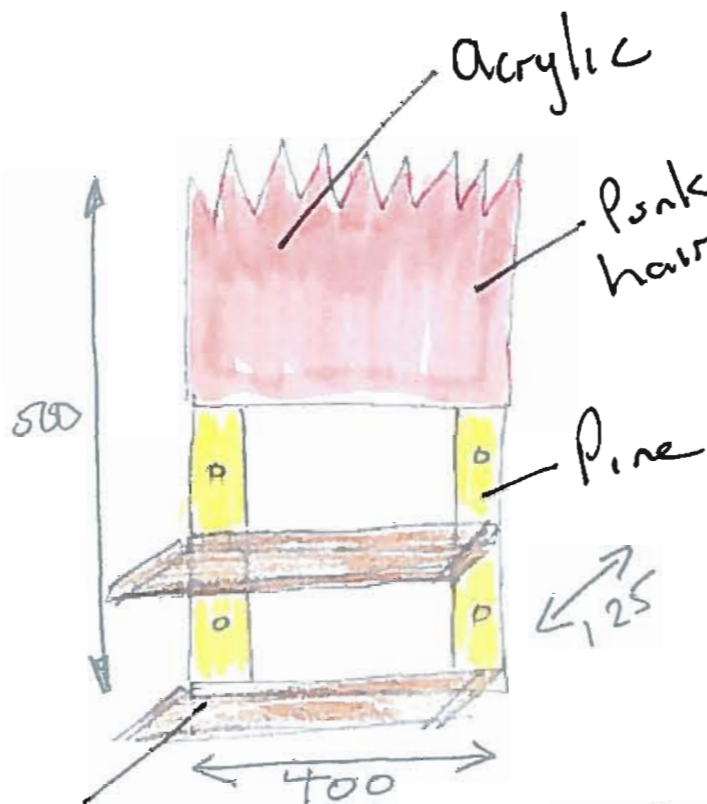


Corner Rebate They are stronger than Butt joints and are simple to make.

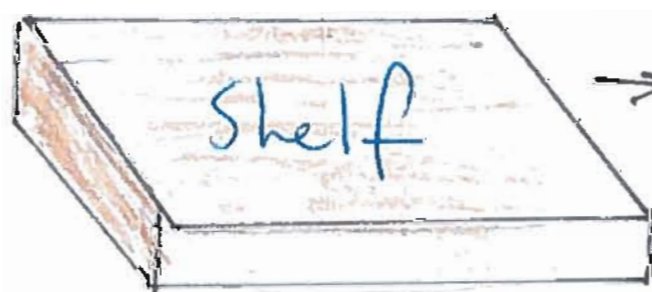
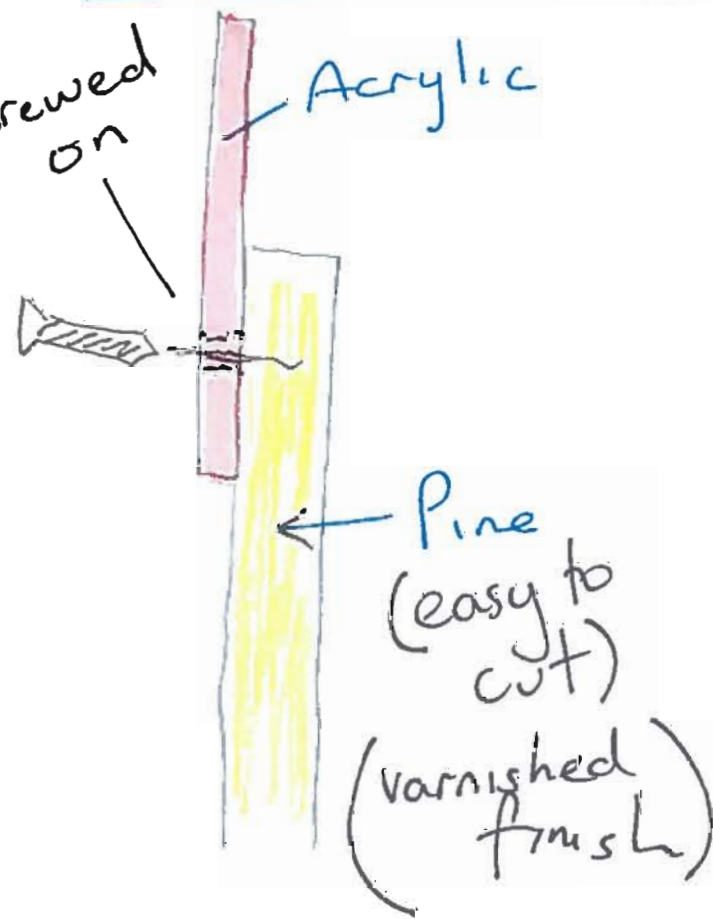


Through Housing Joint These are good for fitting shelves and partitions

Aesthetics



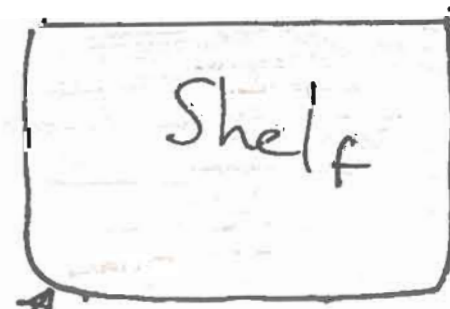
Mahogany (looks good, durable)



Shelves are jointed using a housing joint (Strong)



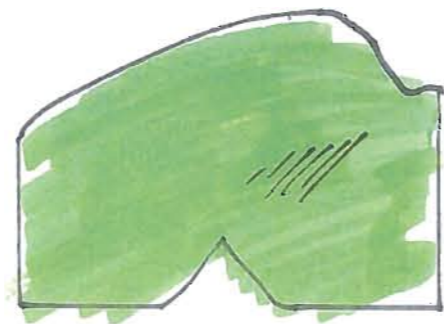
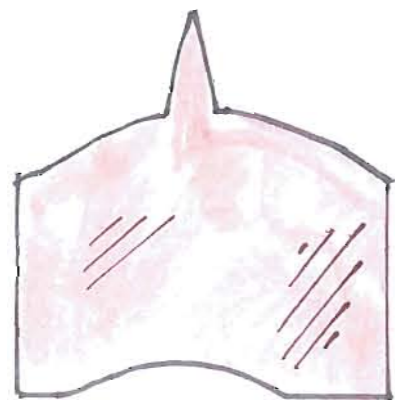
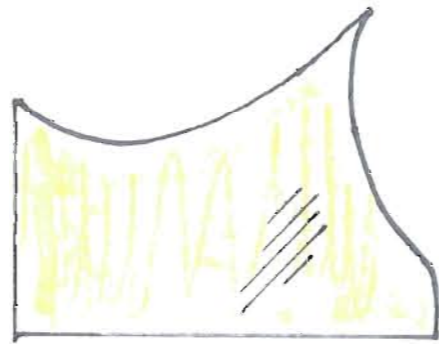
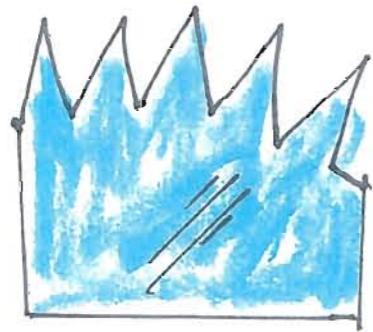
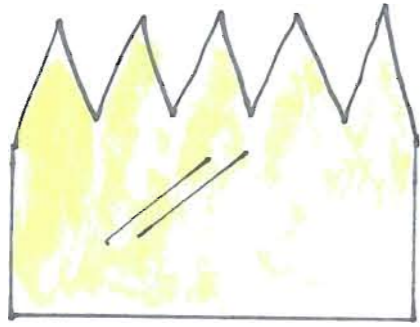
Holes are drilled to join to wall



Rounded for Safer

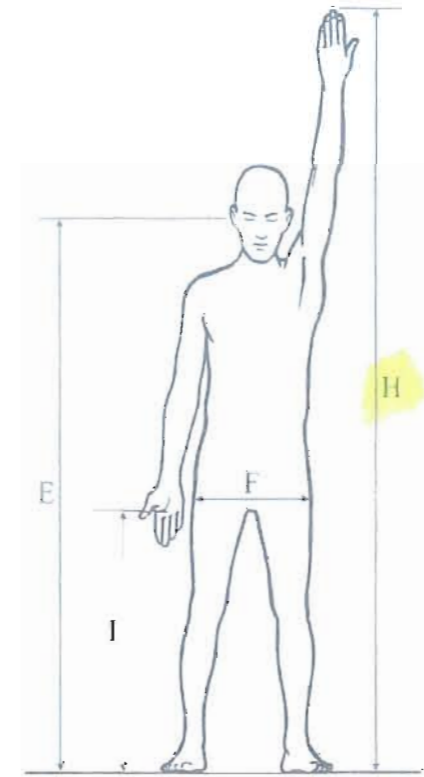
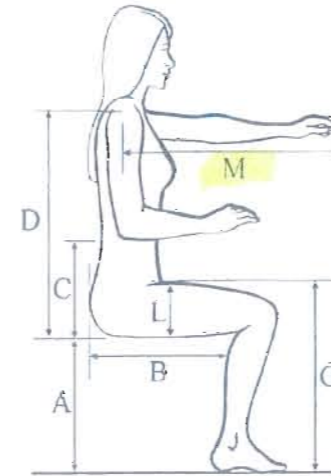
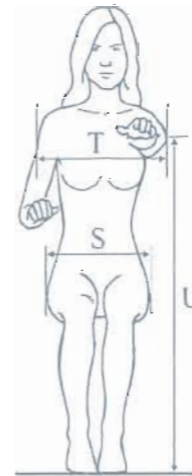
DEVELOPMENTS

Hairstyles



Bright colours to be used to make an exciting colour ~~skeme~~ scheme for punk shelves.

ERGONOMICS

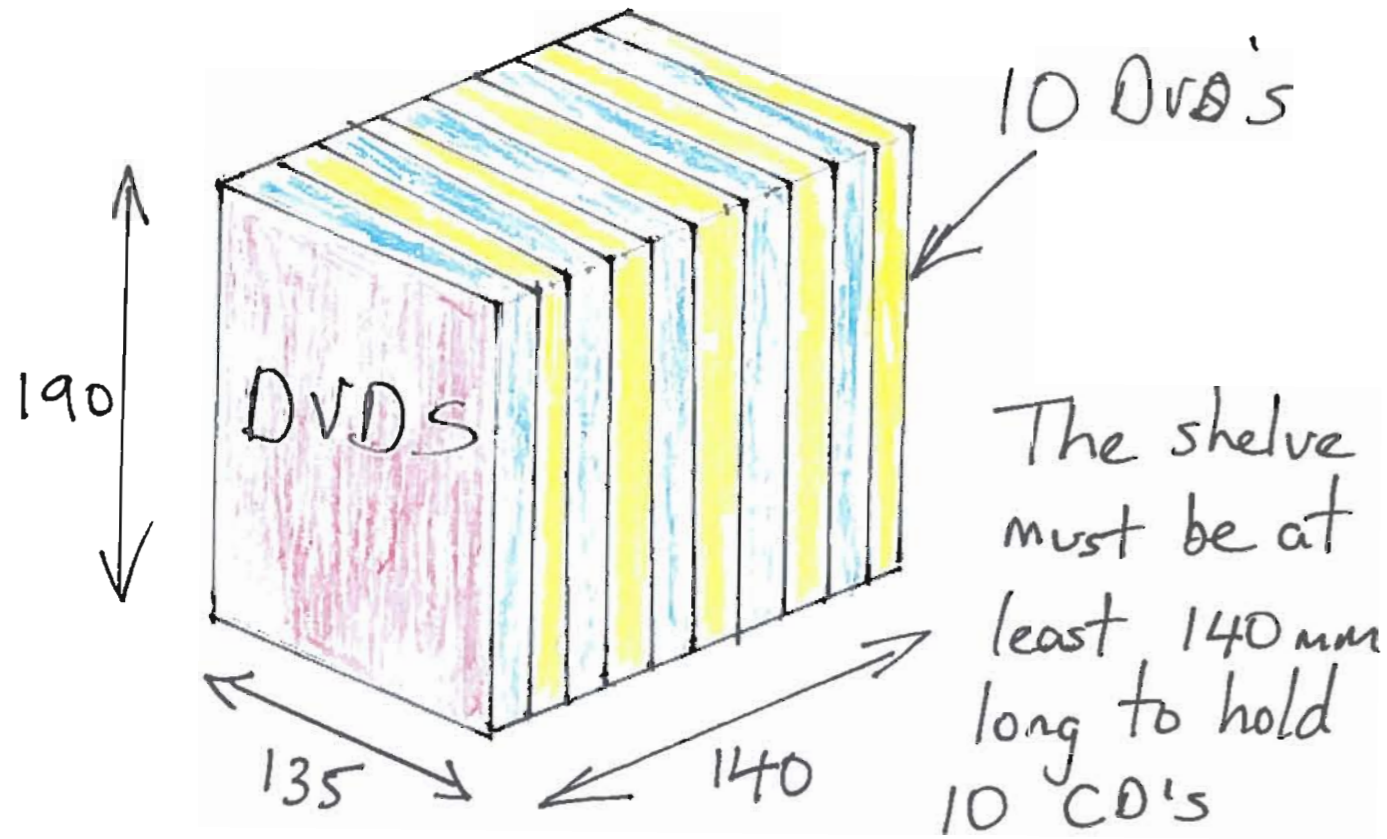


Percentile	Adults 18-64		
	5th	50th	95th
A (mm)	370	410	450
B (mm)	444	493	537
C (mm)	194	236	269
D (mm)	546	606	666
E (mm)	1436	1573	1698
F (mm)	346	393	466
G (mm)	476	531	578
H (mm)	1975	2150	2330
I (mm)	670	725	780
J (mm)	14	17	20
K (mm)	11	14	16
L (mm)	135	160	185
M (mm)	720	780	840
N (mm)	41	47	54
P (mm)	45	54	62
R (mm)	90	100	110
S (mm)	340	400	460
T (mm)	440	480	520
U (mm)	820	930	1040

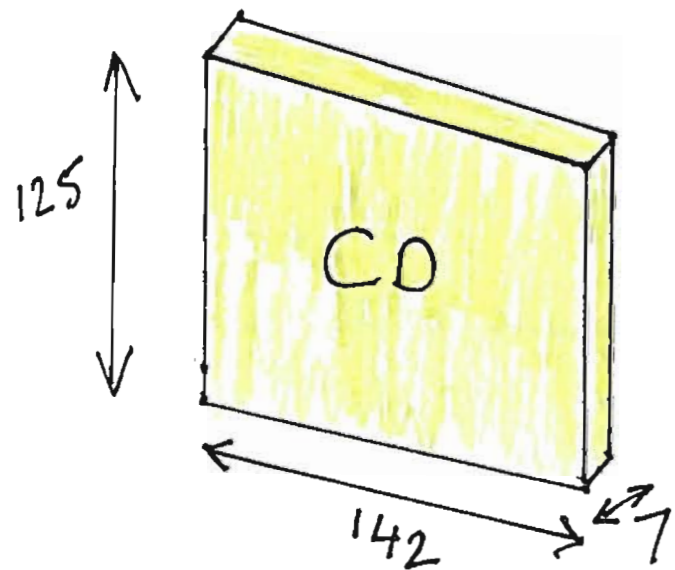
• Anthropometrics is about making things the correct sizes for people.

It is important that the shelf is not too big to use so I have considered the H and M sizes in my design.

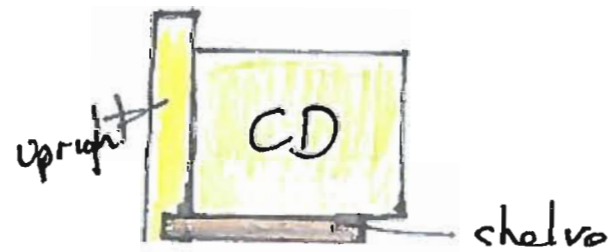
DEVELOPMENTS



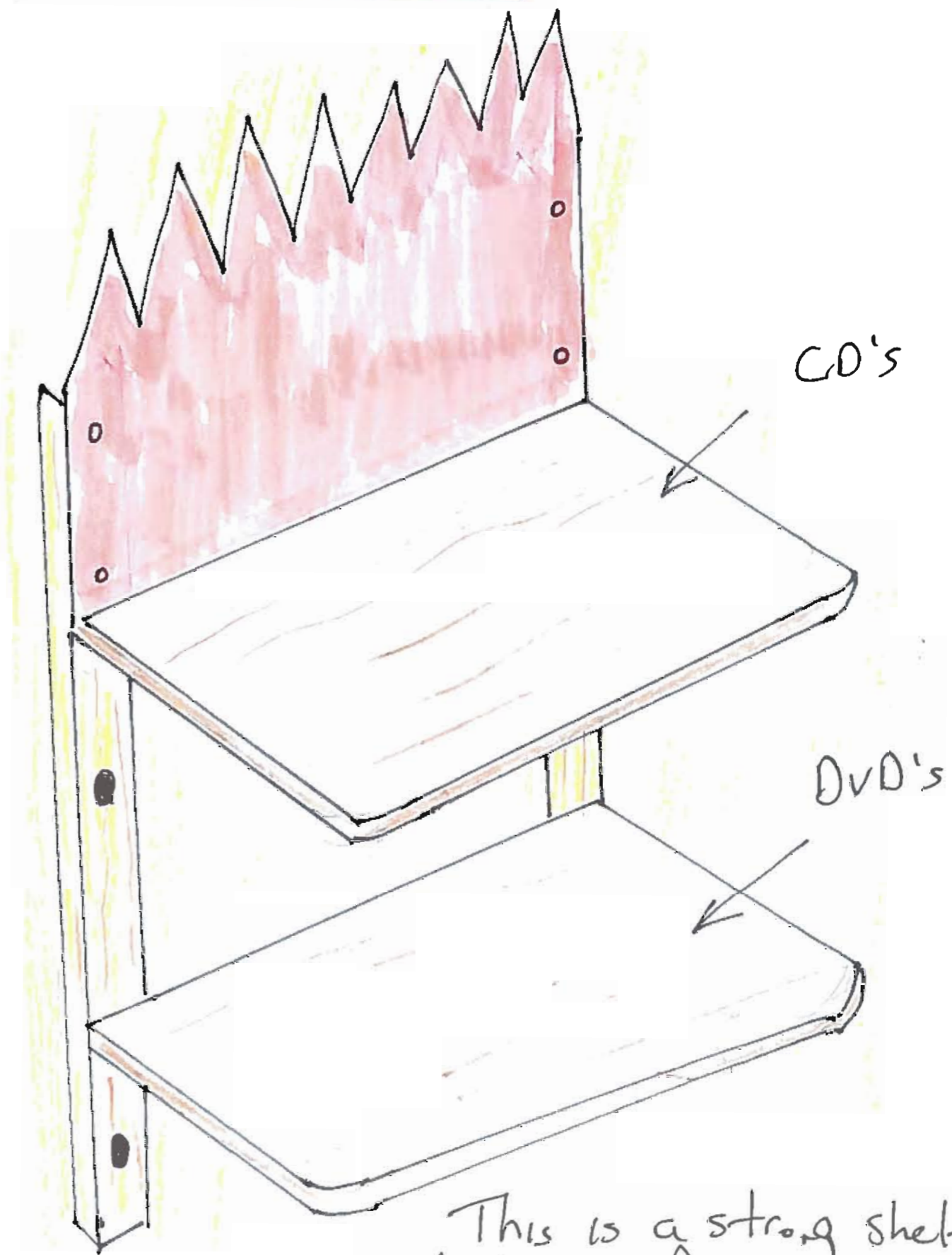
The gap between the shelves must be at least 200mm to allow the DVD's to fit



The shelf must be big enough to store 10 CD's



Finished Model



This is a strong shelf which can fit on a wall and hold lots of CD's and DVD's

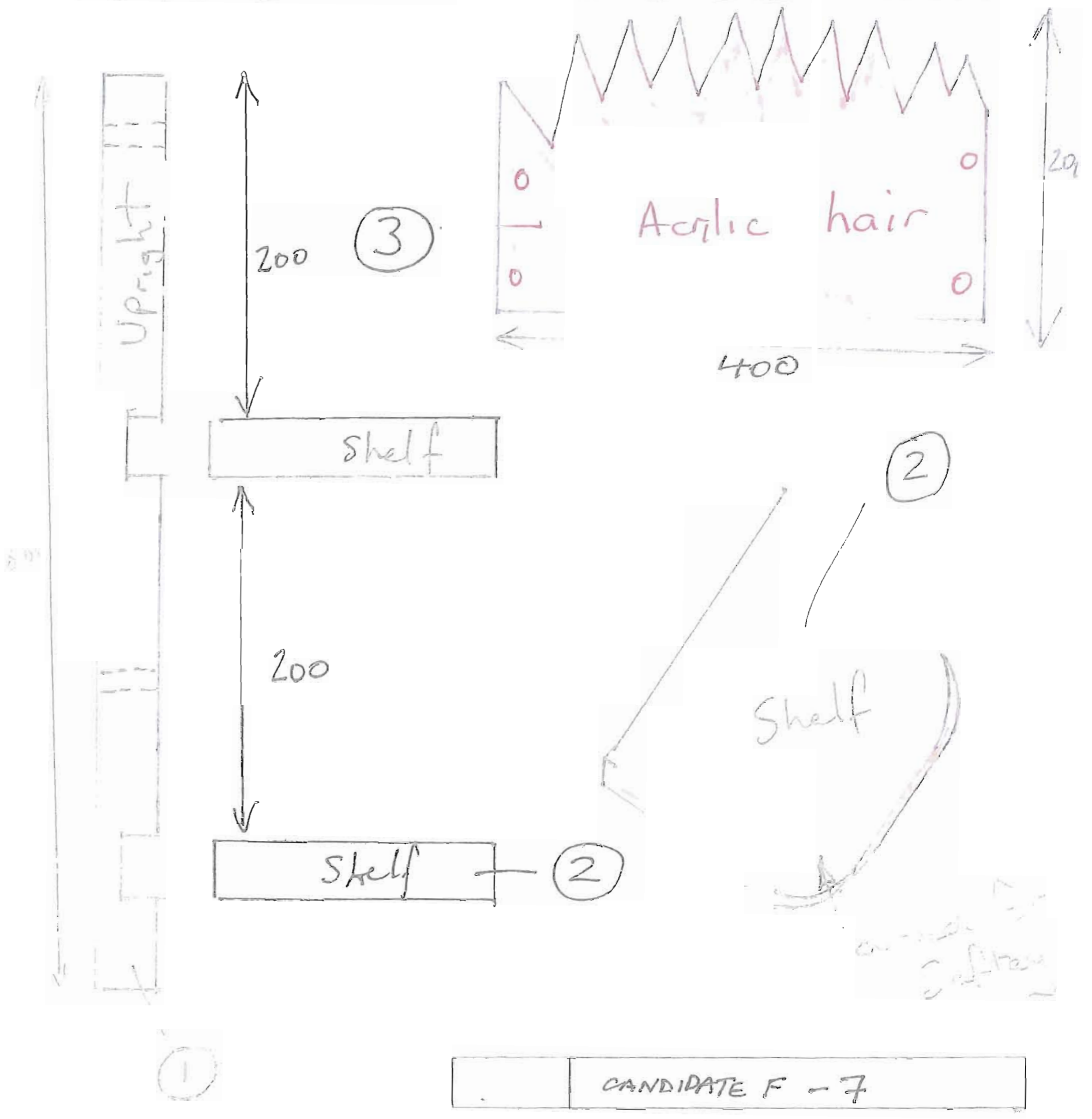
WORKING DRAWING/SKETCH

SEQUENCE OF OPERATIONS

STAGE	OPERATION	TOOLS/EQUIPMENT
1	Mark out upright	Try Square, Pencil, Ruler
2	Cut Joints	Saw, Chisel
3	Cut hairstyle	Saw
4	Polish Acrylic	metal polish
5	Drill holes	Drilling machine
6	Assemble	Glue/Clamps
7	Apply finish	Varnish/Wax

CUTTING LIST

PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
1	Acrylic	2	500	40	19
2	Acrylic	1	400	150	1



Candidate G

Notes to candidates

Before you start the research you should have read the instructions for candidates and be familiar with:

- the brief
- the skills you have to demonstrate
- the type of evidence you have to provide

You should speak to your teacher or lecturer if you are unsure about the areas above.

Research

The company has carried out research and identified a few requirements for the shelf. You should gather further information to ensure the proposal is suitable for the company and the teenagers you know.

You should record your research information on this sheet (you can use both sides).

You should use findings from your research to complete the specification below.

A small shelf – specification

The shelf must:

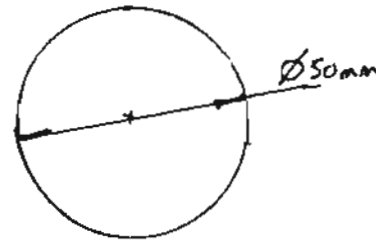
- demonstrate a high level of craftsmanship
- cost no more than £5 to make
- hold deoderant cans of 165mm height
- hold deoderant cans of 50mm diameter
- hold 3 deoderant cans
- be wall mounted
- be no bigger than 500mm x 400mm x 15mm
- use music as a theme
- feature contrasting colour
- have a simple design
- use mostly straight lines

RESEARCH FINDINGS – You may use the other side of this sheet

Things I need to research:

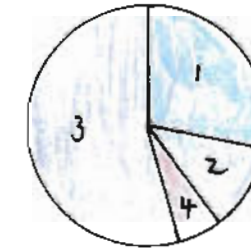
- The sizes of the object (deoderant cans) that my shelf design will hold. → measure
- The number of items it will hold. → ask questions
- Where it is likely to be used by teenagers. → ask questions
- If teenagers have any preferences about how it looks → ask questions
- If it should have any secondary functions → ask questions
- What performance requirements should the shelf have? (What is most likely to break it?) → observations
- How much teenagers would pay for something like this? → ask questions

MEASURING

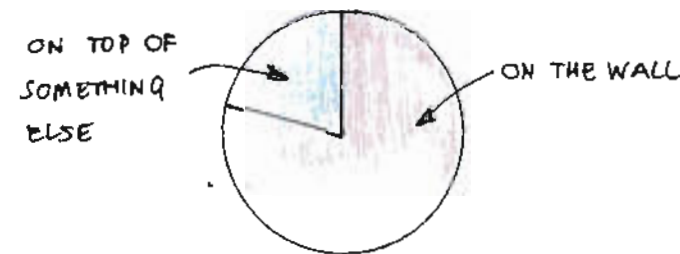


ASKING QUESTIONS

HOW MANY DIFFERENT VARIETIES OF DEODERANT DO YOU NORMALLY HAVE AT THE ONE TIME?



WHERE WOULD YOU PREFER THE SHELF TO BE KEPT/STORED?



The majority of people I asked usually have 3 different varieties of deoderant that they use.

I will design the shelf to hold at least 3 cans.

I asked where the shelf would be best stored.

The most popular response was mounted on the wall. This wasn't the majority though. I am still going to wall mount so it is out of the way.

More questions and answers on the back of this sheet.

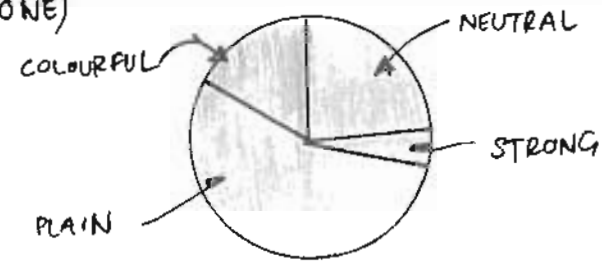
Most cans that I measured were less than 50mm diameter. Since this is the type I use then I will design it for this and most cans will fit.

NAME CANDIDATE G - 1a

ASKING QUESTIONS (cont.)

I tried to ask some questions to see if there was a preferred style amongst teenagers.

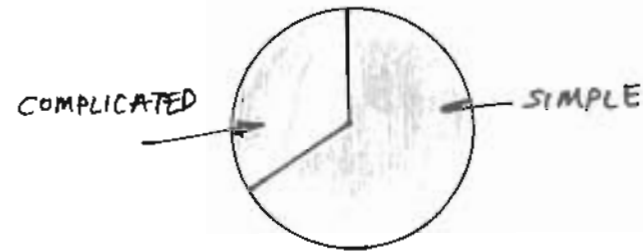
WHICH TYPE OF COLOUR COMBINATIONS DO YOU PREFER? (YOU CAN CHOOSE MORE THAN ONE)



The teenagers I asked seemed to prefer contrasting colours.

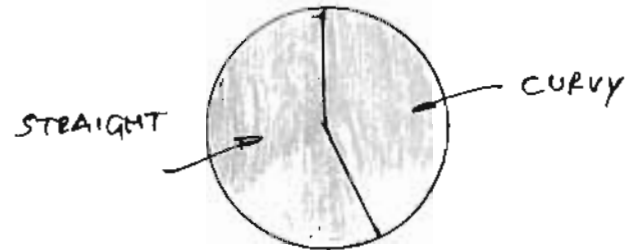
My design should therefore feature some contrast.

DO YOU PREFER SIMPLE OR COMPLICATED DESIGN?



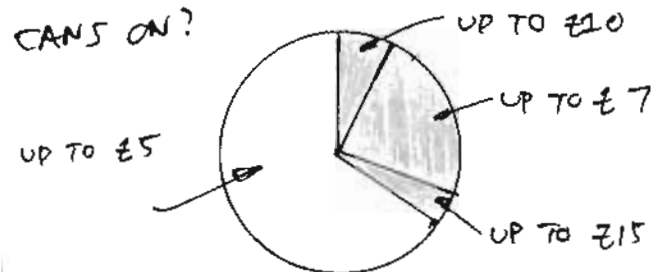
The look of the design should be simple.

WOULD YOU PREFER CURVY OR STRAIGHT DESIGN?



I asked if teenagers would like to see curvy or straight lines/shapes in the design. Most said straight which fits in with the answers to the previous question.

HOW MUCH WOULD YOU PAY FOR A SHELF TO STORE YOUR DEODORANT CANS ON?

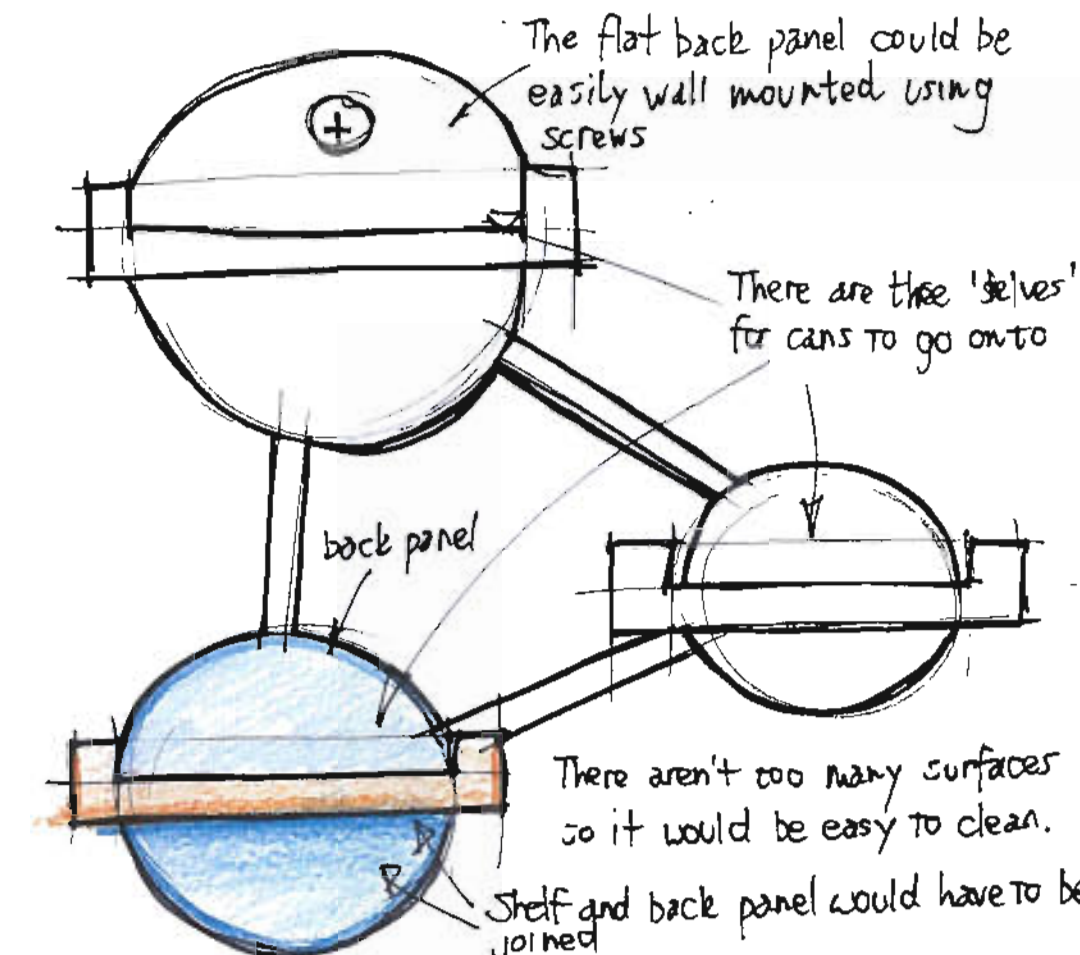


It is clear from this question that very few people wanted to spend more than £5 on a product like this.

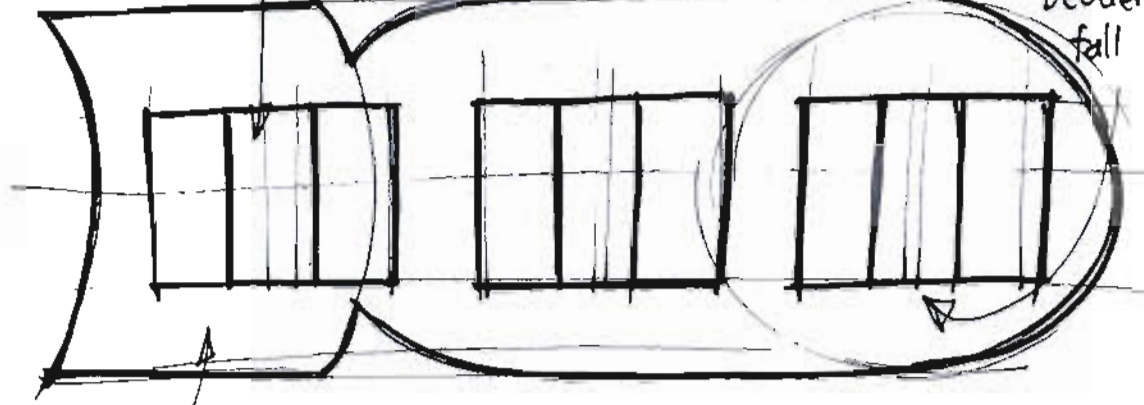
It should cost less than £5 to make so a profit can be made.

INITIAL IDEAS

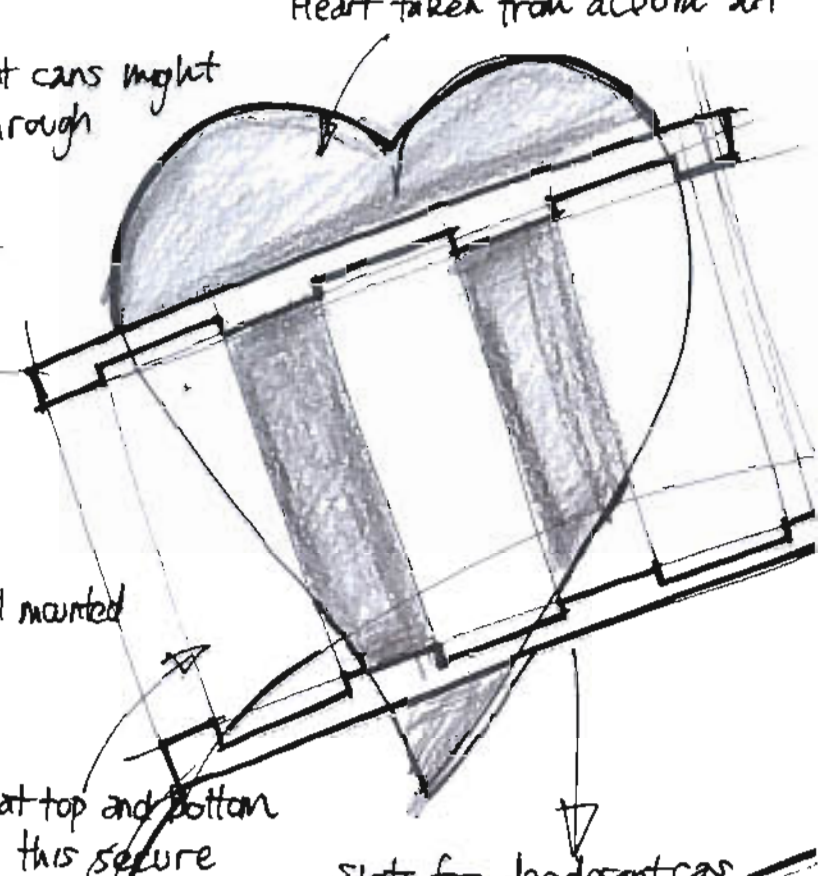
From my morphological analysis table (seperate)



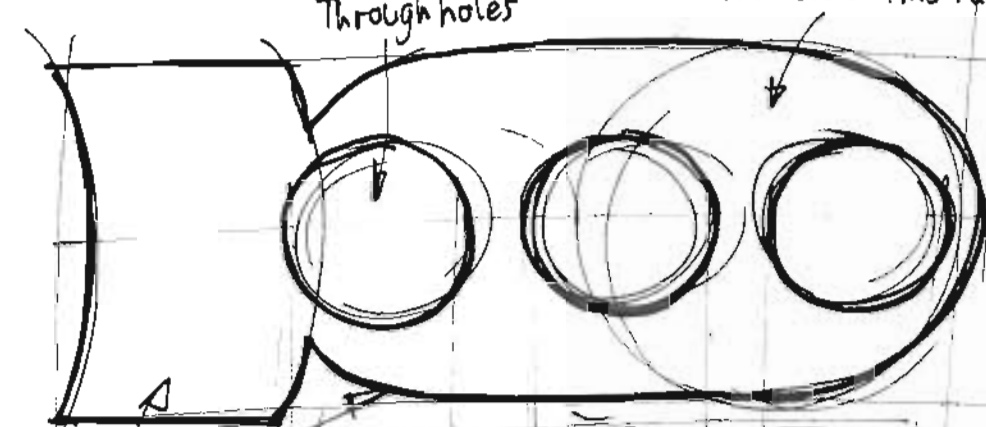
Clips could be bought in as a standard component



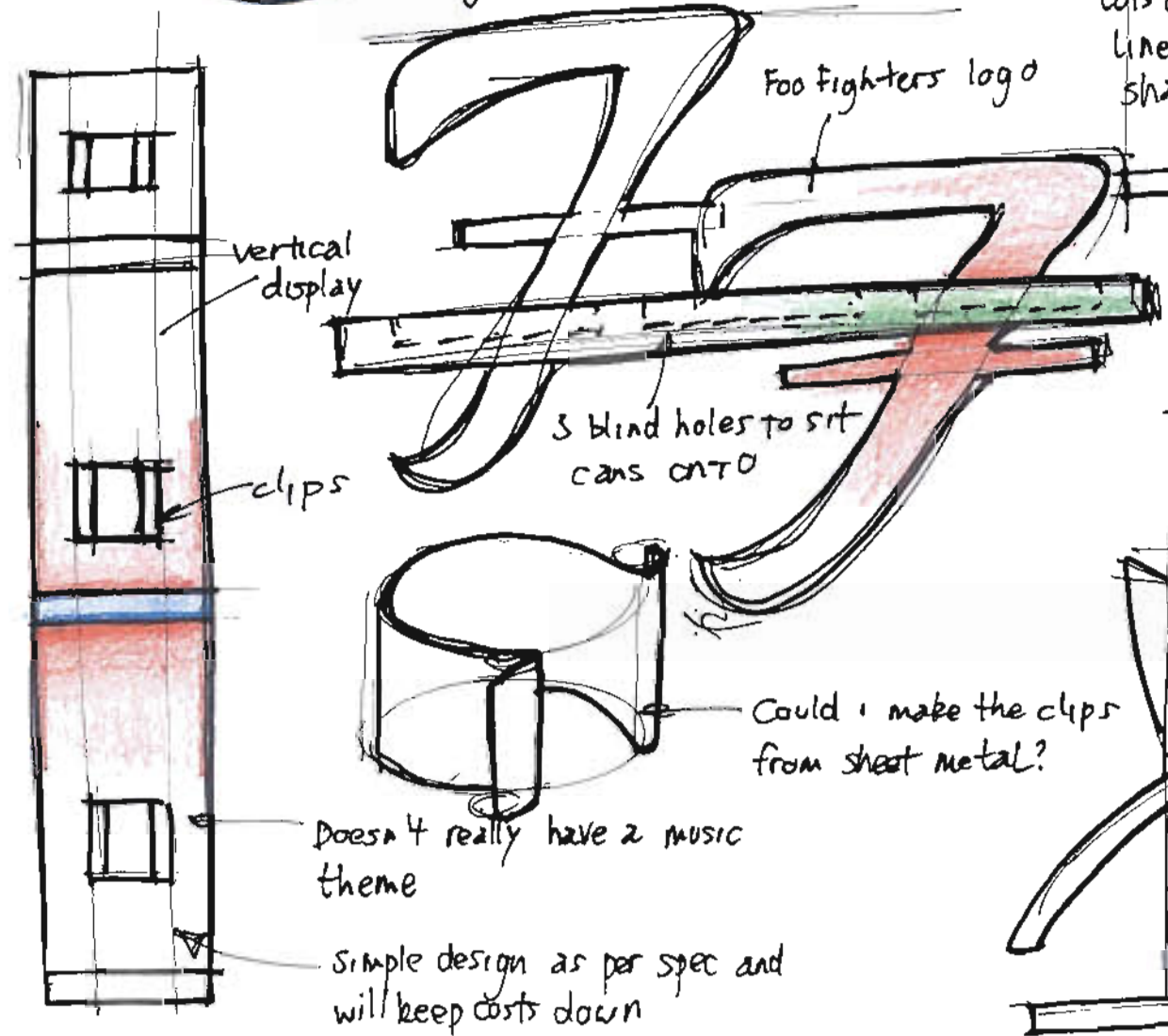
Deodorant cans might fall through



This is a shape from the album art combined with clips.

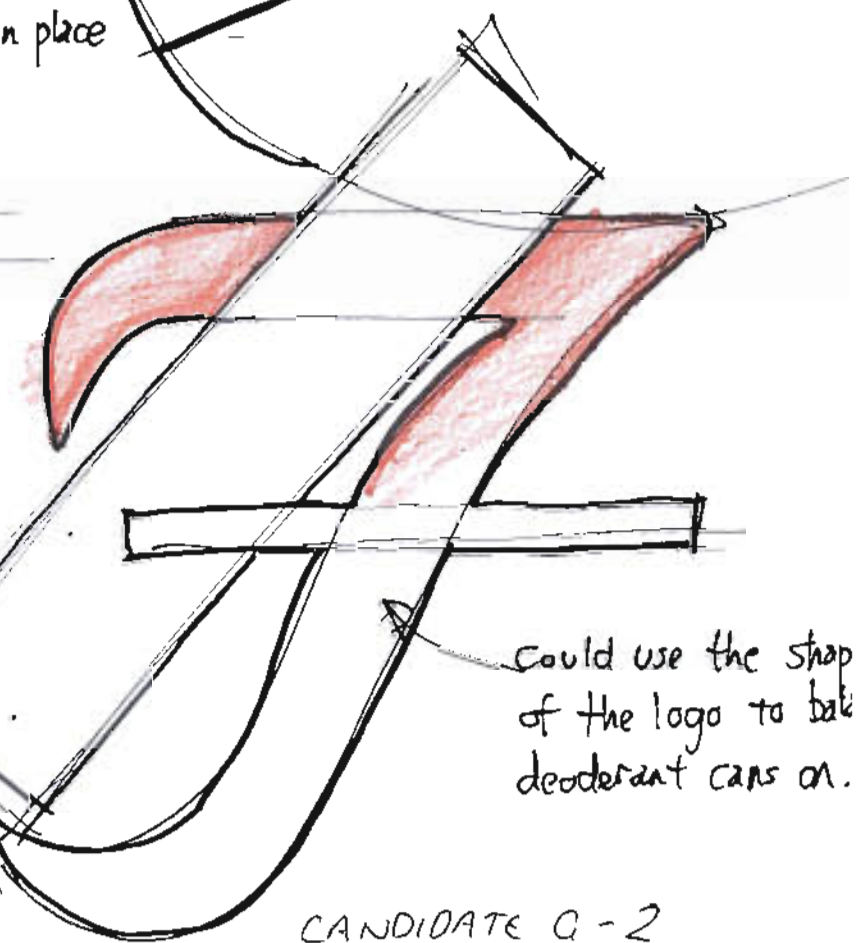
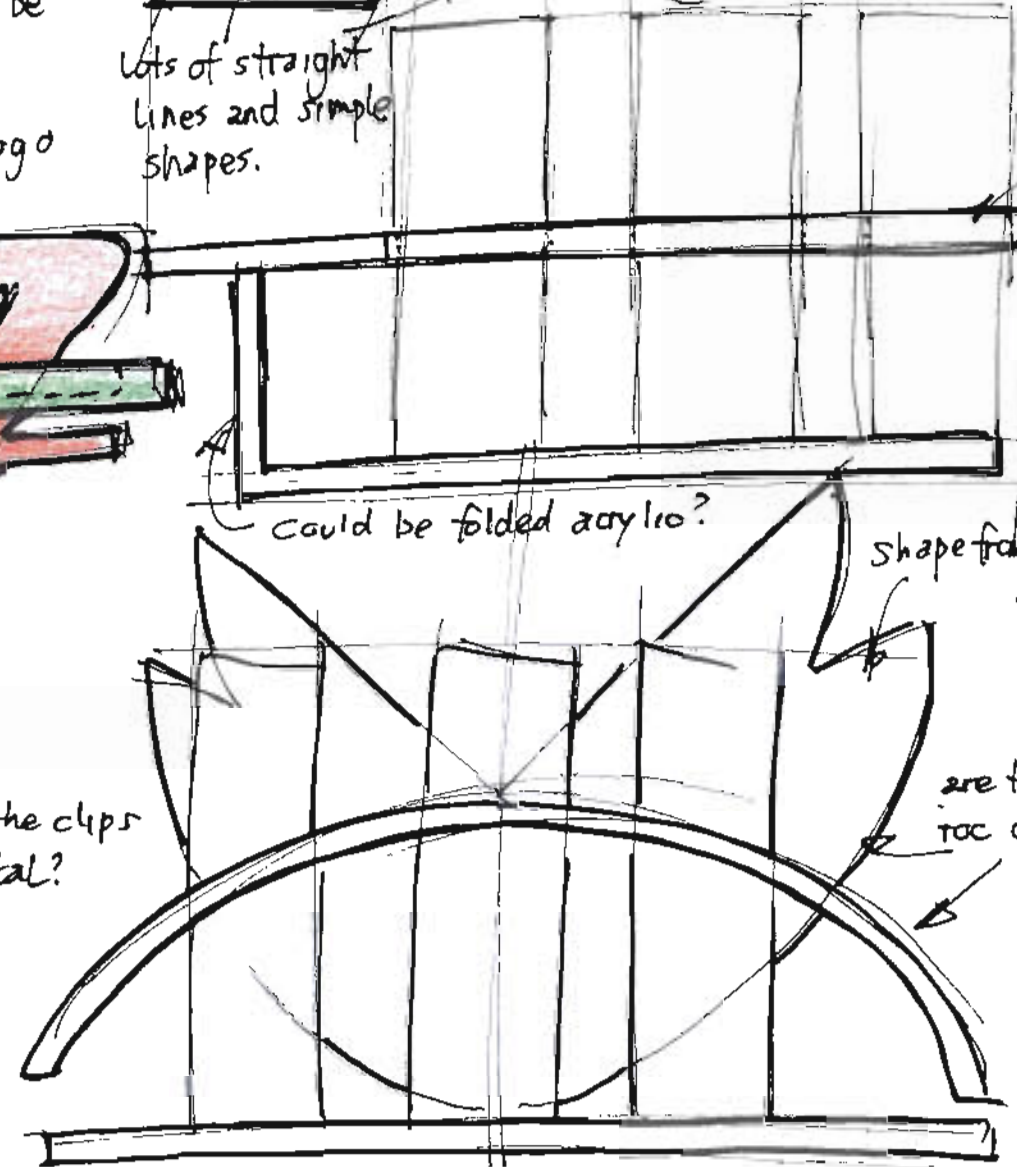


Slots at top and bottom make this secure



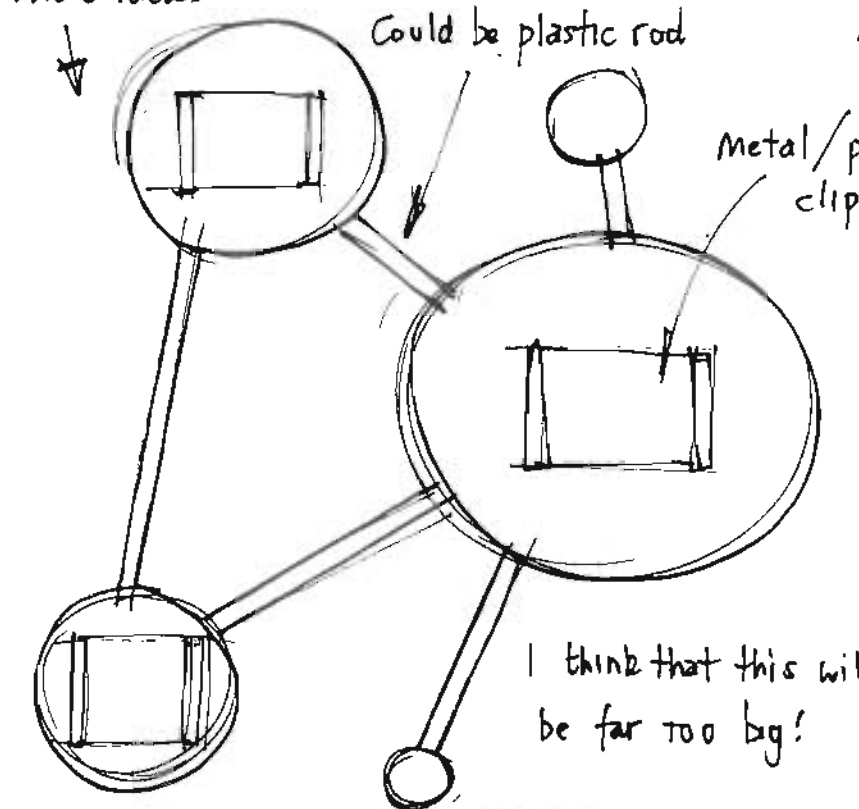
Deodorant can has hole and base to hold it in place

lots of straight lines and simple shapes.



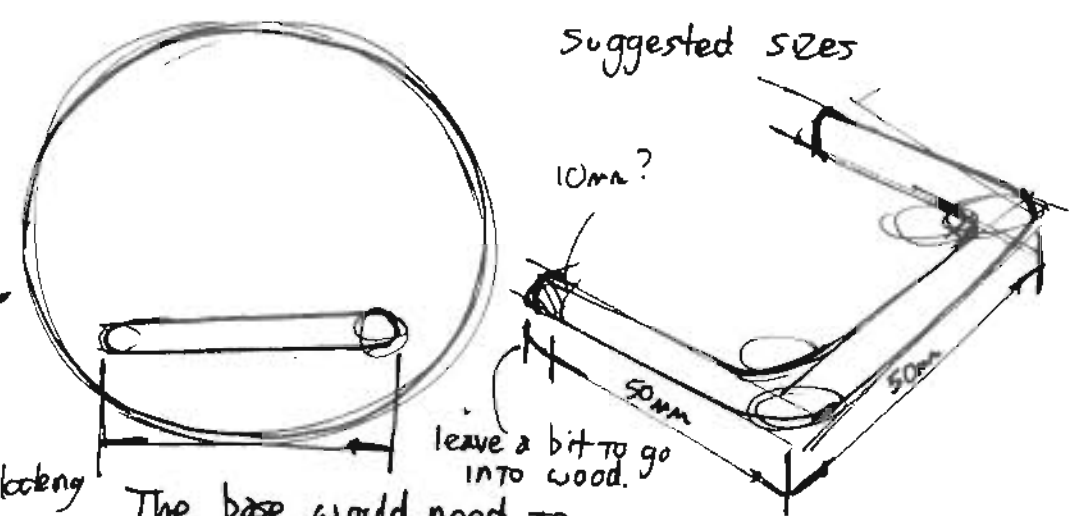
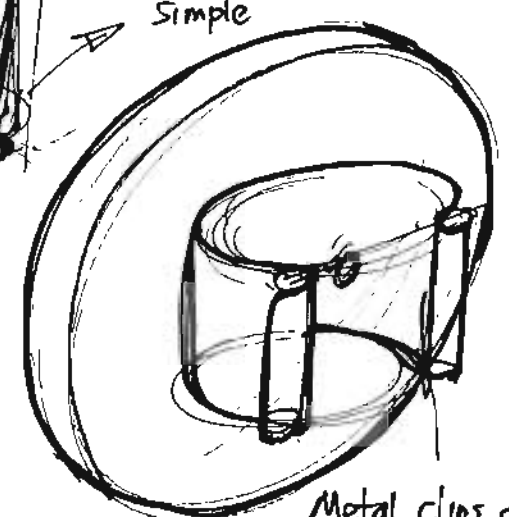
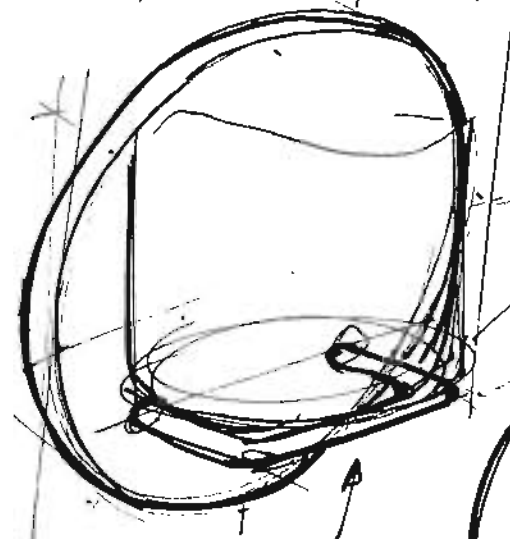
MUSIC THEME SHELF

More ideas



I am going to further explore this idea.

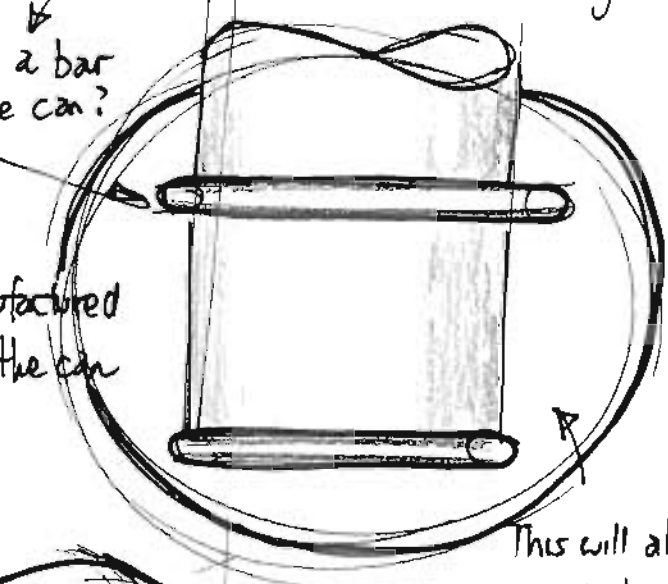
First, look at ways to hold the cans



The base would need to be at least 50mm long.

Would this be secure enough?

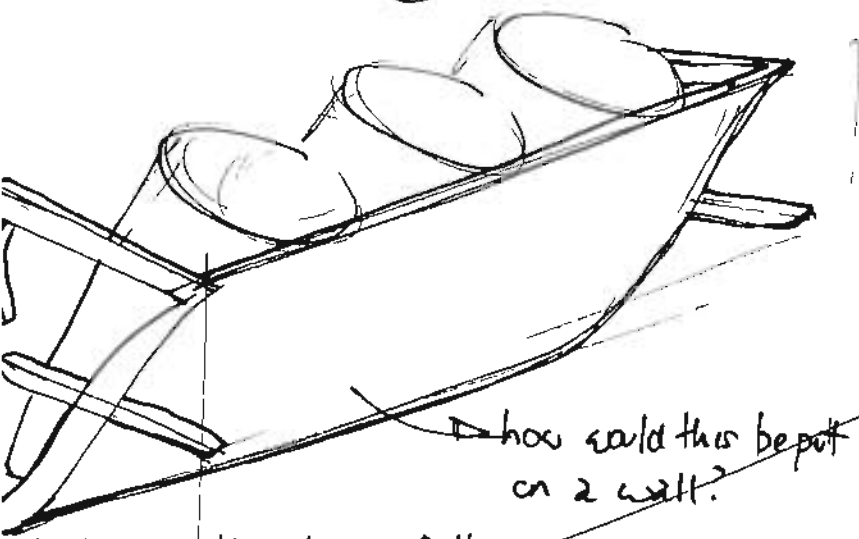
Could add a bar around the can?



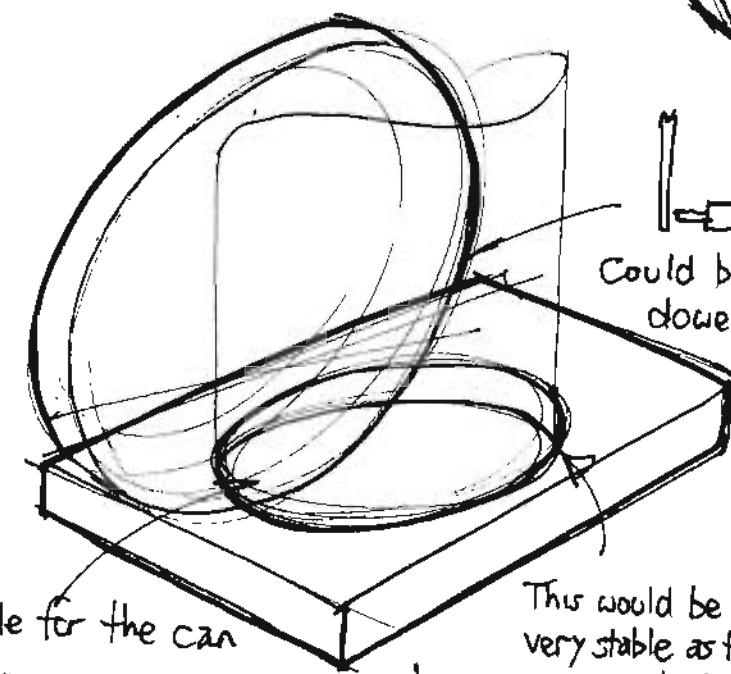
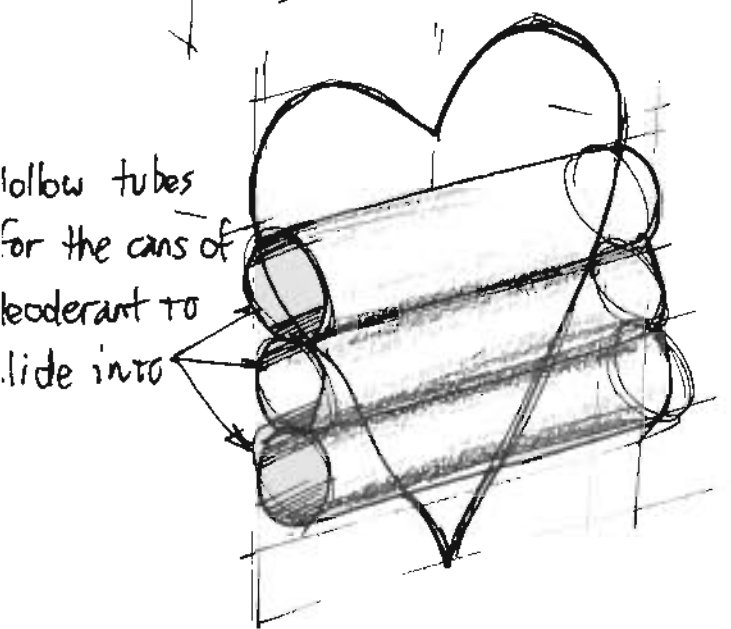
This is quite a simple design that would allow the can to be seen.

There are only 3 parts for each can holder.

These parts could be made from acrylic rod and heated and formed around something round.

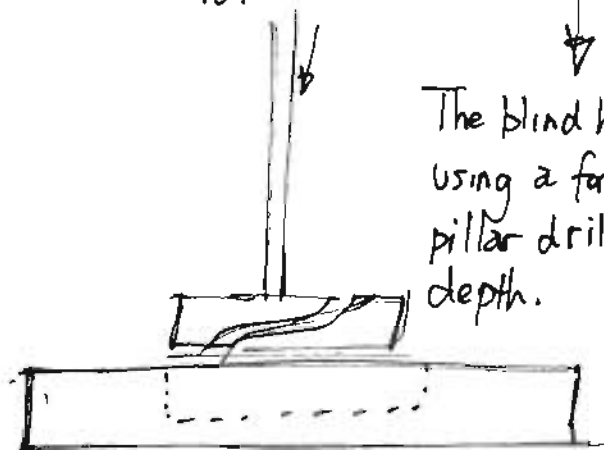


using the shape of the logo to hold up cans



This part would just be a circle cut out of wood. This could let holes be drilled for the holders.

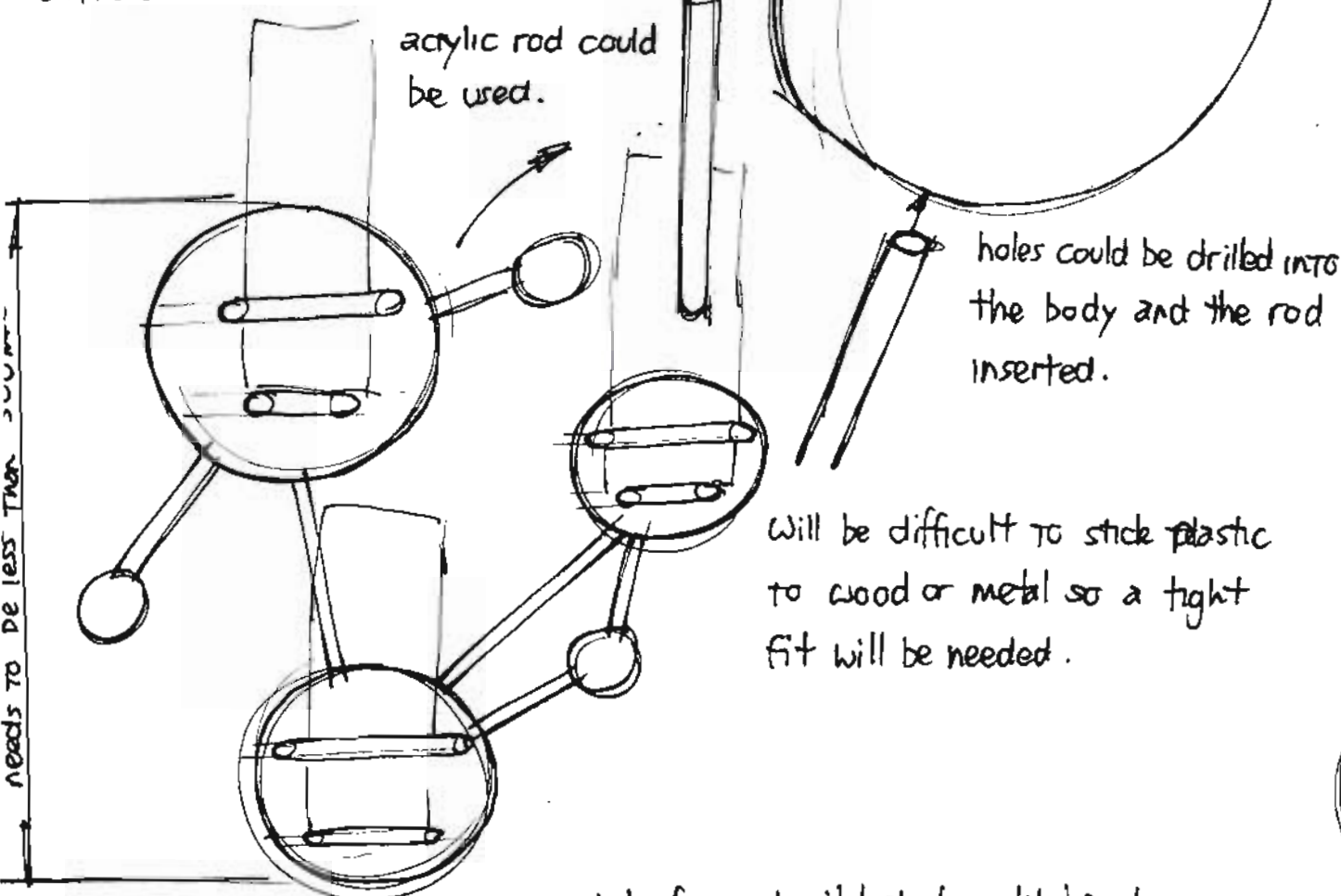
The blind hole could be made using a forstner bit with the pillar drill set to the correct depth.



This would be a fast and simple process.

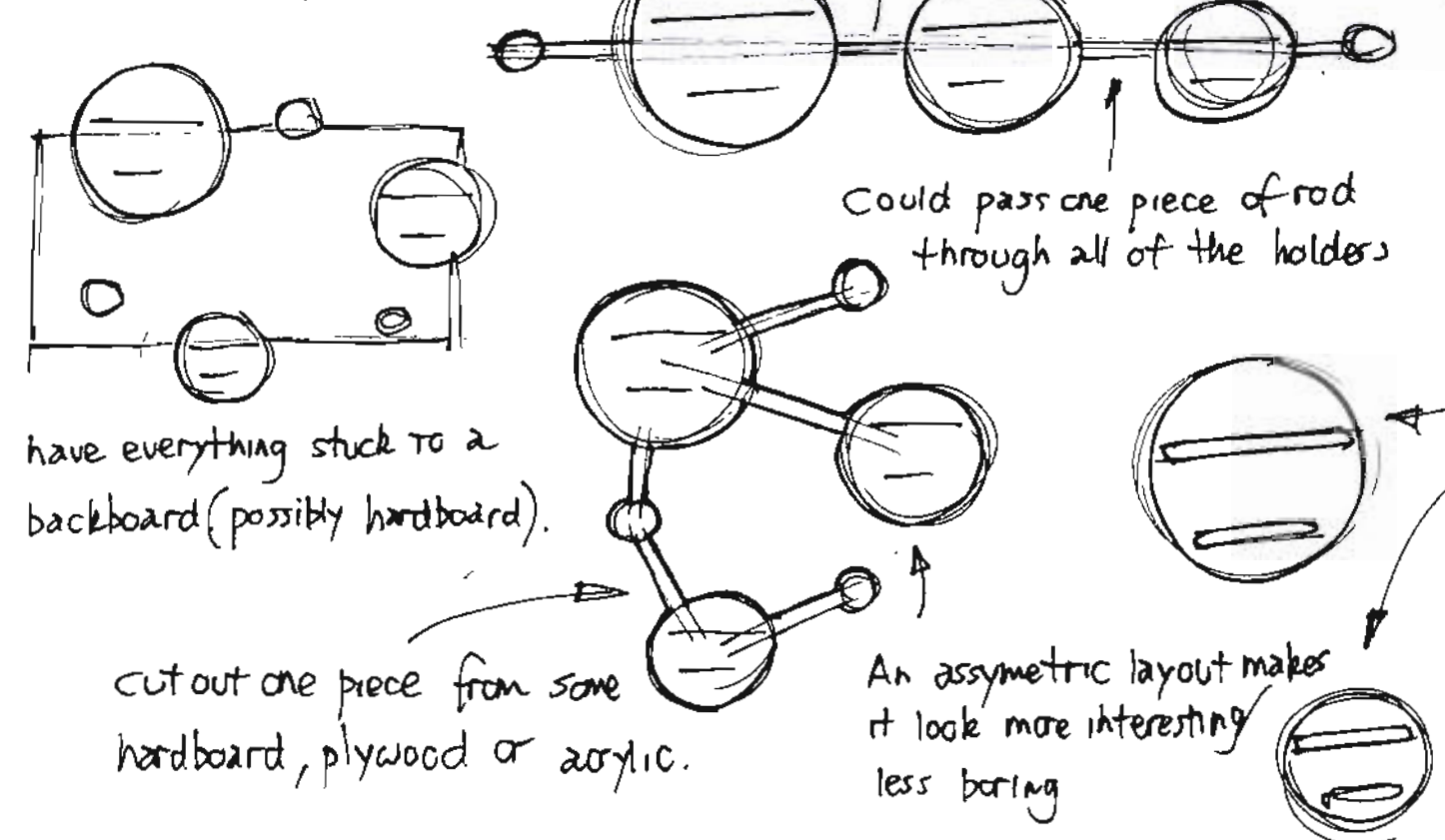
MUSIC THEMED SHELF

Explore ways to 'connect' the different holders.

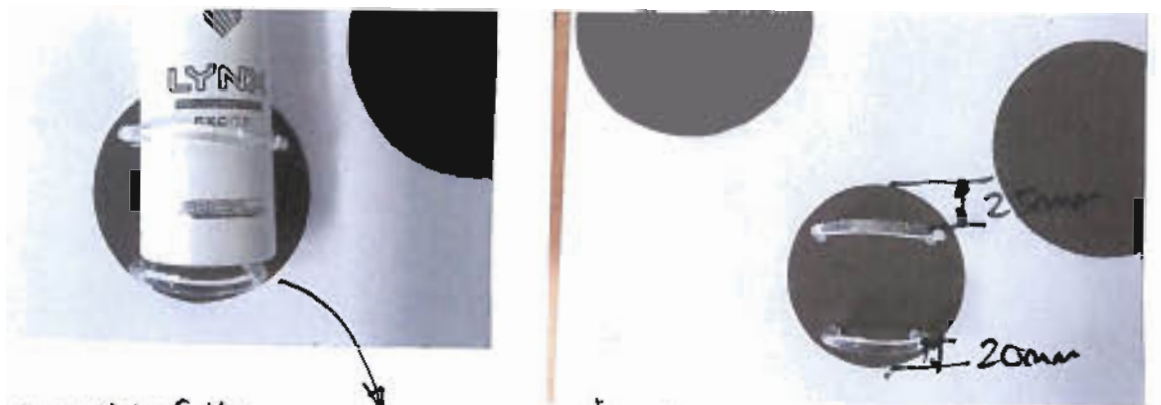


one bit of round mild steel might be cheaper

other ways.

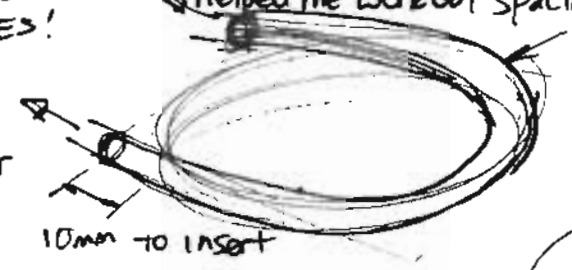
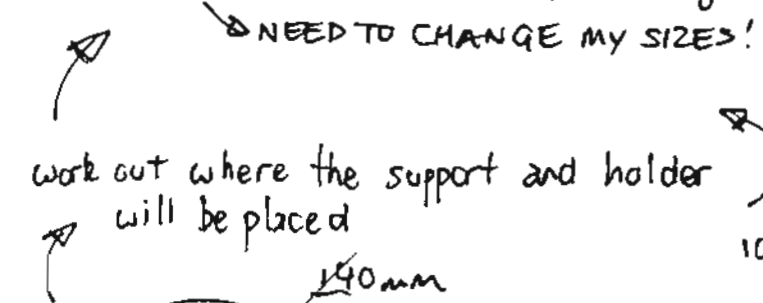


I made a model of the base using my suggested sizes. it was too big and the can fell through

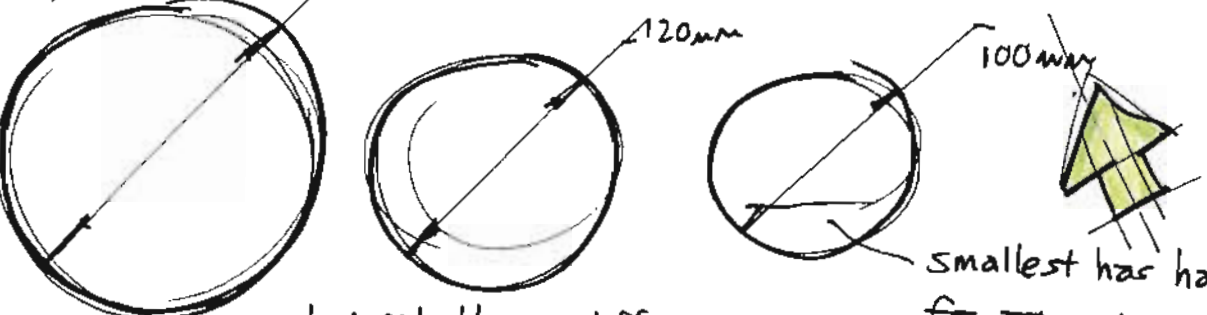


Changed the size of the base to a 40mm diameter

These models are to scale and helped me work out spacing



Going to use the same positioning for all sizes of holders



I want three different size holders for contrast.



I'm going to model to work out the sizes of the holders then decide how they will connect.

They could all be separate and the user could wall mount them.



60mm diameter was too small



100mm
140mm
180mm

100mm
120mm
140mm

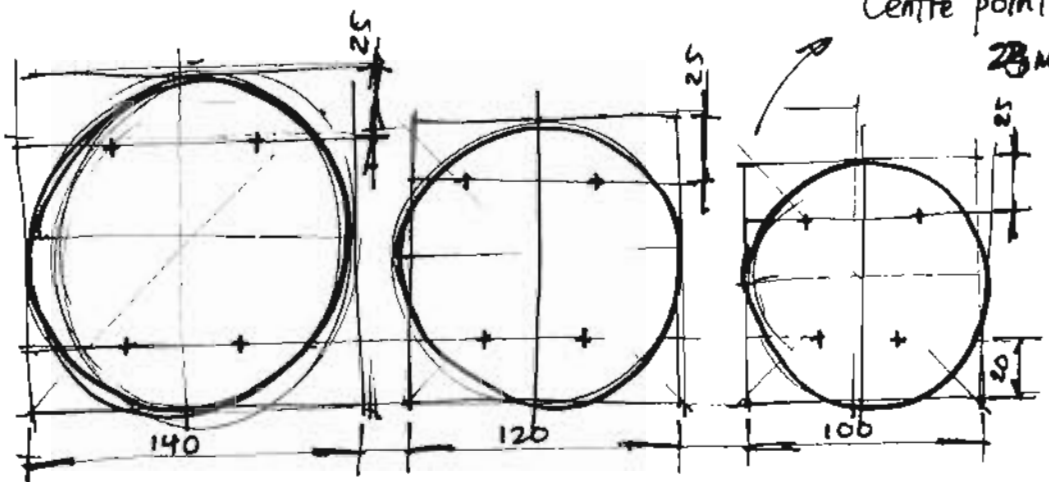
I tried different increases. I prefer the right sizes for the holders.



MUSIC THEMED SHELF

Going to finalise sizes and positioning of holders on holder circles.

Best to start with a square which has the same length sides as the diameter.

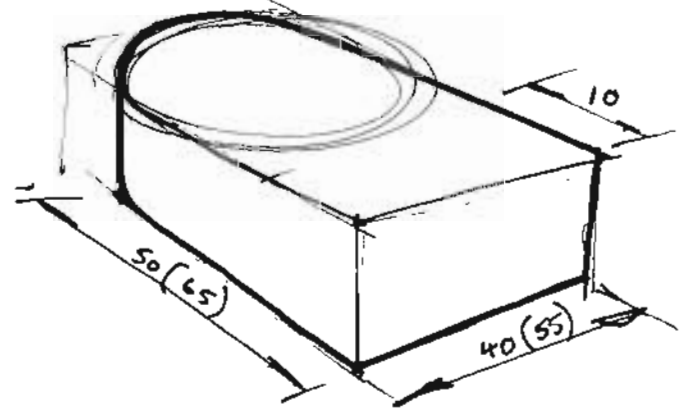


Centre points will be 25mm & 30mm either side of the vertical centre.

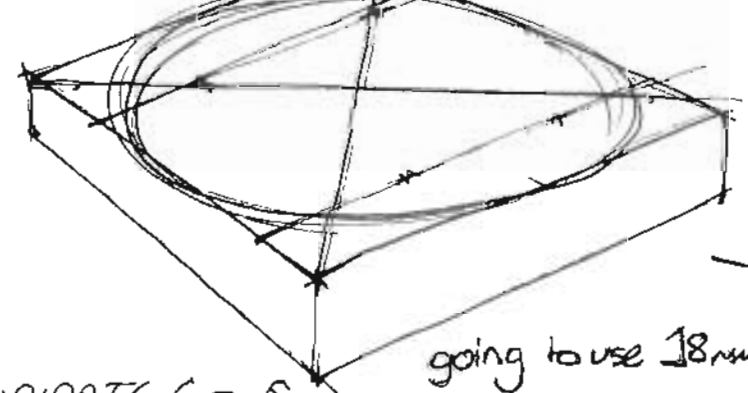
To 1/2 scale.

Using 6mm acrylic rod because it can be heated and bent easily. Would also be strong enough to support the weight

This former will be needed to bend the rod.



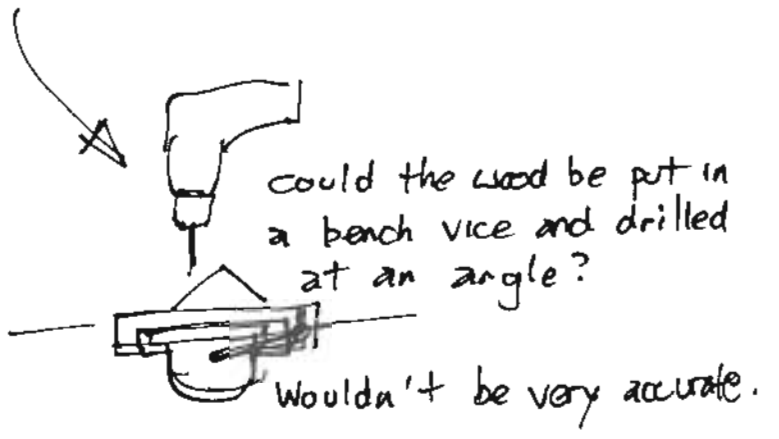
All the holes and circle will need marked onto the square piece of wood before shaping it.



CANDIDATE G-5

I will have to explore the best way to have each of the circle parts connected
 → acrylic rod?
 → plywood/pieces of plywood?

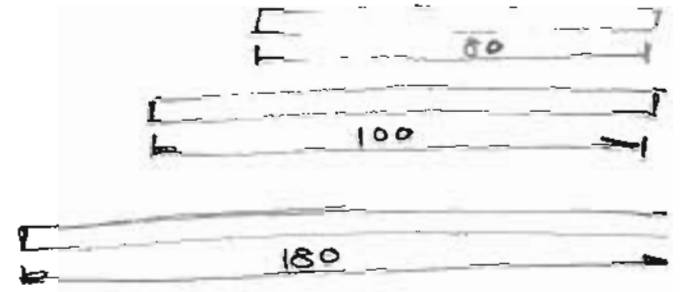
mark drilling angle onto the raw material at the very start.



This is the scale model with the ply strips added in. I think I would them to be longer.



going to try 10mm strip of ply those lengths.



I think that this would be the most simple and secure method.

strips of ply could be painted.

Going to try and use the angles of a 30/60 set square to position the main holders.

I like the random positioning of these parts but they will be very difficult to connect with rods because of the angle.

This would be too close or would force the smaller one further away.

Can't have too many parts cause the spec says it has to be simple

MATERIAL FOR CIRCLE PIECES?

To create the colour contrast in the spec I am going to paint the circle. I am going to use 18mm MDF. This will be thick enough to insert the rod.

Plywood can be painted easily get contrasting colour.

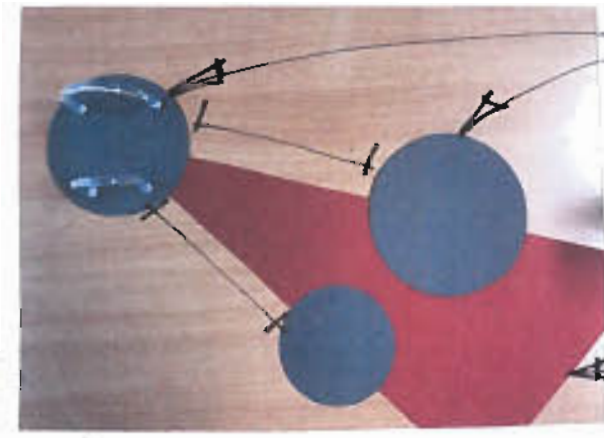
Could use thin strips of plywood stuck behind each of the circles. This would allow small circles like the album artwork.

could cut a piece of thin plywood and paint it and stick the other bits on with PVA.

MUSIC THEMED SHELF

I think better contrast will be created if a simple triangle is used in the background.

I used the sizes of the set square to start with



I think these are too far away. It looks too spaced out.

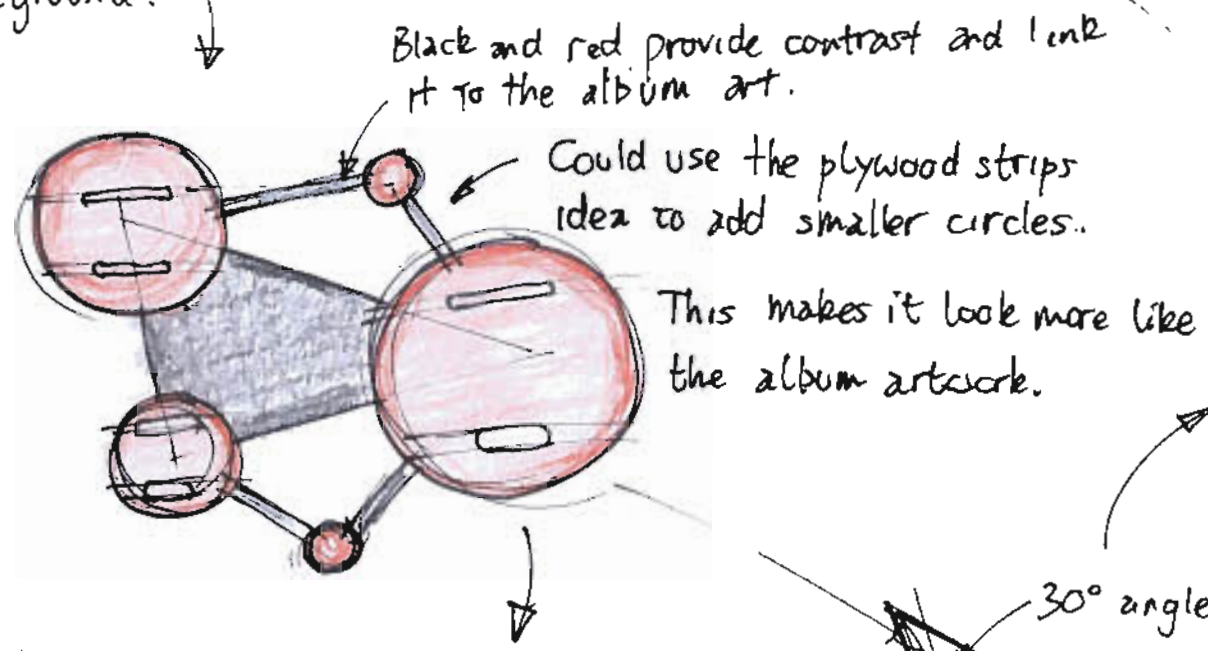


These models helped me to calculate spacings and angles.

moved the circles closer and checked to see if there was still room to put the can in.

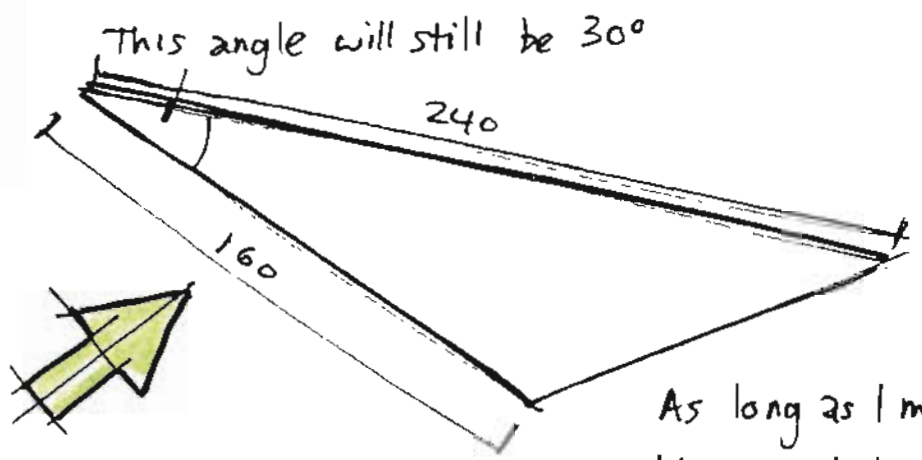
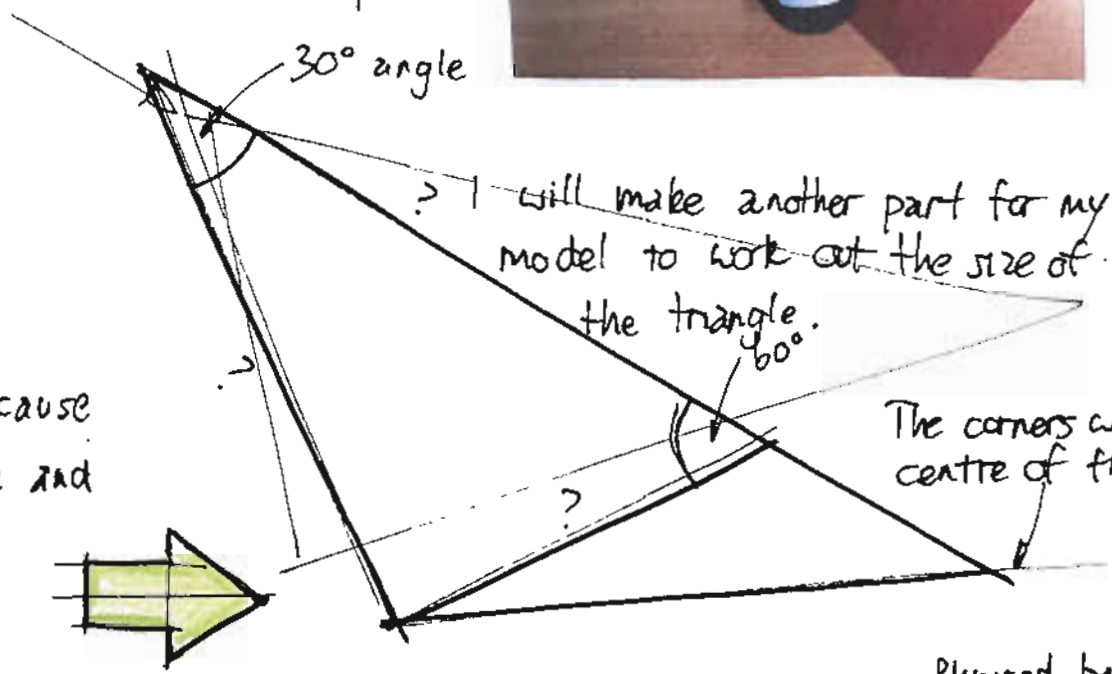


there is still clearance and room for the can.



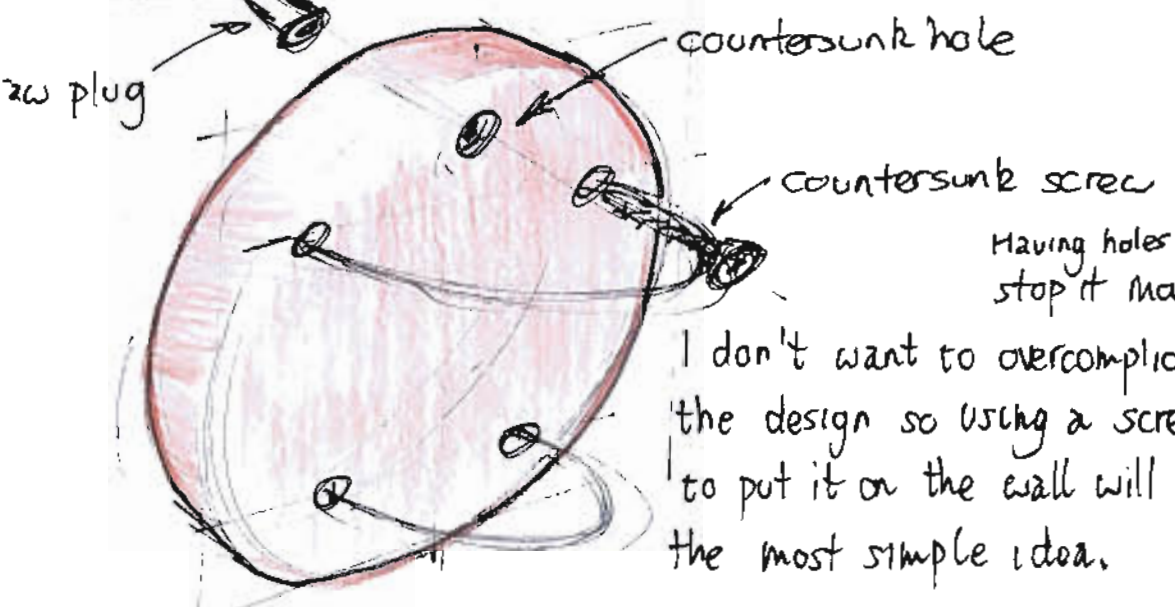
I think the extra circles make it look too complicated and it won't meet the specification.

I am going to keep the triangle because it will make it easier to assemble and I won't have to set angles.



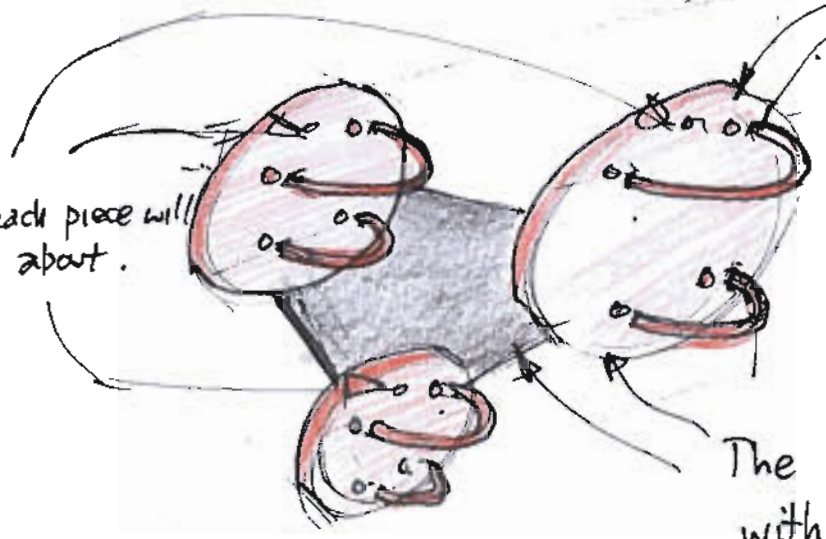
As long as I make the sides the correct length all I need to know is the 30 degree angle.

HOW WILL I WALL MOUNT IT?



I don't want to overcomplicate the design so using a screw to put it on the wall will be the most simple idea.

ASSEMBLY

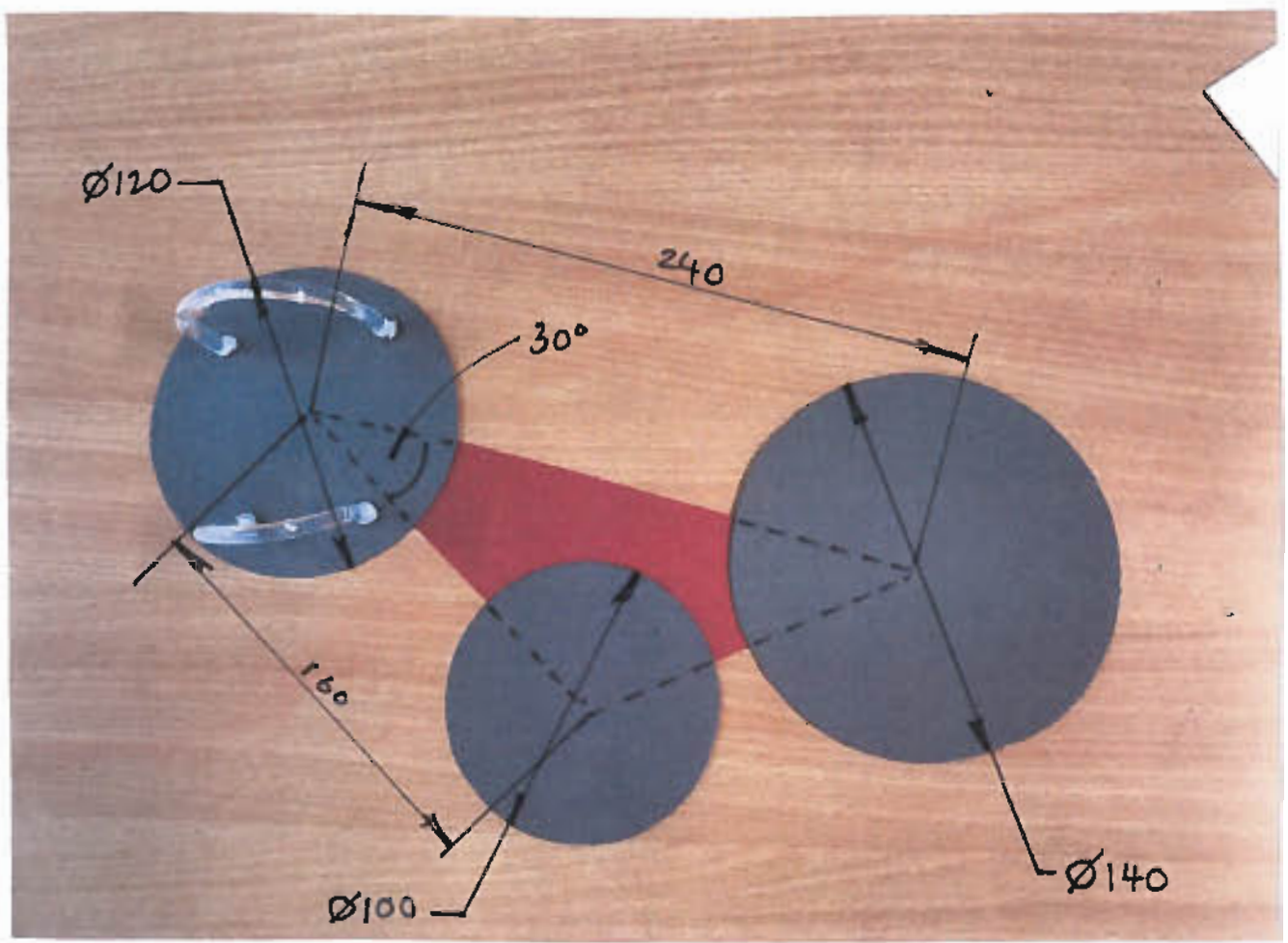


Plywood back is too thin to be screwed into

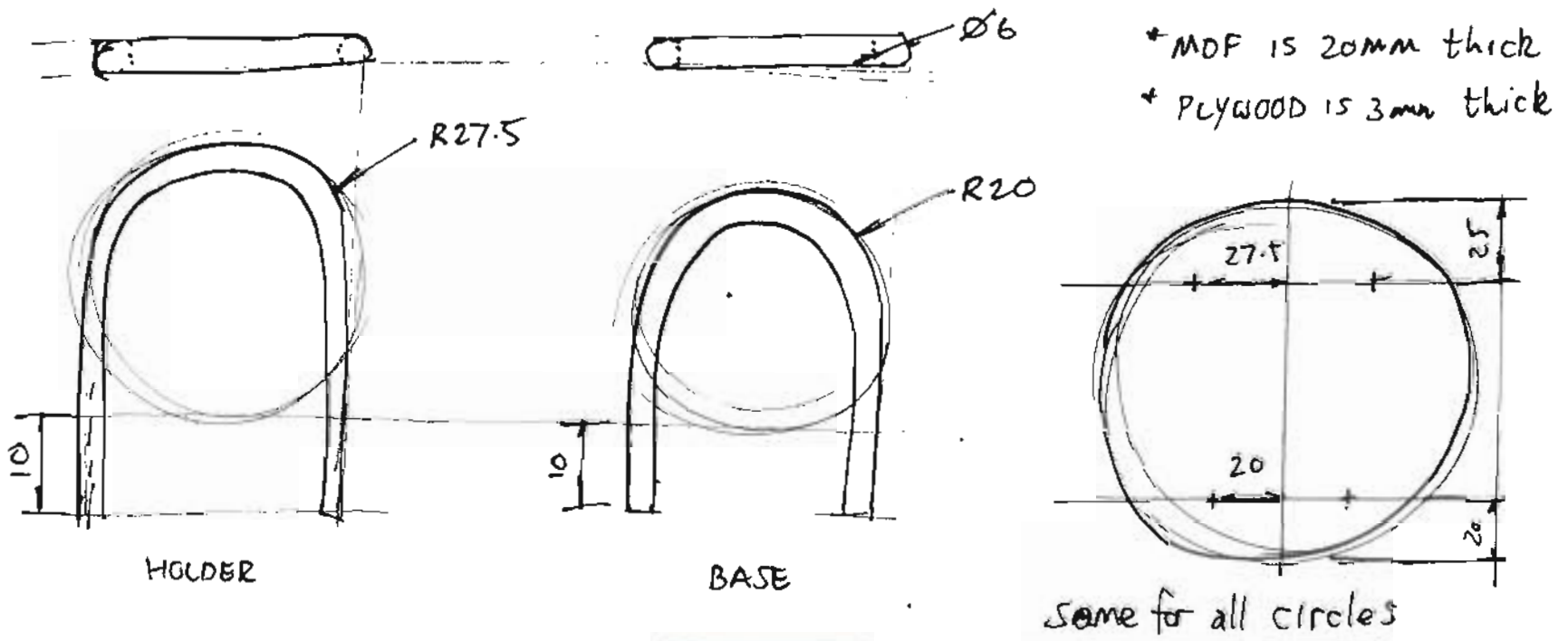
The mdf and acrylic will need stuck together using epoxy resin as they are not similar materials I am going to try and use contact adhesive as I have used this before to stick wood and plastic.

The mdf and the plywood can be stuck together with PVA. I will need to clamp it in a vice for a strong join.

SEQUENCE OF OPERATIONS		
STAGE	OPERATION	TOOLS/EQUIPMENT
2.	mark out circles	steel rule, compass
2.	mark out centres to be drilled	try square, rule, marking gauge
3.	mark out triangle	rule
4.	cut corners off of circles	scroll saw/tenon saw
5.	drill holes	pillar drill, $\phi 6$ drill bit
6.	sand circles round	bandfacer, goggles
7.	form rods	oven, former, gloves
8.	cut plywood	scroll saw
9.	prep wood for finish	abrasives paper
10.	paint ply and mdf (3 coats)	paint, brushes, abrasives
11.	assemble wooden parts	PVA, vice, quick clamp
12.	assemble acrylic parts	contact adhesive.



CUTTING LIST					
PART	MATERIAL	QNTY	LENGTH(mm)	BREADTH(mm)	THICKNESS (mm)
CIRCLES					
BIG	MDF	1	140	140	18
MED	MDF	1	120	120	18
SMALL	MDF	1	100	100	18
TRIANGLE	PLYWOOD	1	220	130	3
HOLDER	RED ACRYLIC	1	150	-	$\phi 6$
BASE	RED ACRYLIC	1	140	-	$\phi 6$



NAME: CANDIDATE G - 7