

DIGITAL PORTFOLIO Grade 8

MYP Product Design

Name: Aljazia Alabbasi

Teacher: Ms. Florentina

Grade 8 Unit: **Mini Speaker**

Criteria A- Inquiry and Analysis -

Name: Aljazia Alabbasi

Teacher: Ms.Florentina

Key Concept: Systems: (Systems are sets of interacting or interdependent components.

Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex).

Global Context: Scientific and Technical Innovation

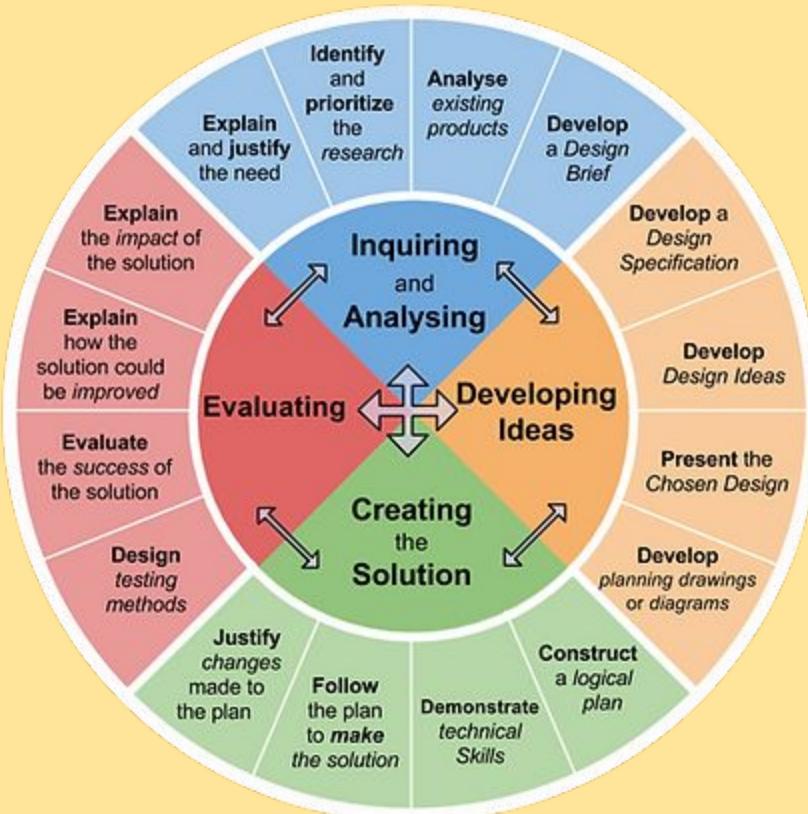
ATL – Thinking (Apply existing knowledge to generate new ideas, products or processes)

IB Learner Profile: Risk takers; Reflective

Statement of Inquiry:

Designers and engineers need to understand Scientific and technical systems to create products that are both functional and innovative.

Design Cycle



Criteria A

Design problem

My target audience for the speaker is my mother, I'm making the speaker for her and its design needs to suit her style and fit into her lifestyle. So I will design the speaker to be disguised as a book so it fits into her aesthetic preference and the environment it will be placed in. She will be able to listen to her podcasts without the speaker standing out and not matching her style.

My mother likes to listen to podcasts while she is doing her chores, but most speakers are too bulky and stand out because they don't fit into their surroundings, the colours are always too bright and catch your attention. The speakers that don't stand out as much are too expensive. I'm making this speaker so it doesn't stand out and looks nice and isn't bulky.

My mother has to hide the speakers because it doesn't match the interior theme, and stands out in the living room, when guests come over and they see the speaker it looks very bulky and out of place, it isn't pleasing to look at and is too bright.

I intend to solve the problem by making a speaker that doesn't stand out, match her taste, and is pleasing to the eye. I will design the speaker to be in the shape of a book so it doesn't stand out and guests don't notice it and its colours and shape doesn't bother them.

Peer assessment - design problem

Amani:

Strengths- The design problem makes sense as your mother isn't able to find speakers that are appropriate for her problem. She wants a speaker that blends into her interior in her house and suits her personality, these points are hard to find in most speakers. From your design problem I could understand clearly what the problem is.

Actions- In the third paragraph I couldn't understand what you were trying to say, I think you need to elaborate on that. You also could mention the colours you are going to use on your speaker and why these colours will blend into your interior. You also have a few grammar errors that you need to fix.

Design problem

My target audience for the speaker is my mother, I'm making the speaker for her and its design needs to suit her style and fit into her lifestyle. So I will design the speaker to be disguised as a book so it fits into her aesthetic preference and the environment it will be placed in.

My mother likes to listen to podcasts while she is doing her chores, but most speakers are too bulky and stand out because they don't fit into their surroundings, the colours are always too bright and catch your attention. The speakers that don't stand out as much are too expensive.

My mother hides any speakers she buys because it doesn't match the interior theme, and stands out in the living room, when guests come over and they see the speaker it looks very bulky and out of place, it isn't pleasing to look at and is too bright.

I intend to solve the problem by making a speaker that doesn't stand out, match her taste, and is pleasing to the eye. I will design the speaker to be in the shape of a book so it doesn't stand out and guests don't notice it.

Action taken :

Design problem

My target audience for the speaker is my mother, I'm making the speaker for her and its design needs to suit her style and fit into her lifestyle. So I will design the speaker to be disguised as a book so it fits into her aesthetic preference and the environment it will be placed in. She will be able to listen to her podcasts without the speaker standing out and not matching her style.

My mother likes to listen to podcasts while she is doing her chores, but most speakers are too bulky and stand out because they don't fit into their surroundings, the colours are always too bright and catch your attention. The speakers that don't stand out as much are too expensive. I'm making this speaker so it doesn't stand out and looks nice and isn't bulky.

My mother has to hide the speakers because it doesn't match the interior theme, and stands out in the living room, when guests come over and they see the speaker it looks very bulky and out of place, it isn't pleasing to look at and is too bright.

I intend to solve the problem by making a speaker that doesn't stand out, match her taste, and is pleasing to the eye. I will design the speaker to be in the shape of a book so it doesn't stand out and guests don't notice it and its colours and shape doesn't bother them.

Analyzing Existing Products #1

Aesthetics

The translucent yellow acrylic they used has a cool effect where the edges of the acrylic look like they are glowing. However, since you can see through the acrylic, you can look into the box and see how messy and disorganized all the wires are inside. There is also some orange acrylic around the speakers, orange and yellow aren't colors you usually see together so it's a bold choice.

They could have made a smaller box inside the translucent yellow out of plywood to hide the inside but keep the translucent yellow and its glowing effect.

Target Market

The target market for this speaker is people who like the color yellow and orange. People who like the glowing effect will definitely want this speaker. It has sharp edges so it isn't safe for a younger audience.

Shape and Size

This speaker is in the shape of a cube. However, since only two sides of the cube are rounded off there is a safety hazard because of the sharp edges. The speaker is approximately 12cm x 12cm x 8cm in size.



Function

This has the purpose of serving as a speaker that can effectively project sound.

Manufacture

It was manufactured using the materials and machines provided at school. A laser cutter to cut acrylic. Strip heater to form a 90 degree angle.

Materials

The materials that were used in this speaker are different colored acrylic, and the speaker mechanism. There is translucent yellow acrylic being used for the basic shape of the speaker and dark orange acrylic as an accent color.

Analyzing Existing Products #2

Aesthetics

The speaker is black with a red line and engraving to make it look like a beatbox. The engraving is very hard to see, and part of the red line has chipped off. The idea is nice but the execution could be better.

They could have used plywood instead of black acrylic and then painted it black so that the engraving will be easier to see.

Client/Customer

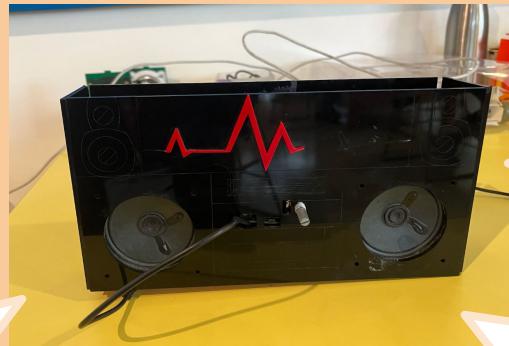
This speaker is for an older audience, as it looks like a beatbox which would be nostalgic to them.

Shape and Size

The speaker is 13cm x 25cm x 7cm, in my opinion for a mini speaker that size is too big, as it will be heavy and you will have less options of its placement.

The shape of the speaker is a cuboid.

In my opinion, the speaker should be smaller as it will be less heavy and there will be more places that you can place it



Function

The function of this is to be used as a speaker that can successfully project sound, while being in favor of its target audience

Manufacture

This speaker was manufactured using the materials and machines provided at school. A laser cutter was used to cut acrylic. Strip heater to form a 90 degree angle.

Materials

This speaker is made out of black and red acrylic and the speaker mechanism. They used these materials as it helped them achieve their idea of a beatbox best.

Analyzing Existing Products #3

Aesthetics

The speaker is all black, the design is very simple and minimalistic. There are two speakers in it one smaller than the other.

They could have added an engraved design on it to make it more interesting to look at.

Client/Customer

The audience for this speaker is people who want a simple and functioning speaker, but do not mind if it's big.

Shape and Size

I don't have the dimensions of this speaker, however by the design I can tell it's big, maybe around 25cm x 25cm x 10cm. The speaker is a cuboid with rounded edges. To improve it, they should make the size of the speaker smaller so you are able to move the speaker around easily.



Function

This has the purpose of serving as a speaker that can effectively project sound.

Manufacture

It was manufactured in a factory using industrial grade manufacturing, including plastic injection molding.

Materials

This speaker is made out of black plastic and the speaker mechanism. They most likely chose these materials as they're very sustainable.

a. Electrolytic Capacitors

Reduce voltage

fluctuations in various filtering devices

b. Chip

Acts as miniature electrical switches that can turn a current on or off

c. Circuit Board

Sends electronic signals to other components of an electronic device

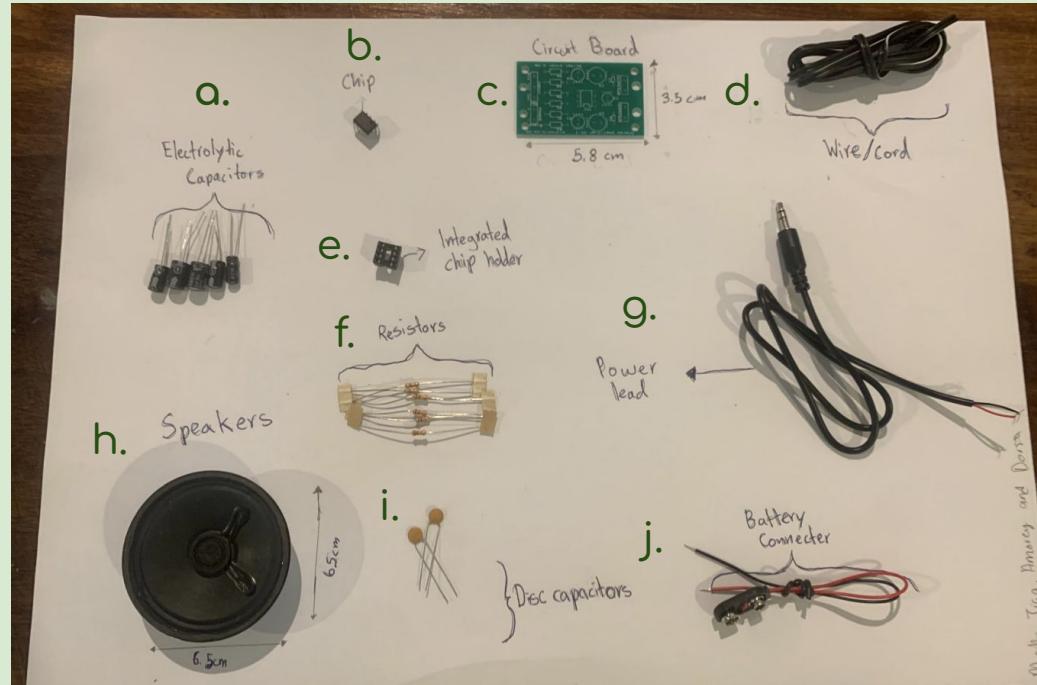
d. Wire/Cord

Transports electricity to transmit energy and information

e. Integrated Chip Holder

Houses the elements of an integrated circuit or a transistor

Disassembly



f. Resistors

Limits or regulates the flow of electrical current in an electronic circuit affecting the voltage and current

g. Power Lead

Aids the transmission of electrical power

h. Speakers

Converts an electrical audio signal into a corresponding audio output.

i. Disc Capacitors

Used as safety capacitors in electromagnetic interference suppression applications

j. Battery Connector

Combines electric circuits

Peer Assessment

Peer assessed by : Zahra

S - You clearly described the speakers.

L - No literacy mistakes.

A - Add more detail, and explain why they used those materials.

Action taken :

Analyzing Existing Products #2

Aesthetics

The speaker is black with a red line and engraving to make it look like a beatbox. The engraving is very hard to see, and part of the red line has chipped off.

Client/Customer

This speaker is for an older audience, as it looks like a beatbox.

Shape and Size

The speaker is 13cm by 25cm, in my opinion for a mini speaker that size is too big. The shape of the speaker is a cuboid.

Function

The function of this is to be used as a speaker that can successfully project sound, while being in favor of its target audience

Manufacture

This speaker was manufactured using the materials and machines provided at school. A laser cutter was used to cut acrylic. Strip heater to form a 90 degree angle.



Materials

What materials have been used? This speaker is made out of black and red acrylic and the speaker mechanism.

Analyzing Existing Products #2

Aesthetics

The speaker is black with a red line and engraving to make it look like a beatbox. The engraving is very hard to see, and part of the red line has chipped off. The idea is nice but the execution could be better. They could have used plywood instead of black acrylic and then painted it black so that the engraving will be easier to see.

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The function of this is to be used as a speaker that can successfully project sound, while being in favor of its target audience

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This speaker was manufactured using the materials and machines provided at school. A laser cutter was used to cut acrylic. Strip heater to form a 90 degree angle.



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Shape and Size

The speaker is 13cm x 25cm x 7cm, in my opinion for a mini speaker that size is too big, as it will be heavy and you will have less options of its placement.

The shape of the speaker is a cuboid.

In my opinion, the speaker should be smaller as it will be less heavy and there will be more places that you can place it

Materials

This speaker is made out of black and red acrylic and the speaker mechanism. They used these materials as it helped them achieve their idea of a beatbox best.

Design Brief

I will design and make a speaker so that my mother has a speaker that matches her aesthetic and doesn't draw too much attention or create distraction. I will solve this problem by creating a speaker that is personal to her and matches her preferences and needs. The target market for this speaker is my mother, because i'm designing the speaker for her.

My speaker will consist of mostly neutral colors and will be a simple design, because in the products I analyzed, I saw this was effective and that neutral colors looked nicer and would match my mothers preferences and the speakers environment.

For composition I will consider using materials that are sustainable and match my mothers preferred color scheme. The sizes I must consider are above 10cm x 10cm but below 22cm x 22cm, as I saw while analyzing products that anything larger than 22cm was too heavy and big to move around and my speaker should be portable, however, my mother will place it on a shelf and a speaker less than 10cm will not look nice and will be too small on the shelf. I will use minimalist style furniture and speakers to inspire the shape of my design, as the environment my mother will put the speaker is very minimalist and the speaker should match the color scheme and not stand out too much. I will do this by looking at references when creating my design and following the specification I make. The speaker I make must be able to play music or other audios.

Where It Will Be Placed



It's important to keep in mind that the speaker will be placed on a shelf. My speaker should be larger than 10cm x 10cm but below 22cm x 22cm, because if the speaker is less than 10cm by 10cm it will look out of place as it's very small compared to the other objects on the shelf, however, if it's more than 22cm by 22cm it will also stand out as it will be bigger than the other things on the shelf.

The color of the speaker should be more muted and similar to the colors of objects on the shelf.

The speakers size and colors shouldn't make it stand out on the shelf and should help it to blend into its surroundings.

Criteria B

Specification

Key Words	Specification Point
Aesthetics	The colors used in the speaker will be neutral and won't stand out a lot. Some examples are; brown, pink, green, or even pastels. The speaker shouldn't look bulky.
Customer	My mother is the target audience for this speaker. She likes minimalist designs. More neutral colors will fit into her lifestyle better.
Shape	The base shape of the speaker shouldn't be too complicated, a cube or cuboid is good. Although, it shouldn't stand out too much.
Size	The size of the speaker shouldn't be too big, she should be able to move it around. However, the size shouldn't be less than 10cm x 10cm
Materials	The base materials used should be made of plywood and/or colored acrylic. Other materials can be used.
Manufacture	It will be manufactured using the materials and machines provided at school. A laser cutter to cut acrylic. Strip heater to form a 90 degree angle.
Function	My speaker should be able to play music, or any sound the device connected to it plays.
Safety	Sharp edges should be avoided in the design of the speaker. It shouldn't be a hazard to her.

Peer Assessment

Peer assessment by : Zahra

S - You wrote a clear description of the kind of speaker you want and what matches your mothers style.

L - No literacy mistakes.

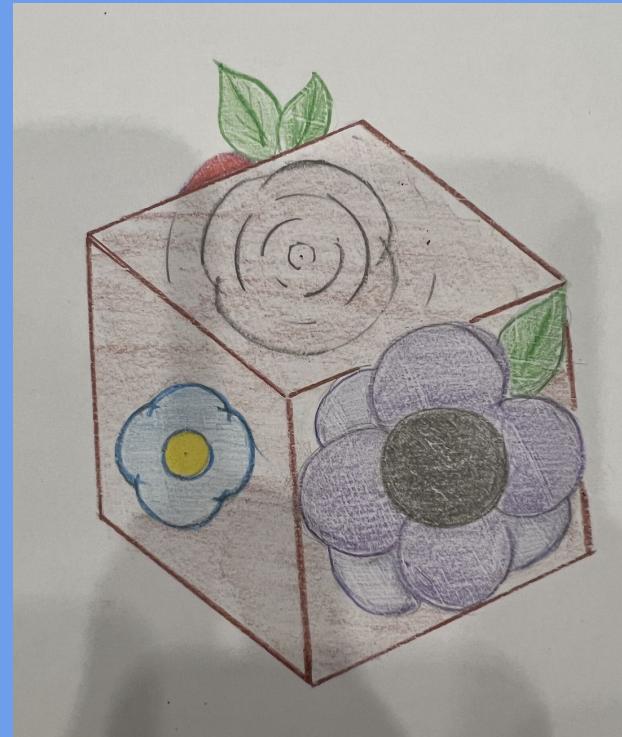
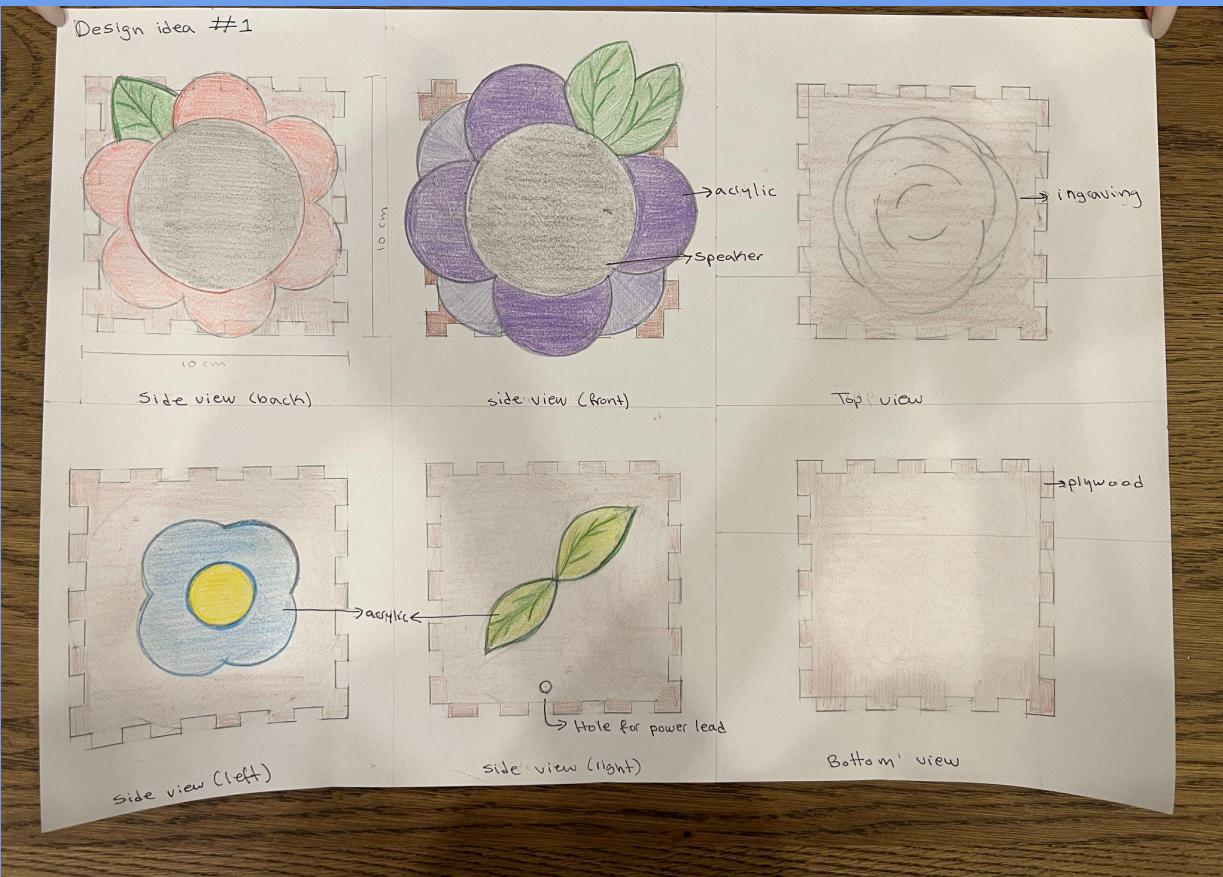
A - Add more detail and some reasoning.

Specification	
Key Words	Specification Point
Aesthetics	The colors used in the speaker will be neutral and won't stand out a lot. The speaker shouldn't look bulky
Customer	My mother is the target audience for this speaker. She likes minimalist designs.
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Action taken :

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Design Idea #1



Design Idea #1 - Analysis + Prototype



Product Analysis:

The flowers and leaves will be cut out out of red, blue, green, and purple acrylic and then glued onto the base shape, a cube made out of plywood. There will also be an engraving on the top side of the cube, it will be an engraving of a rose.

The circles inside of the red and purple flowers will be the speakers.

The side with the two leaves will have a hole for the power lead.

The dimensions of the cube will be 10cm x 10cm x 10cm.

Prototype Analysis:

The prototype is made out of paper. The cube is black in the prototype, even though in the design it's meant to be brown as it's plywood, this is because the prototype is only meant to represent the design idea and visualize it. I noticed that the rose, that's meant to be engraved, on the top of the cube isn't clear, it might be better if I paint the area engraved on the plywood red.

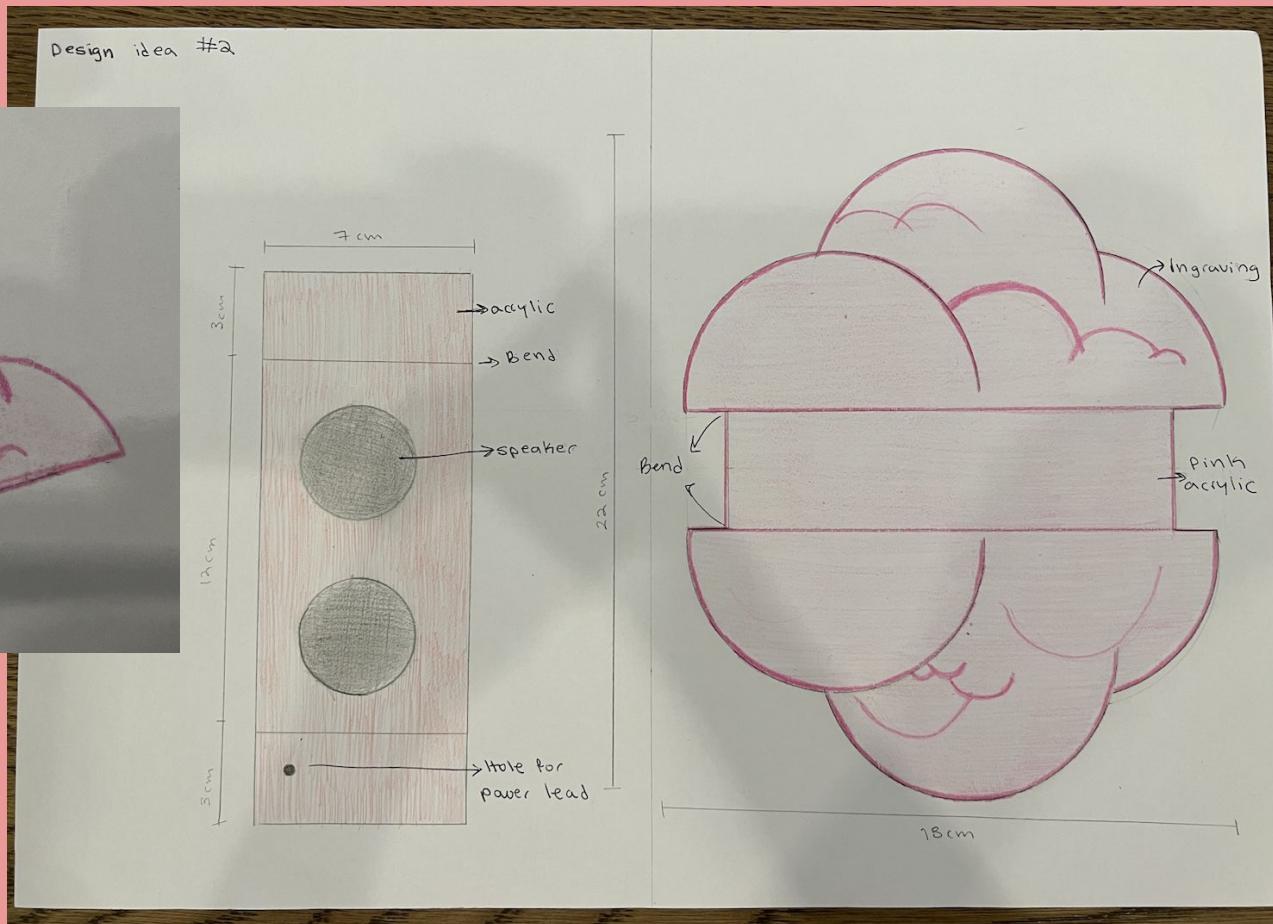
In the design idea the cube's sides are supposed to be connected without needing glue because of its design, however, in the prototype since its made out of paper we weren't able to demonstrate that even though it will be in the final design.

In the design idea, the petals of the flower were sticking out beyond the cube surface, in the prototype I found this didn't work as the petal on the bottom could not stick out and would affect the other petals.

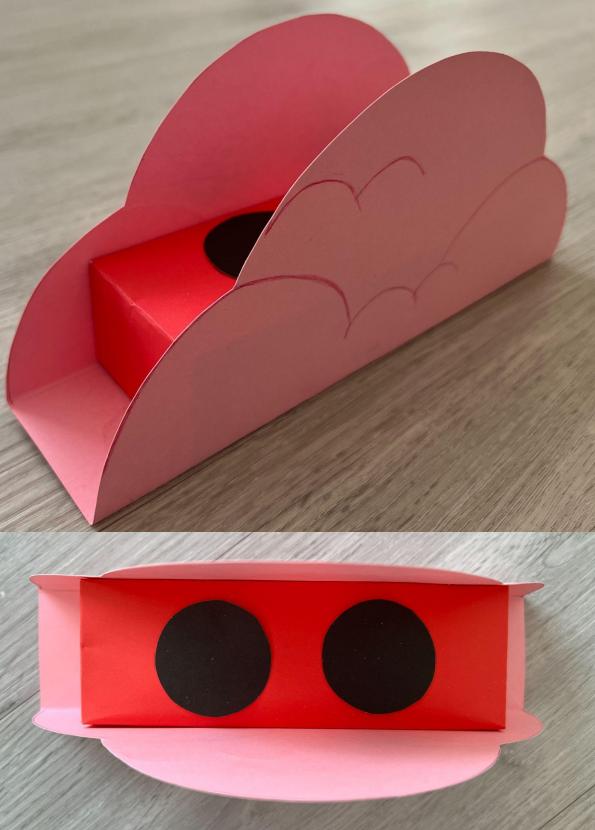
After making the prototype, I found that the size of the cube was a bit small, and after placing it on the shelf it became clearer and the cube stood out because of its size.



Design Idea #2



Design Idea #2 - Prototype + analysis



Product Analysis:

The pink cloud and red cuboid will be cut out of pink and red acrylic and then glued together.

There will be lines engraved on the pink acrylic to make it clearer that it's supposed to be a cloud.

The circles on the top of the red cuboid will be the speakers. On the left side of the red cuboid there will be a hole for the power lead.

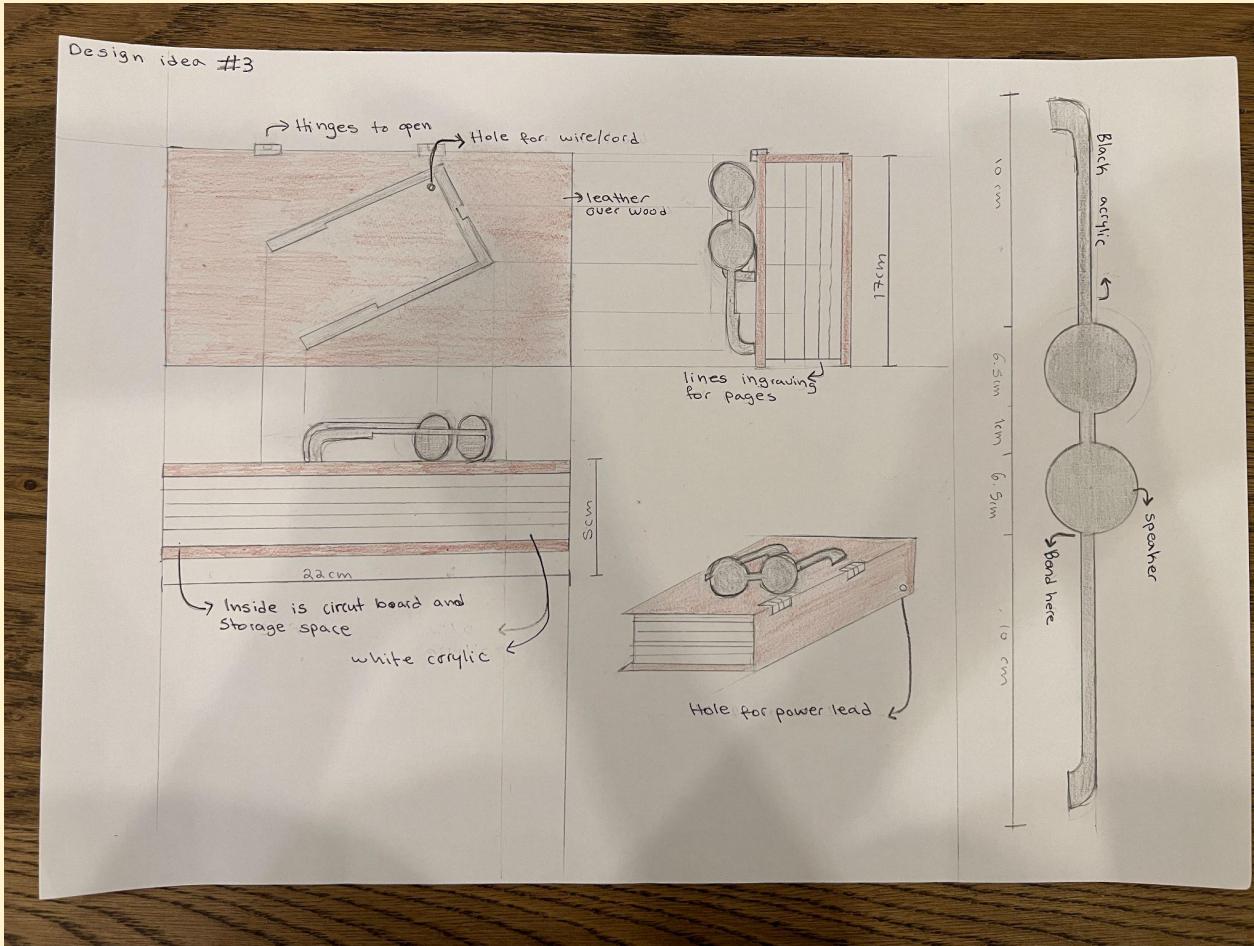
It's dimensions will be 18cm x 22cm x 7cm.

Prototype Analysis:

The prototype is made out of paper. In the prototype I noticed that since the red acrylic part will be glued to the pink acrylic part my mother will be unable to access the inside of the cube to be able to, for example, replace the batteries of the speaker, this is an issue since I want her speaker to be functional for a long time. I will need to come up with a way to keep the red acrylic part from moving but make it so you can remove it so you have access to the speaker mechanism.

After making the prototype, I saw that the size of the speaker was too big, and it only became clearer when it was on the shelf.

Design Idea #3



Design Idea #1 - Analysis + Prototype



Product Analysis:

The book cover, glasses, and book pages will be cut out of plywood and black and white acrylic. However, the book cover is going to be covered in brown leather. The different pieces will be glued together, but the top of the book cover will be connected using a hinge so that it can be opened and my mother can store objects in it. When deciding on the size of the book I measured the size of the books on the shelf my mother will place the speaker, that way the book will fit into the shelf and the size will not be out of place.

The lenses of the glasses will be the speakers. There will be a hole for the power lead on the spine of the book.

Prototype Analysis:

The prototype is made out of foam. The colors of the glasses and book aren't completely accurate to the design, this is because the prototype is only meant to represent the design idea and visualize it. I noticed that the book looked very plain as there was nothing written on it, so I might consider adding my name on it as the book title to make it less plain. The prototype shows the lenses of the glasses as an oval, however, the lenses will actually be circles as they will be the speakers.

In the prototype, the cover of the book doesn't open even though in the design idea I was supposed to add hinges to be able to open it, this means that I am not able to access the storage space inside the prototype to see if it's big enough to store, for example, keys inside. After I placed the book on the shelf, I saw that it was a good idea to measure the size of the books on the shelf and use it as a reference of how big the book should be, as the book fit in great and it wasn't too big or too small.

Peer Assessment

Peer assessed by : Zahra

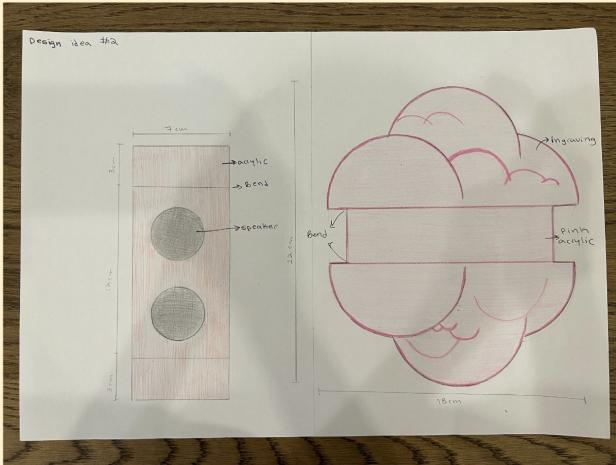
Action taken :

S - You clearly annotated your design and added color.

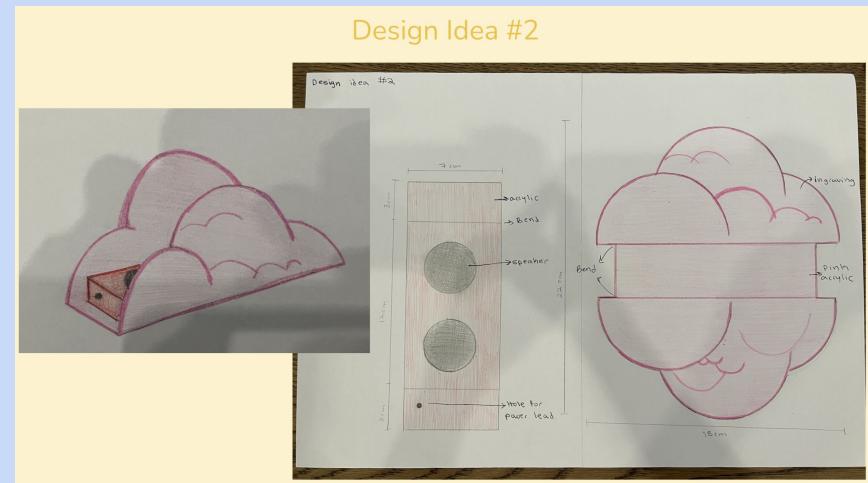
L - No literacy mistakes.

A - Make it clear what the final design will look like once the speaker is done.

Design Idea #2



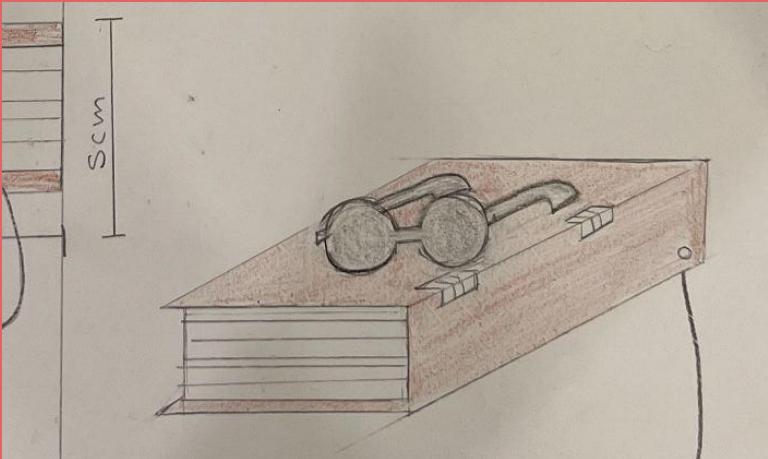
Design Idea #2



Evaluation of design ideas against the specification

Key Words	Specification points	Design idea #1	Design idea #2	Design idea #3
Aesthetics	The colors used in the speaker will be neutral and won't stand out a lot. Some examples are; brown, pink, green, or even pastels. The speaker shouldn't look bulky			
Customer	My mother is the target audience for this speaker. She likes minimalist designs. More neutral colors will fit into her lifestyle better.			
Shape	The base shape of the speaker shouldn't be too complicated, a cube or cuboid is good. Although, it shouldn't stand out too much.			
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Manufacture	It will be manufactured using the materials and machines provided at school. A laser cutter to cut acrylic. Strip heater to form a 90 degree angle.			
Function	My speaker should be able to play music, or any sound the device connected to it plays.			
Safety	Sharp edges should be avoided in the design of the speaker. It shouldn't be a hazard to her.			

Final idea - reasoning



My final idea is design idea #3 as it fit my mothers personality and lifestyle best, and it fit the most elements of the specification. A book shape would be ideal to fit into many bookshelves distributed in my home. It isn't too bulky or too bright and neon so she will be able to place it in the living room without it drawing too much attention. The design is minimalistic and fits her preferences better than the other designs, which aren't as plain or don't have neutral colors.

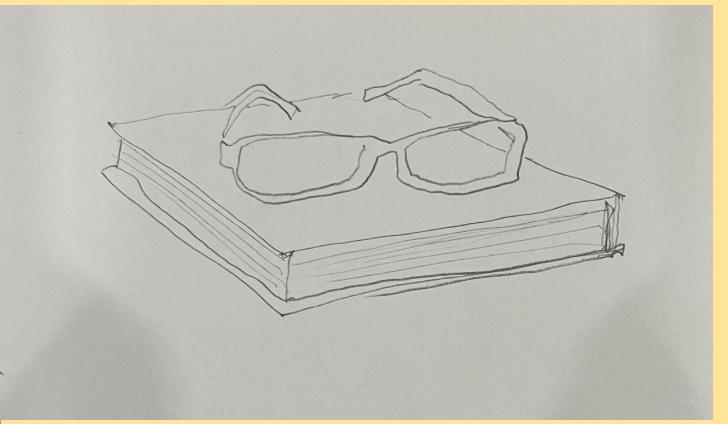
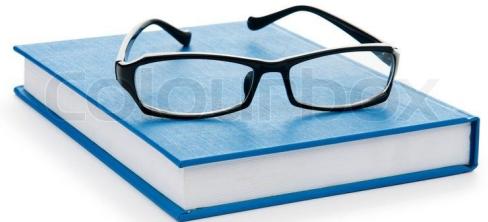
Final idea - reasoning



Another reason I chose design idea 3 is that when I made the prototypes and placed them onto the shelf I saw that design ideas 1 and 2 stood out, but design idea 3 fit into the shelf's minimalist design and the size was great as it was similar to the size of the other objects on the shelf.

The other design ideas stood out and were too small or too big, however, my mother wanted a speaker that would fit into her minimalist style and would blend into the environment she wanted to place the speaker.

Final idea (design idea #3) - inspiration

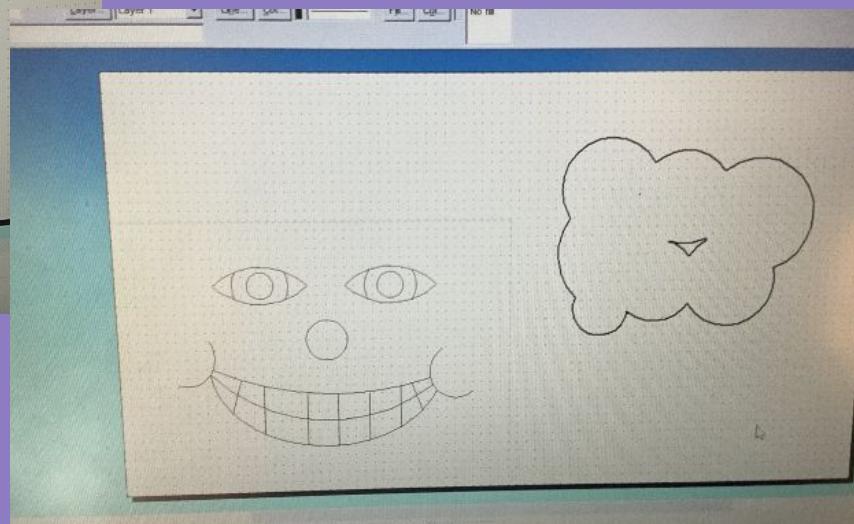
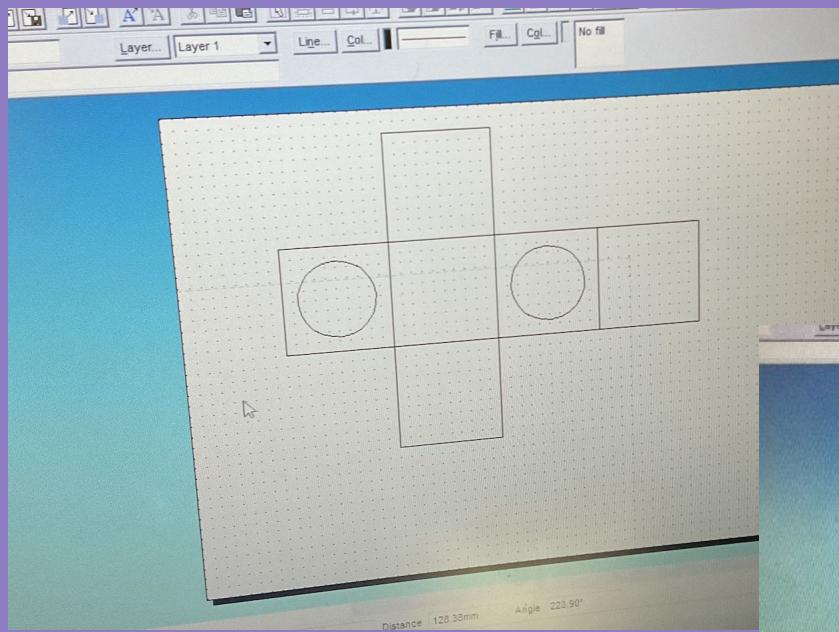


Self Assessment

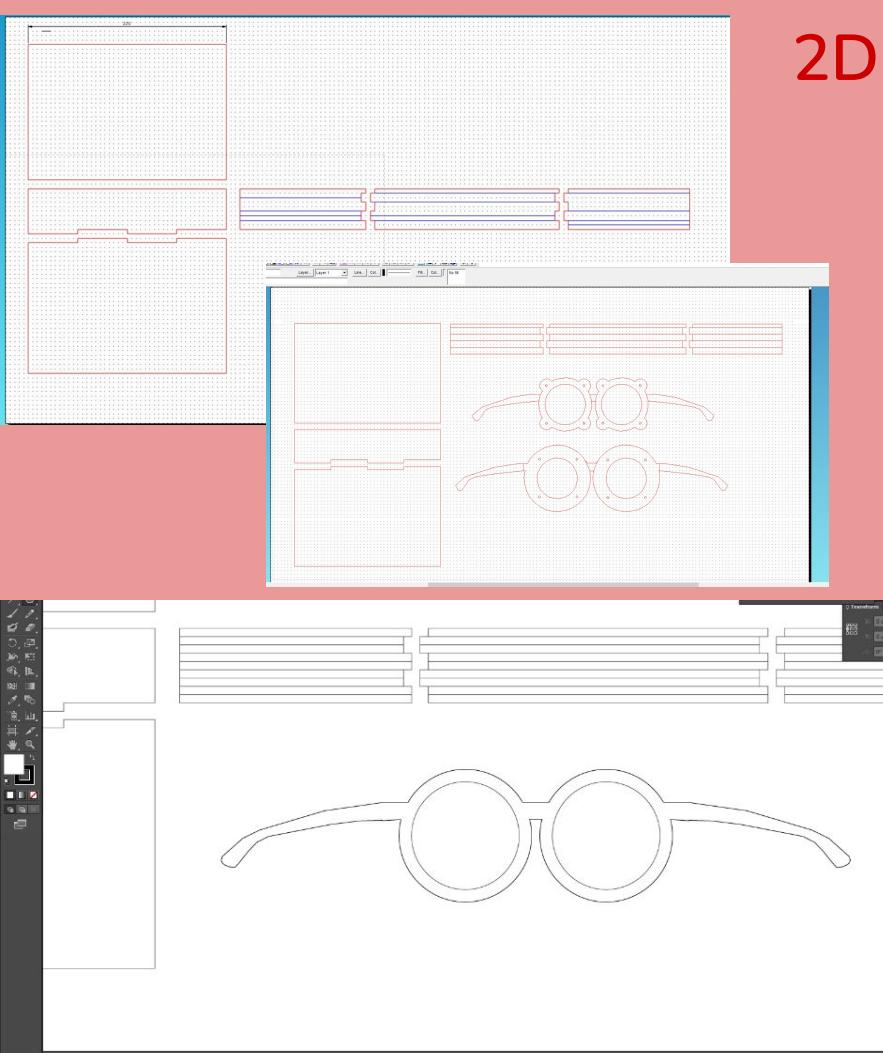
I believe that I managed to deliver a nice design that can be easily fabricated. The sequence for ideation was smooth and transitional. I had to monitor my mother preference of audio devices and the areas she use them in. however, I think I could have been faster in fostering the idea and delivering the design. The time spent on gathering the initial measurements and establish parts fitment within the design could have been shorter.

Criteria C

2D Design Practice



2D Design process



When I was designing my speaker on 2D design I had to measure everything, for instance the thickness of the materials I will be using.

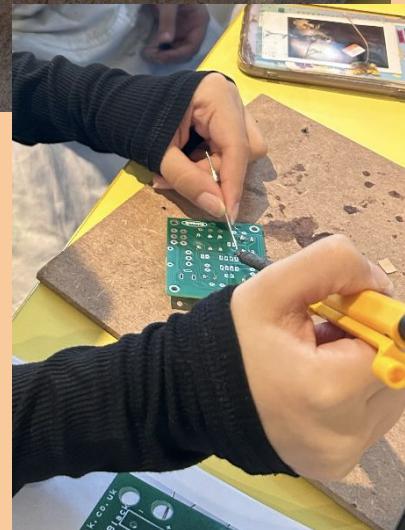
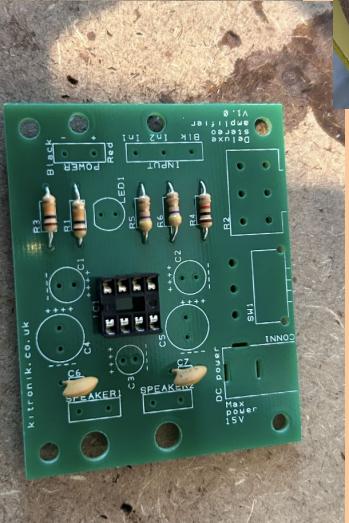
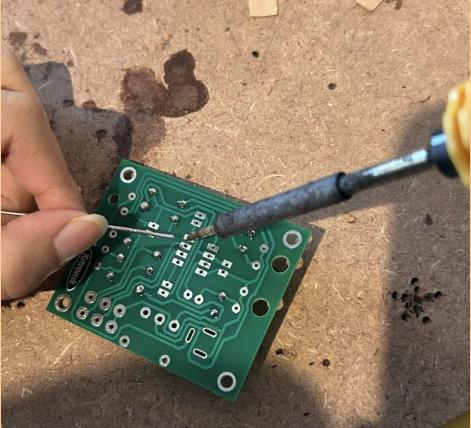
However, I faced an issue with the frame of the speaker since I didn't keep that in mind, and had to change the design of glasses and their shape.

And I needed to decide the style of the lines on the book, in the final design I chose to go with a more classic look as shown in the bottom picture, but as you can see in the top picture there is a more cartoony look to it.

I also had to keep in mind that I will be covering the cover of the book with leather, and that it shouldn't be bigger than the measurement of the leather.

And I had to make sure that the colors for the lines in the final version were correct, and that the glasses had the lines showing where they would be bent.

Soldering process

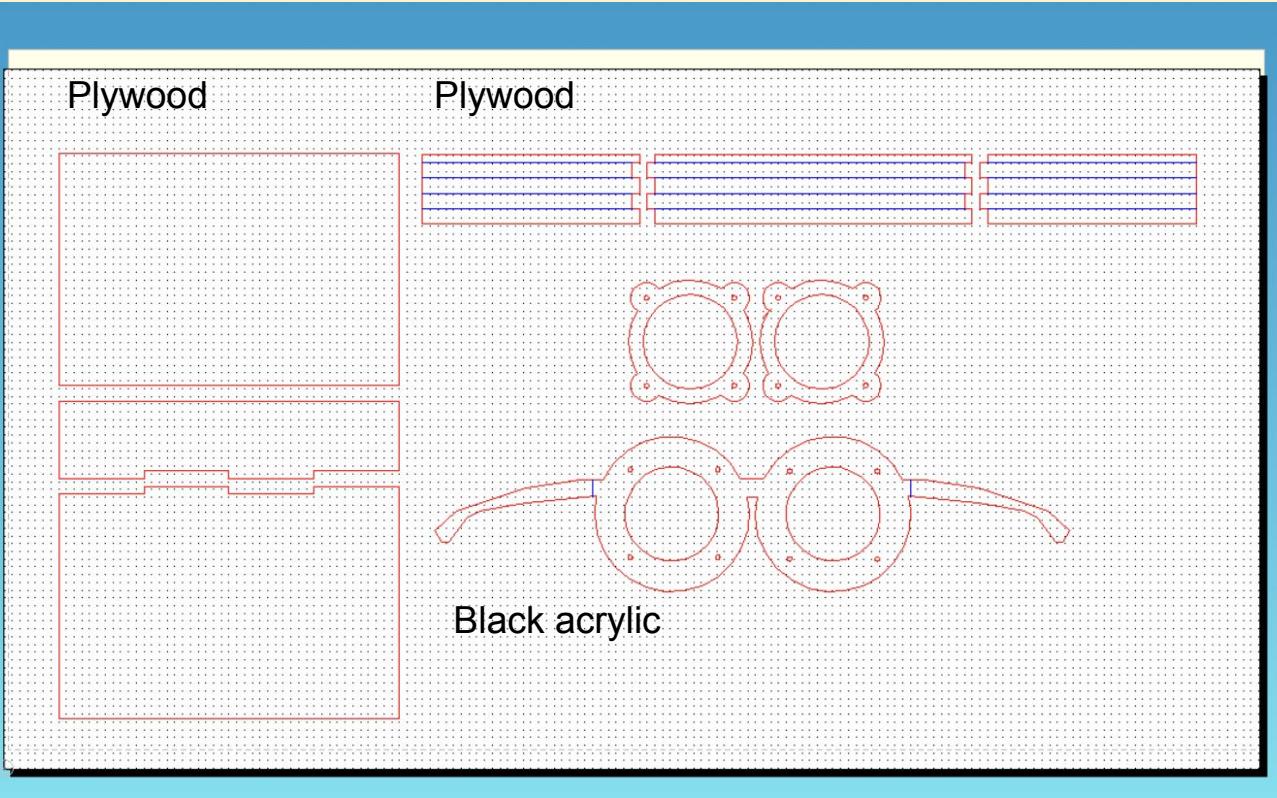


When soldering I had to make sure the pieces were places in the correct places, with the negative side facing the correct way. I also made sure the soldering was in the proper shape and that the pieces were flat against the circuit board.

It's necessary to make sure that the soldering is done correctly or else the speaker will not work, so I needed to be careful the entire process.

When I was soldering the wires I had to be careful about what position I placed them in and to not cut something that would cause the speaker to not function when I was done soldering and was cutting the wires.

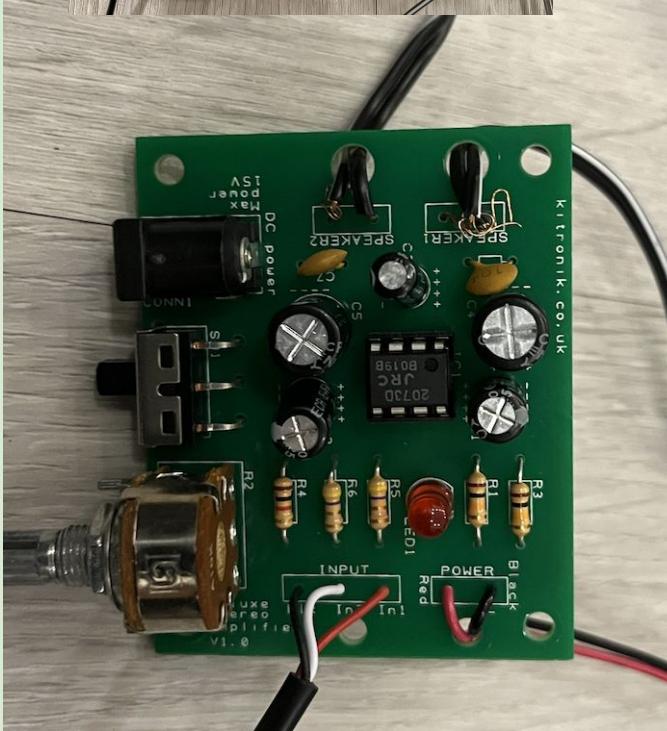
2D Design



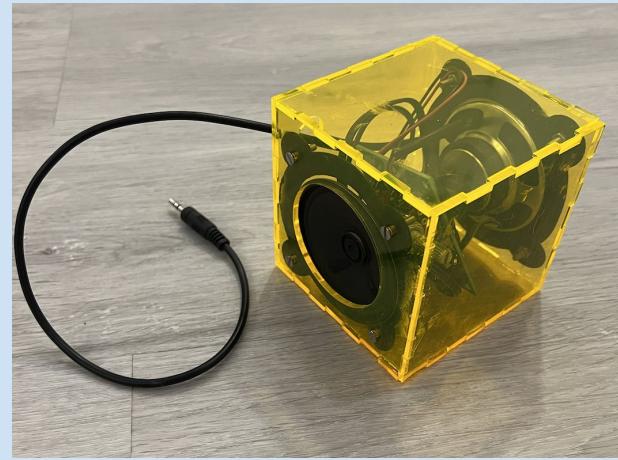
This is the final 2D design, the purpose of the colour coding is so that the laser recognizes where to cut and where to engrave the materials. The red color is used to indicate cutting, and the blue engraving.

(I placed the designs in the same file, despite the different materials. to be able to fit them into one slide.)

Soldered Circuit



Final (cube) Design



Criteria D

Peer Feedback

Zahra Ag.:

S- I like the colour you chose, it's very vibrant and eye catching.

A- However, you should add an engraving of a pattern or design.

Sama:

S- The speaker functions and the soldering is done well.

A- You should add another material or color to make the design less simple.

Improvements

Engraving (there will also be an engraving of my name on the back)



Acrylic, laser cut and glued on

Opaque plastic

Original design(2D design):

To improve my design I could use a speaker that is thinner so that when glued to the glasses it makes the glasses seem more realistic and minimalistic.

On the leather I could add my name, as a sort of title so that when people looked at the speaker they knew who made it, without me making it obvious or out of place. Or I could add my name on the side of the glasses instead, to make them seem even more like real glasses.

I should also add a divider, made out of wood, on the inside to separate the circuit board from the storage space.

Cube design(printed/laser cut):

I could add a material on the inside of the cube so you wouldn't be able to see the all the wires and the circuit board inside, or I could even paint the inside of the cube. This way it still has the effect of a translucent cube but you can't see the inside.

I could also engrave designs on the speaker to make the design more interesting, or add a cut out of a design out of another color or material. I could also engrave my name on the back of it so people can see that I made it.

Improvements

- I need to research substitute materials that are anti-static or dust resistance, to reduce maintenance.
- Add a screen to the device to show the connection or the video/sound playing.
- Add a light feature to indicate operational status, or rather, how much battery is left.