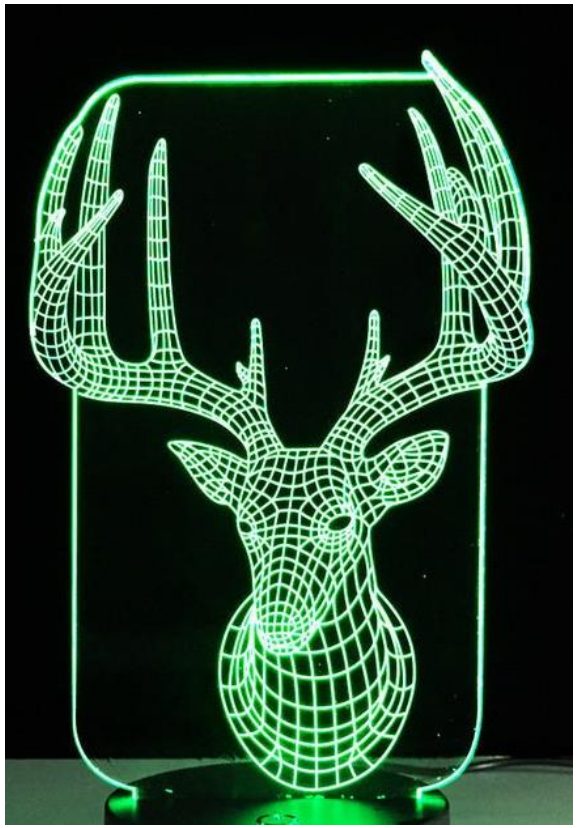
Year 8 USB light



Autumn term

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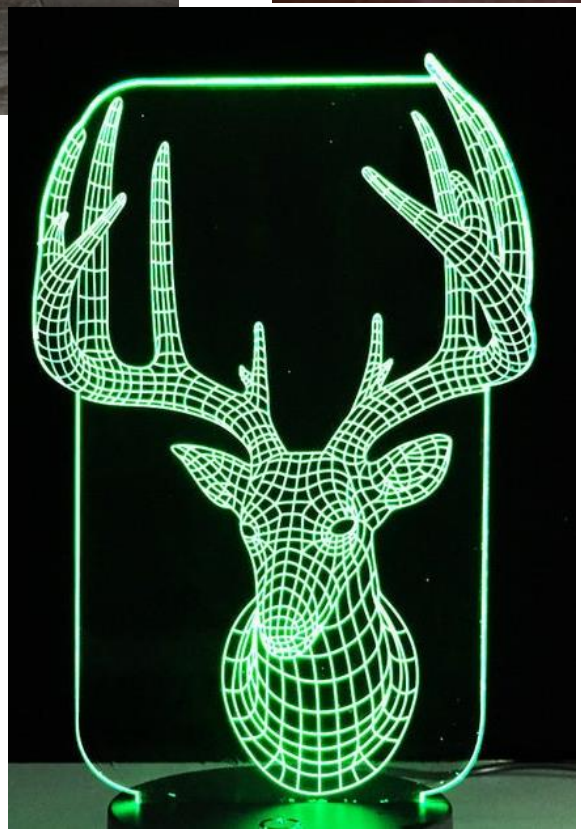
DESIGN BRIEF

Design a **portable** and **lightweight** solution to **illuminate** a desk area in the home or workplace. The product must be manufactured from **sustainable** materials and be designed to be recycled at the end of its life. The product must also utilise a **USB** power source.

EXAMPLES



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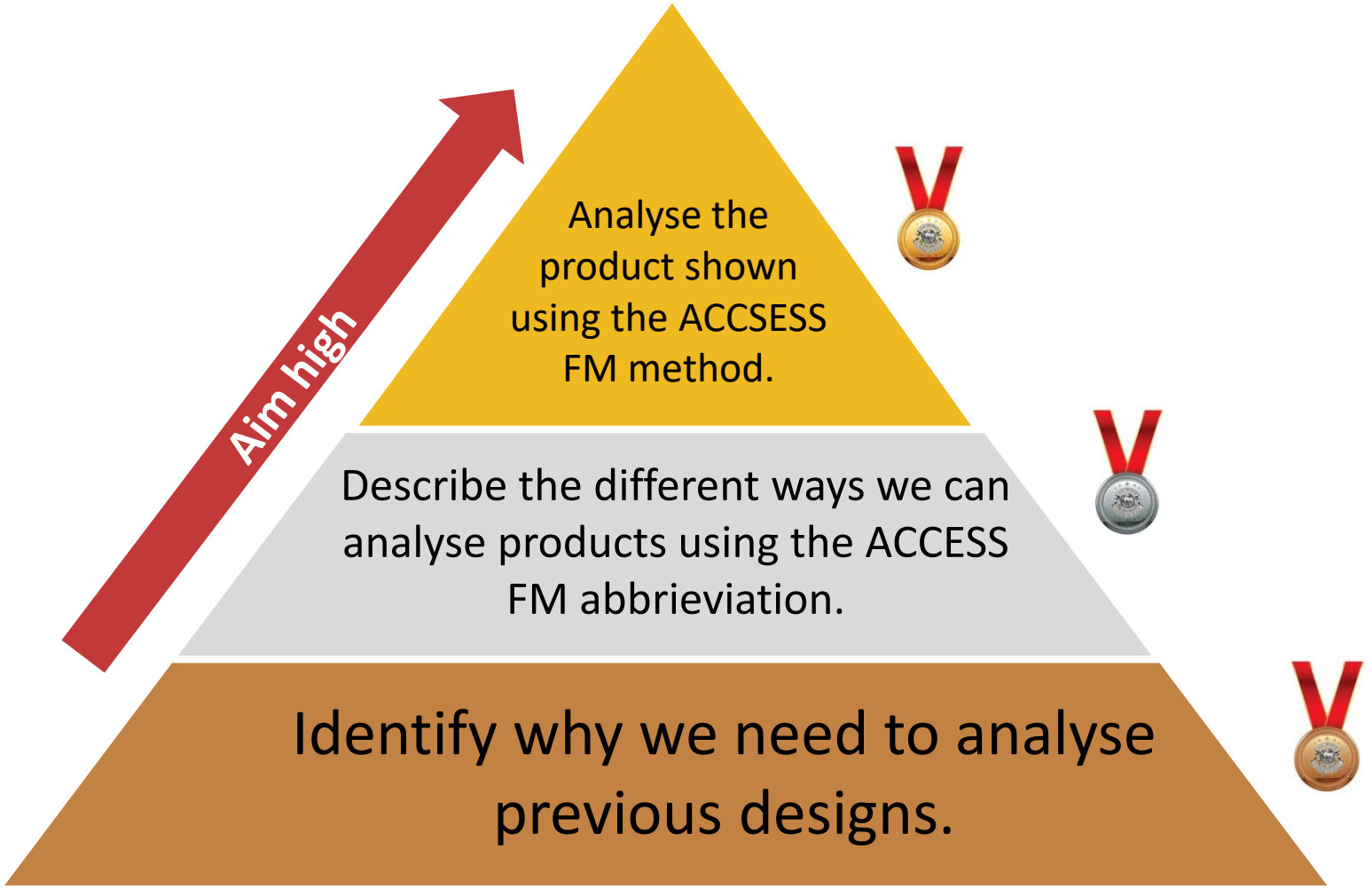
Amcan

Research



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Product Analysis

A very important part of research is a **product analysis**. A product analysis is taking a product that is currently on the market and ***evaluating*** and ***analysing*** it in depth to find things that are successful, but more importantly to find things that need to be improved.

ACCESS FM is a designers tool used to make you think about products in a ***critical*** and analytical way. You need to think about each aspect and use the aspect to think about questions to ask yourself.

A = Aesthetics

C = Client

C = Cost

E = Environment

S = Safety

S = Size

F = Function

M = Materials and Manufacturing techniques

Aesthetics

- Does the product look attractive? *THINK* shape, form, materials, size, beauty, ugliness
- Why does it look attractive or ugly?
- Does it make good use of colour and texture?
- Does it have a quality finish?
- Where did the designer get his or her inspiration for the design?

Cost

- What is the estimated cost of production?
- What is the retail cost? Why does it cost this much?
- What is the relationship between the two?
- Is the product affordable?
- Does it seem good value for money?
- Does the price reflect any social or moral considerations (e.g. Fair Trade)?

Client

- Who is the product designed for?
- How and where would they use it?
- What impact does it have on the customer's quality of life?
- Does it add value to the client's way of life?
- How is the product promoted to attract its customer?

Environment

- What is the product's impact on the environment? *THINK* batteries, rethink, refuse, reduce, reuse, recycle, life cycle.
- *THINK* about its manufacture, general use, distribution and final disposal when it is no longer needed.

Safety

- How has the designer considered safety issues when designing the product?
- *THINK* about the way the product is used and how different parts have been joined together.
- Does the product meet recognised safety standards?

Size

- What size is it? *THINK* in millimetres and any thing else that can be measured e.g. volts, weight, area, volume, density etc.
- Is the product comfortable to use? *THINK* anthropometrics or ergonomics.
- Are its proportions appropriate for its use?
- If you increased or decreased the product's scale, would it work or look better?
- To what extent has the designer considered human factors (ergonomics) in the product's design?

Function

- How well does the product work?
- Why does it work this way?
- How could it be improved?
- How easy is it to use?

Manufacture & Materials

- What is the product made from?
- Would another type of material work better?
- What impact could the designer's choice of material have on the environment?
- How has the scale of production affected the designer's choice of material and manufacturing processes

Access FM template

A

C

C

E

S

S

F

M

What is a Target Audience?

- A target market is the people you are aiming to sell you product to. They are the people who will buy and/or use the product.
- These can be categorized by the following criteria

Gender

The gender of a consumer is important because it tells you the sorts of interests they have and also colours they may like.

Age

The age of a consumer is important because it will tell you their size, what the may be interested in and how much money they have.

Interests

The interests are important as it allows you to design products that may suit your consumers interests.

Profession

A profession tells us a lot about an individual. Income, personality etc.

Income

The income of a target audience is important as it gives us an indication of expendable income.

Buying Habits

A persons buying habits can help companies design product to closer suit certain target audiences.

Location

Location also tells us a lot about a target audience as it shows us what they have access to.

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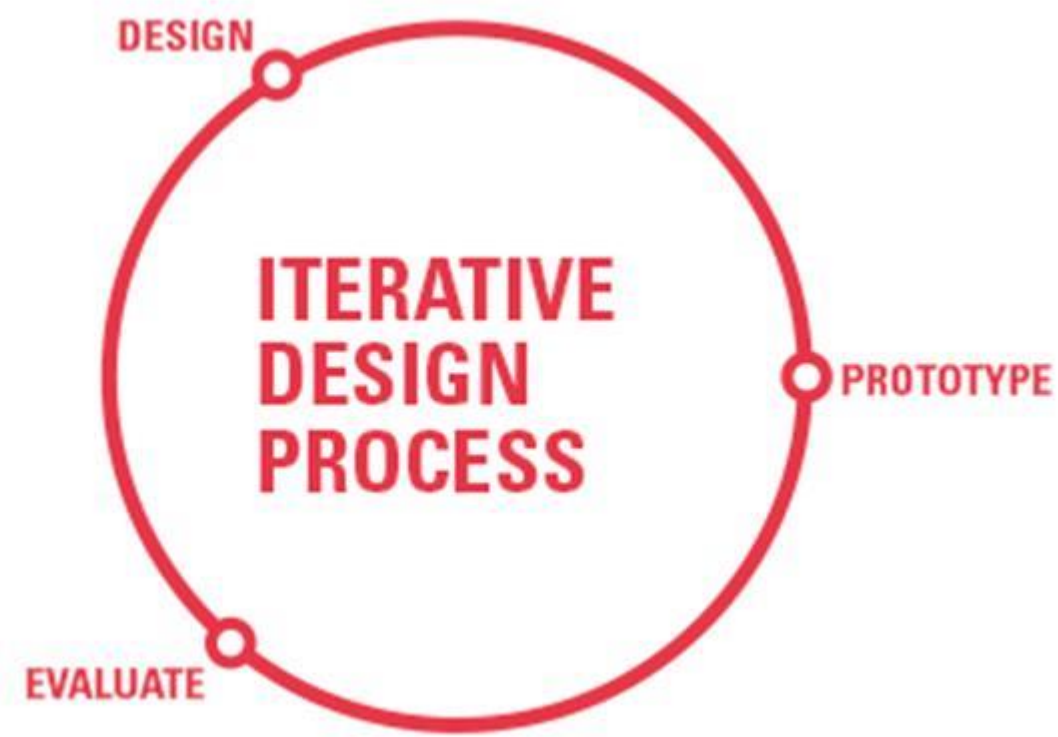
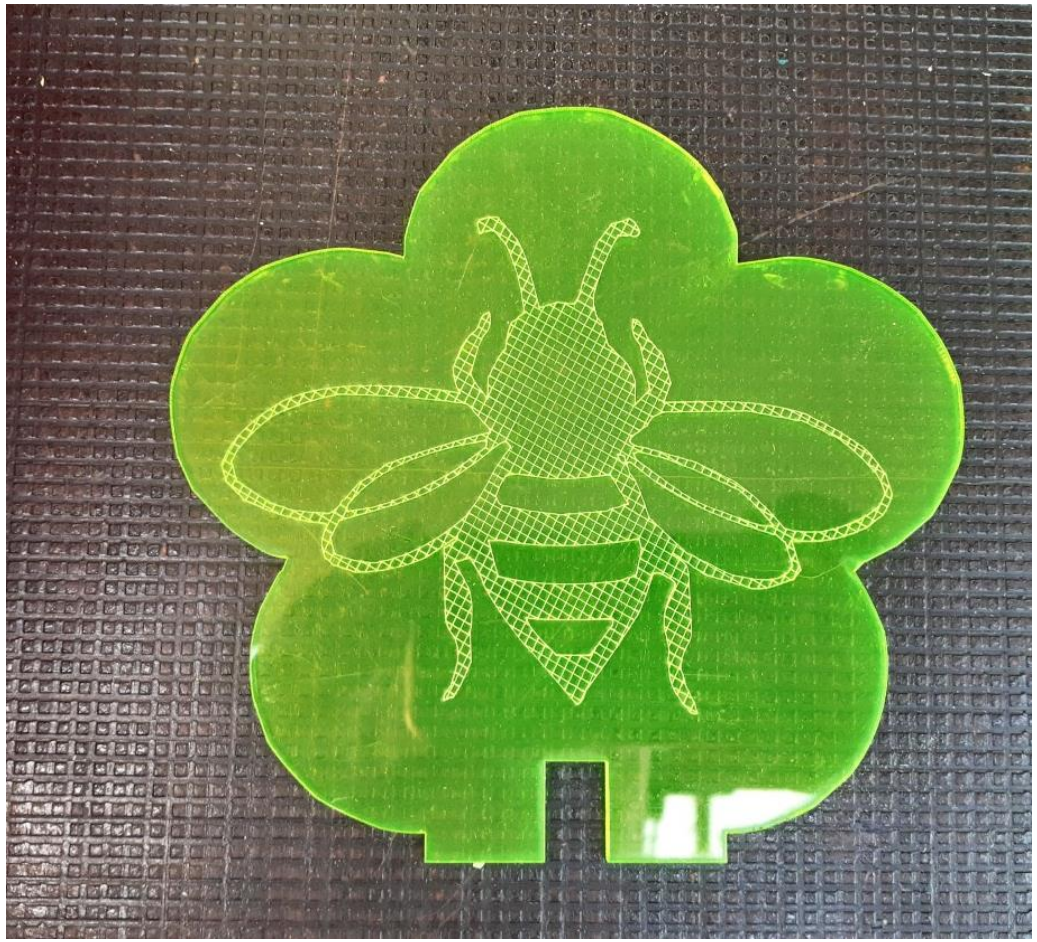
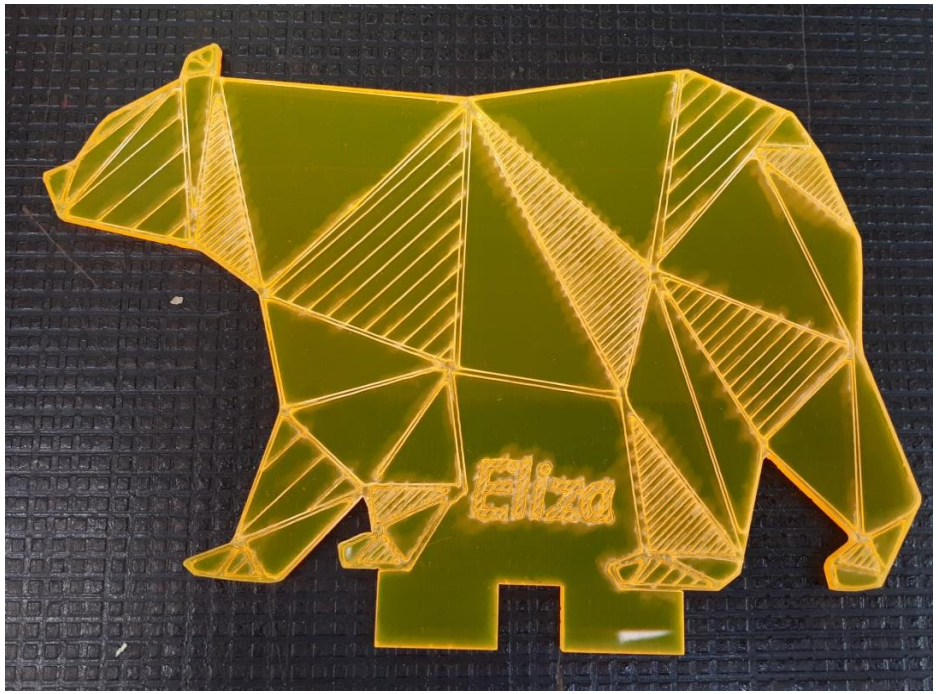
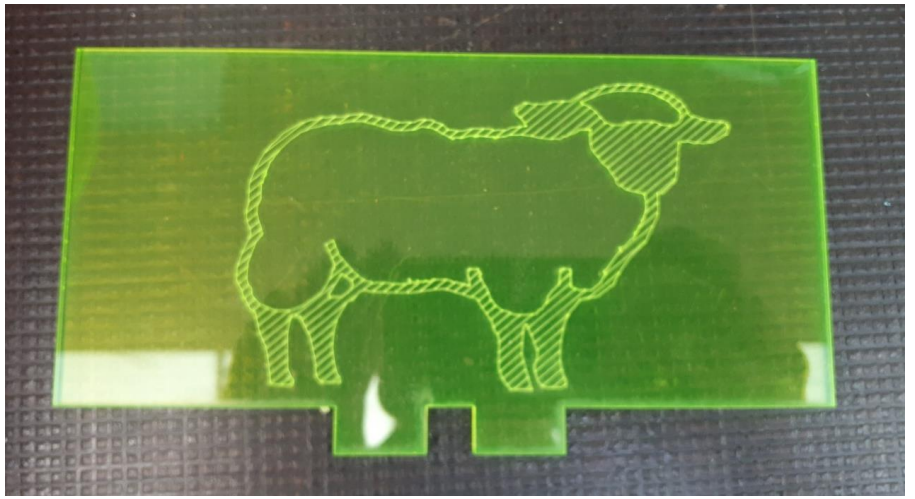
Iterative Design



Laser cut examples



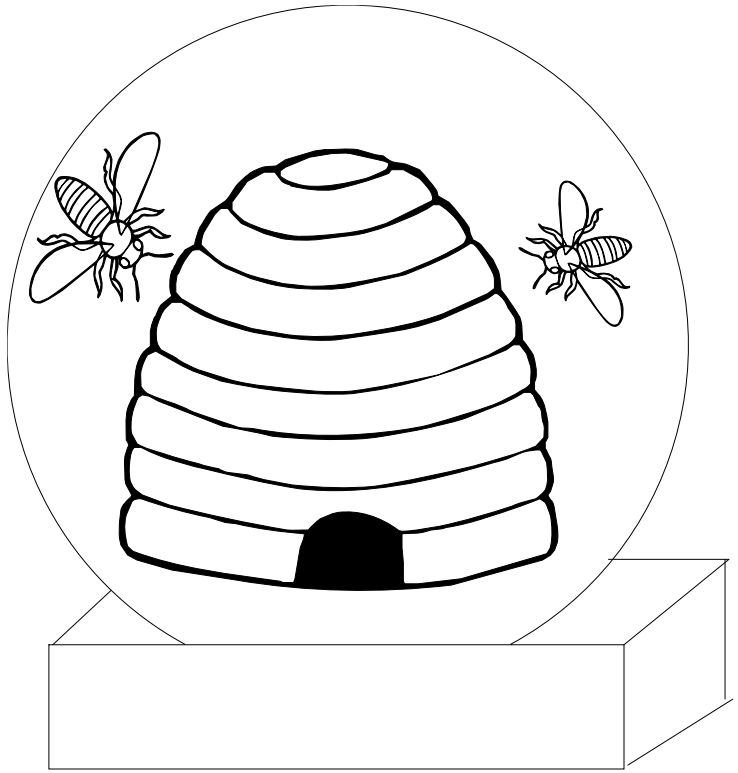


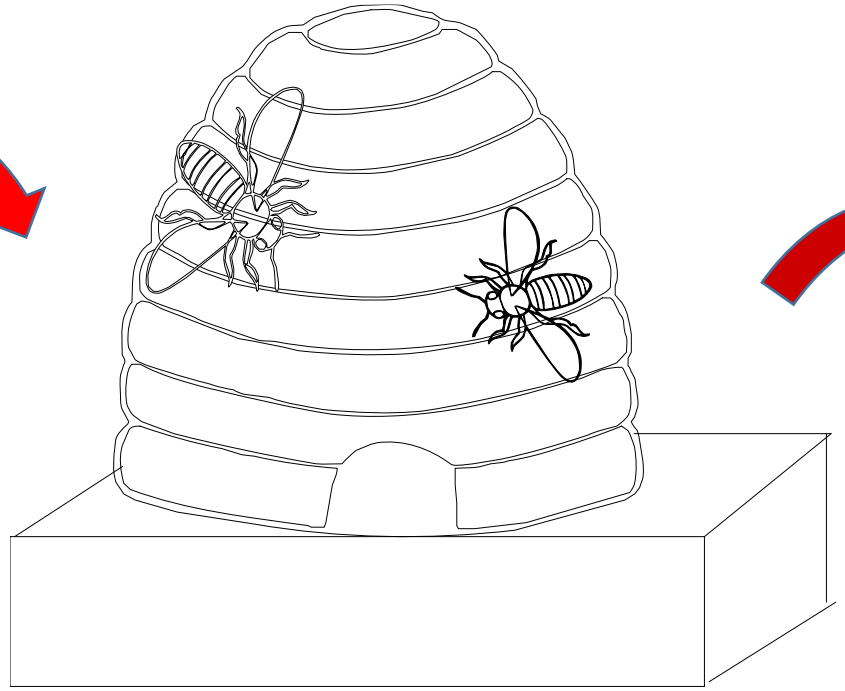


Design ideas - Success criteria

- Hint of colour
- Annotated
- Labelled
- Clear outline
- Ruler for straight lines/templates for shapes
- 3d (if possible)
- Dimensions included
- Explanation as to why it is your chosen idea
- Annotation

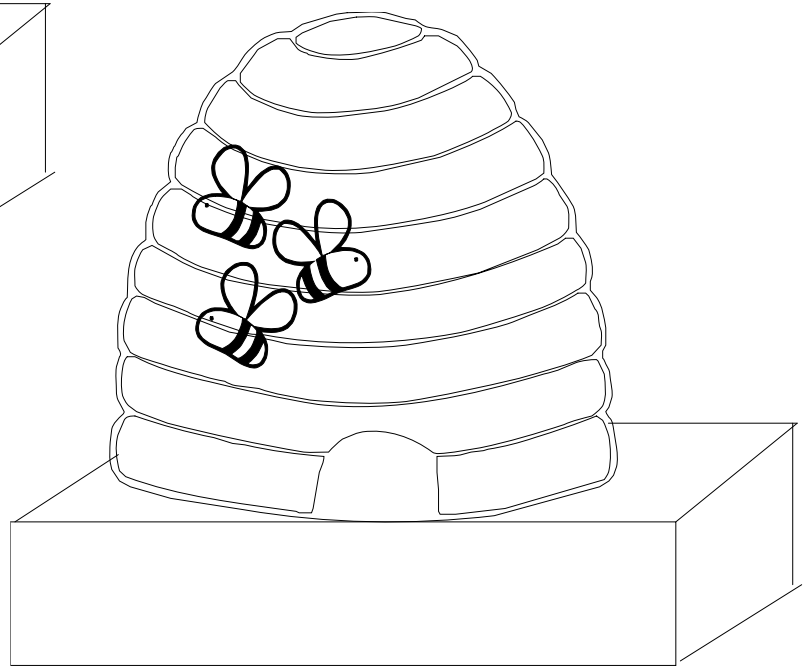
-Simple bee nest shape
-Detailed bees
-Simple circle design
-Aimed for people who are interested in nature and the outdoors



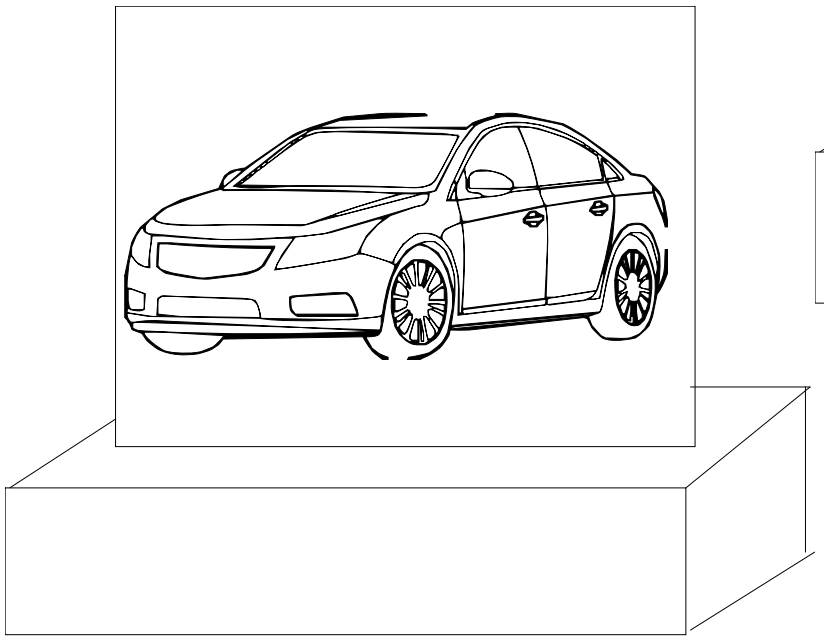


-More interesting shape
-Bees are too detailed to overlap, need to simplify
-Removed solid black colour

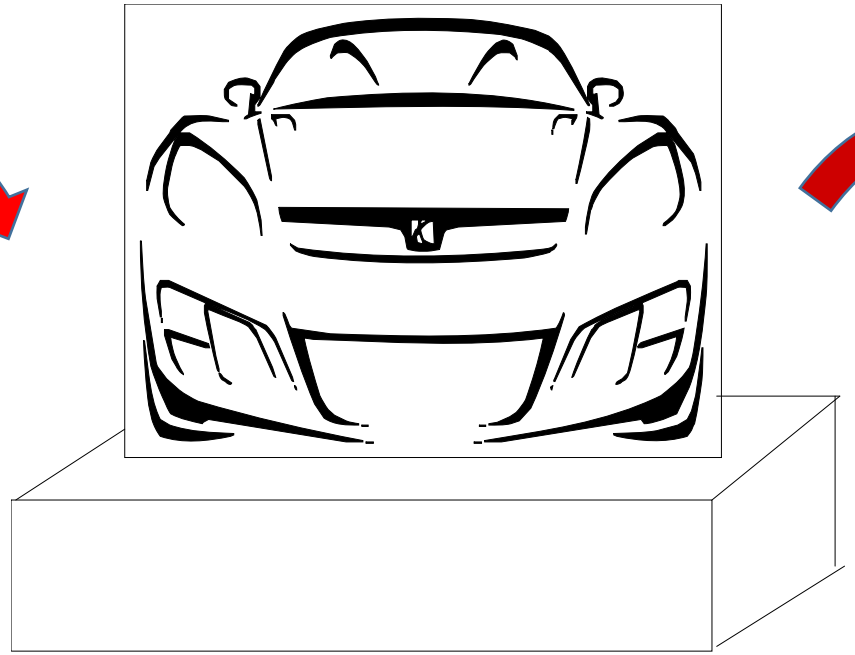
-Bees are simplified
So more bees can be added
- Yellow acrylic will be used to compliment design theme



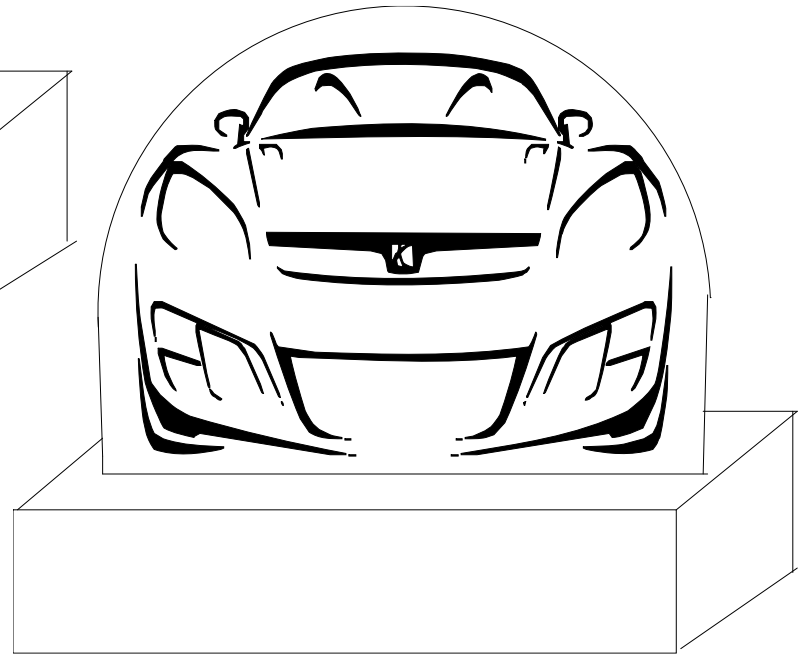
- Detailed car design
- Simple rectangle shape
- side view of car



-Detailed car design
- Front view of car to compliment the headlights illuminating
-Rectangle design is too harsh for soft lines used



-Softer outline shape to compliment curve of the car



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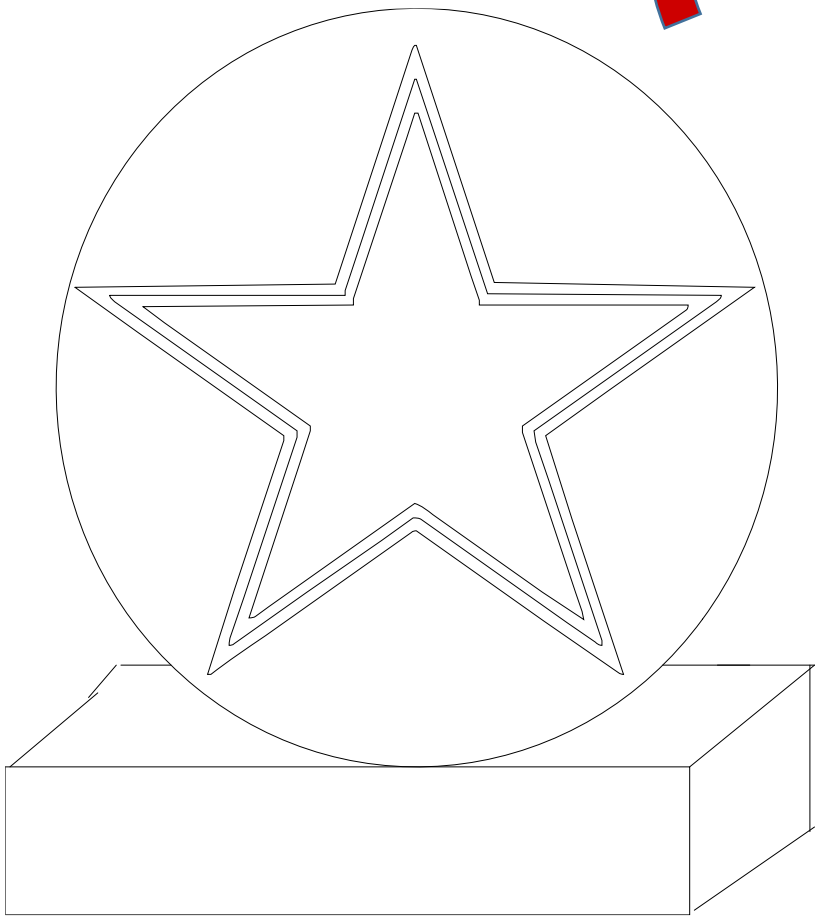
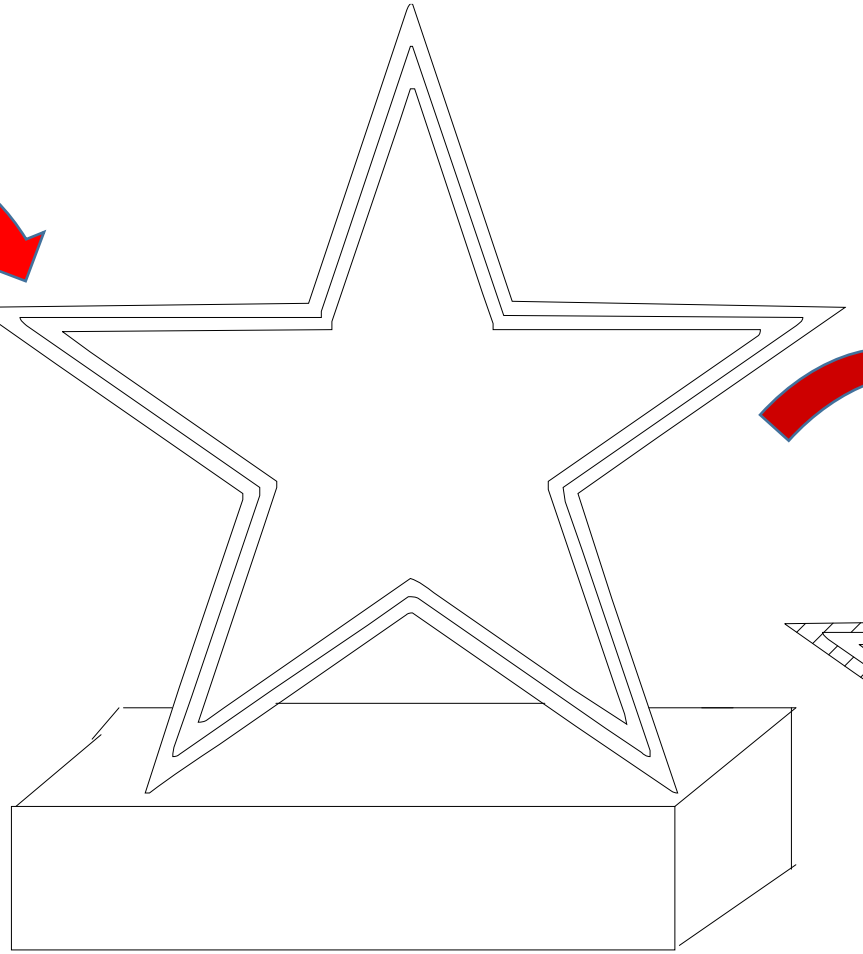
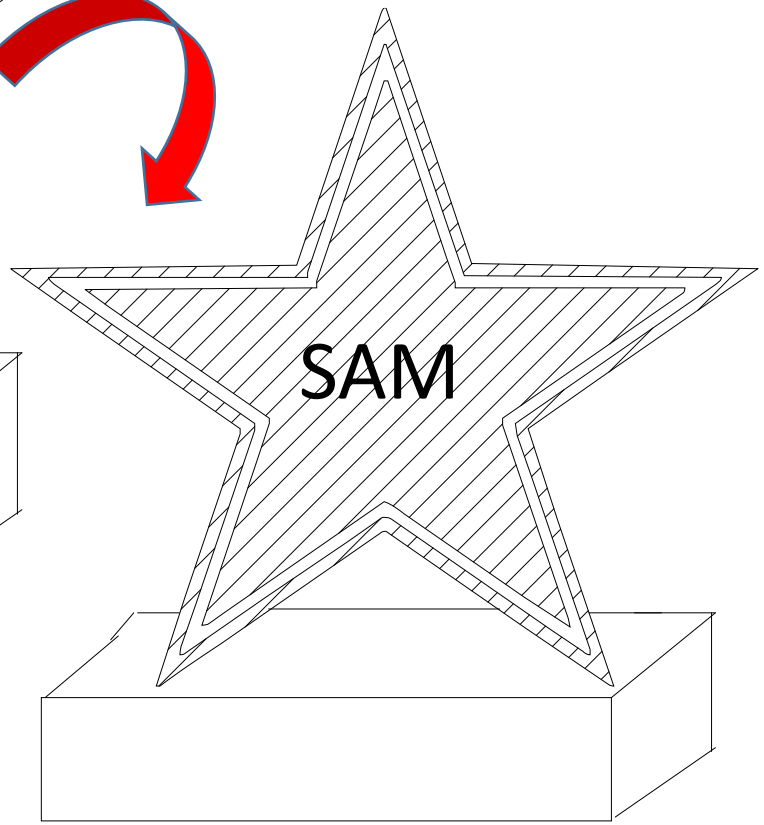
-Simple circle shape
- Star with some detail
- Will interest all customers
- Gender neutral



-More interesting shape outline
Not enough detail in star



-Lines have been added for more detail
-The detail will be illuminated
-Personalized name



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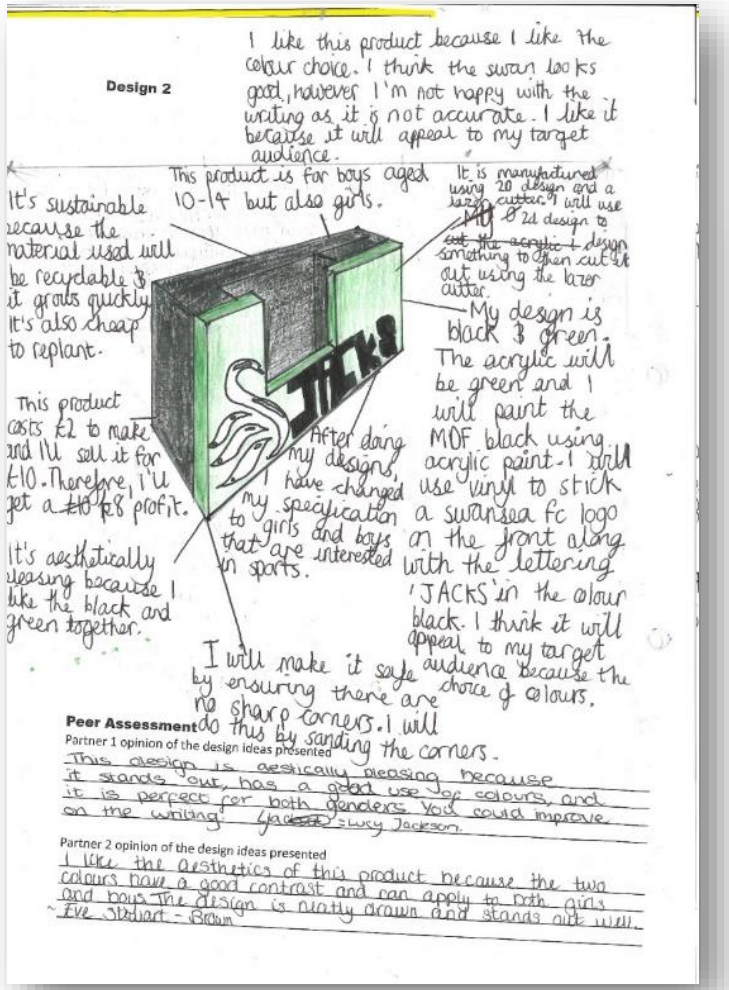
What a good one looks like



Design 2

I like this product because I like the colour choice. I think the swan looks good, however I'm not happy with the writing as it is not accurate. I like it because it will appeal to my target audience.

This product is for boys aged 10-14 but also girls.

It's sustainable because the material used will be recyclable & it grows quickly. It's also cheap to replant.

It is manufactured using 2D design and a laser cutter. I will use ~~MDF~~ 2d design to ~~cut the acrylic~~ design something to then cut it out using the laser cutter.

My design is black & green. The acrylic will be green and I will paint the MDF black using acrylic paint. I will use vinyl to stick a swansea fc logo on the front along with the lettering 'JACKS' in the colour black. I think it will appeal to my target audience because the choice of colours.

This product costs £2 to make and I'll sell it for £10. Therefore, I'll get a ~~£10~~ £8 profit.

After doing my designs, I have changed my specification to girls and boys that are interested in sports.

It's aesthetically pleasing because I like the black and green together.

I will make it safe by ensuring there are no sharp corners. I will do this by sanding the corners.

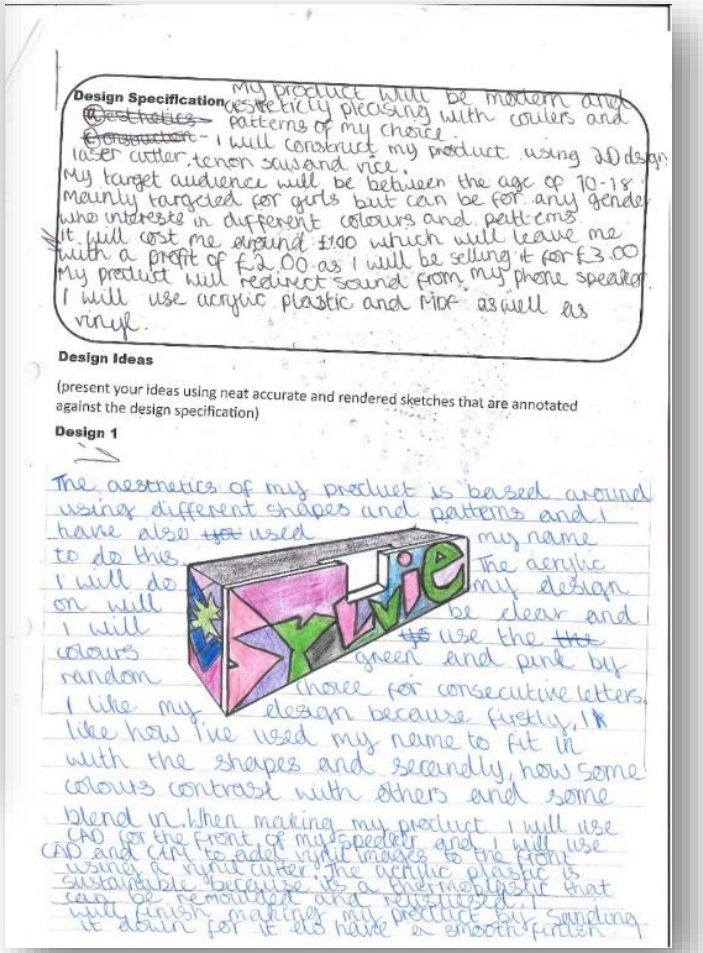
Peer Assessment

Partner 1 opinion of the design ideas presented

This design is aestically pleasing because it stands out, has a good use of colours, and it is perfect for both genders. You could improve on the writing. Jack = Lucy Jackson.

Partner 2 opinion of the design ideas presented

I like the aesthetics of this product because the two colours have a good contrast and can apply to both girls and boys. The design is neatly drawn and stands out well. ~ Eve Stewart - Brown



Design Specification

~~Aesthetics~~ My product will be modern and aestheticly pleasing with coulers and patterns of my choice.

~~Construction~~ - I will construct my product using 2D design laser cutter, tenon saw and vice.

My target audience will be between the age of 10-18 mainly targeted for girls but can be for any gender who interests in different colours and patterns.

It will cost me around £1.00 which will leave me with a profit of £2.00 as I will be selling it for £3.00

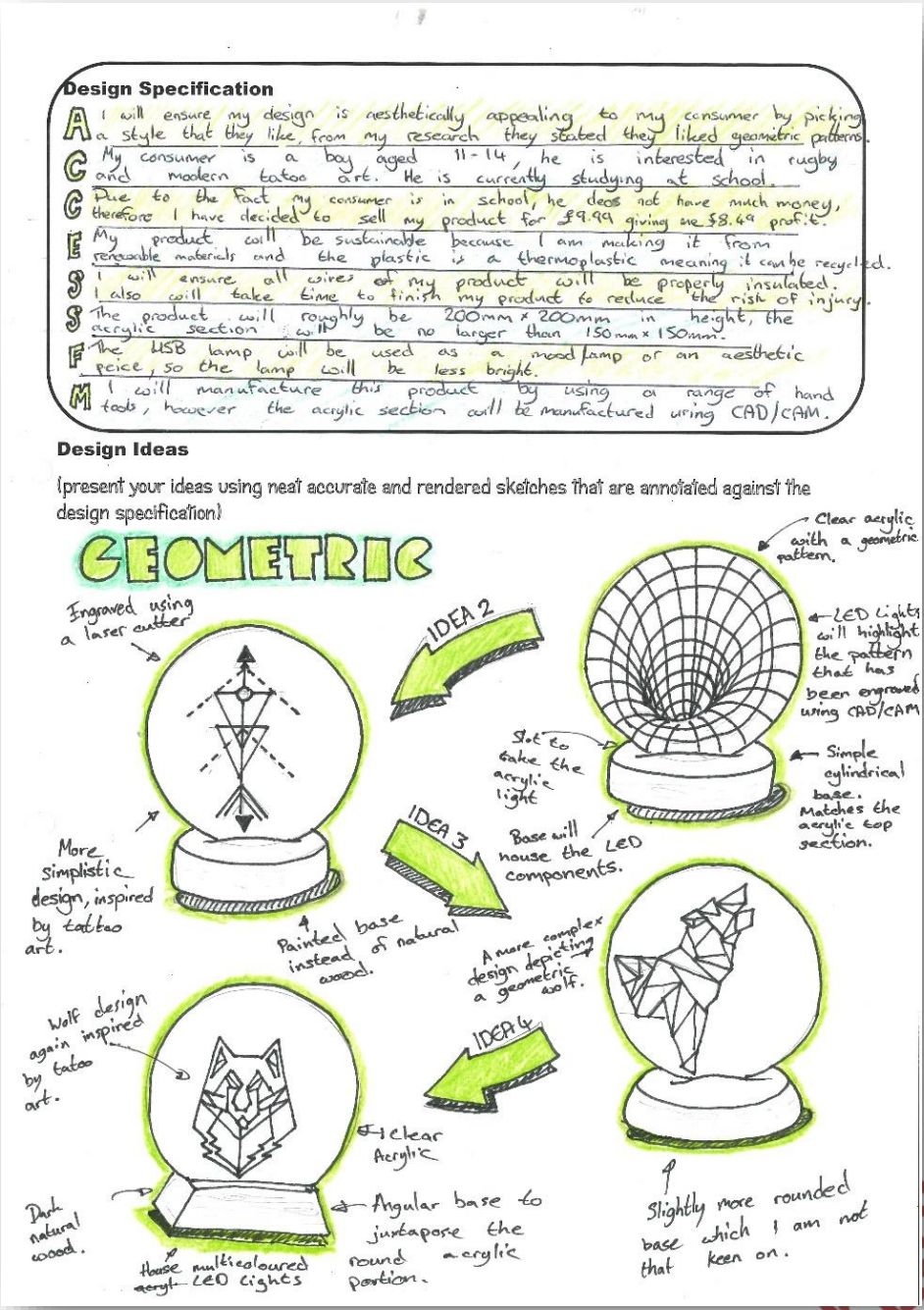
My product will redirect sound from my phone speaker. I will use acrylic plastic and MDF as well as vinyl.

Design Ideas

(present your ideas using neat accurate and rendered sketches that are annotated against the design specification)

Design 1

The aesthetics of my product is based around using different shapes and patterns and I have also ~~yet~~ used my name to do this. The acrylic I will do my design on will be clear and I will use the ~~the~~ colours green and pink by random choice for consecutive letters. I like my design because firstly, I like how I've used my name to fit in with the shapes and secandly, how some colours contrast with others and some blend in. When making my product I will use CAD for the front of my speaker and I will use CAD and CAM to add vynil images to the front using a vynil cutter. The acrylic plastic is sustainable because its a thermoplastic that can be remoulded and reusuesed. I will finish making my product by sanding it down for it to have a smooth finish.



Design Specification

A I will ensure my design is aesthetically appealing to my consumer by picking a style that they like, from my research they stated they liked geometric patterns.

C My consumer is a boy aged 11-14, he is interested in rugby and modern tatoo art. He is currently studying at school.

C Due to the fact my consumer is in school, he does not have much money, therefore I have decided to sell my product for £9.99 giving me £8.49 profit.

E My product will be sustainable because I am making it from renewable materials and the plastic is a thermoplastic meaning it can be recycled.

S I will ensure all wires of my product will be properly insulated. I also will take time to finish my product to reduce the risk of injury.

S The product will roughly be 200mm x 200mm in height, the acrylic section will be no larger than 150mm x 150mm.

F The USB lamp will be used as a mood lamp or an aesthetic peice, so the lamp will be less bright.

M I will manufacture this product by using a range of hand tools, however the acrylic section will be manufactured using CAD/CAM.

Design Ideas

(present your ideas using neat accurate and rendered sketches that are annotated against the design specification)

GEOMETRIC

Engraved using a laser cutter

More simplistic design, inspired by tattoo art.

Painted base instead of natural wood.

IDEA 2

IDEA 3

IDEA 4

Clear acrylic with a geometric pattern.

LED lights will highlight the pattern that has been engraved using CAD/CAM

Slot to take the acrylic light

Simple cylindrical base. Matches the acrylic top section.

Base will house the LED components.

A more complex design depicting a geometric wolf.

Wolf design again inspired by tatoo art.

Clear Acrylic

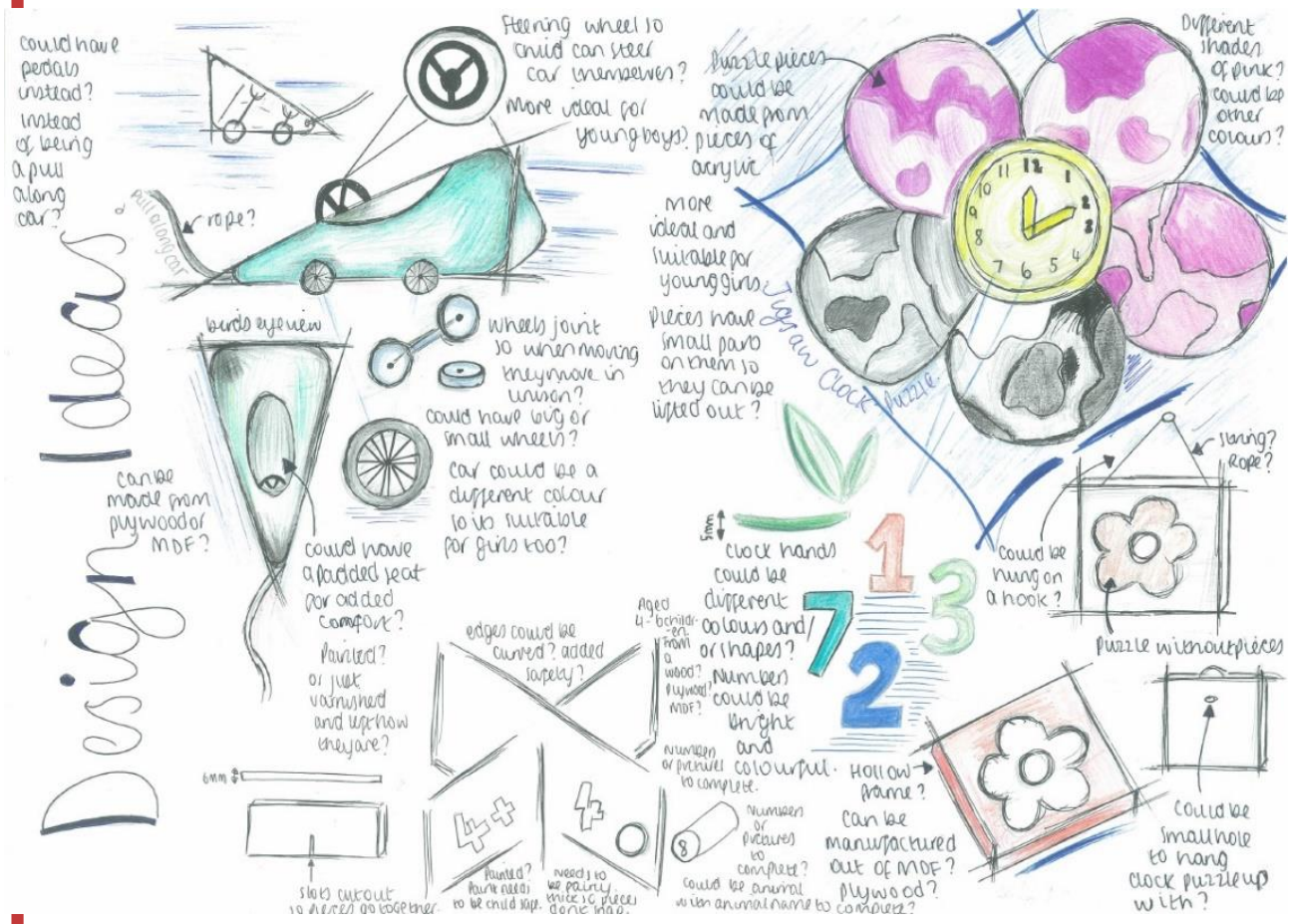
Dark natural wood.

Angular base to juxtapose the round acrylic portion.

House multicoloured ~~acryl~~ LED lights

Slightly more rounded base which I am not that keen on.

What a good one looks like



annotation

[anəˈteɪʃ(ə)n]

NOUN

a note by way of explanation or comment added to a text or diagram.
"marginal annotations"

synonyms: note · notation · comment · gloss · footnote · commentary · explanation · interpretation · observation · elucidation · explication · exegesis

- the action of annotating a text or diagram.
  "annotation of prescribed texts"

Success criteria

- Organise your ideas, notes and thoughts by utilising the skeleton
- Support points and issues covered with examples/details
- Evaluate your work by developing your analytical opinions
- Refer to your design specification
- Support text with further diagrams and sketches
- Use technical terminology
- Use defined paragraphs to define the text
- Use capital letters for names of people, places, days, months, etc.
- Make sure that your work is neat and legible

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Literacy planning frame – DESIGN DEVELOPMENT ANNOTATION

HOW COULD THIS DESIGN BE CONSTRUCTED OR ASSEMBLED?	WHAT IS THE MAIN FUNCTION OF THIS DESIGN?	WHAT DO YOU LIKE & DISLIKE ABOUT THIS DESIGN?	WHAT DOES YOUR INTENDED USER LIKE & DISLIKE ABOUT THIS DESIGN?	HOW DOES THIS DESIGN COMPARE TO YOUR DESIGN CRITERIA?
WHAT MATERIALS COULDBE USED TO MAKE THIS DESIGN?	**SUCCESS CRITERIA** • Organise your ideas, notes and thoughts by utilising the skeleton • Support points and issues covered with examples/details • Evaluate your work by developing your analytical opinions • Refer to your design specification • Support text with further diagrams and sketches • Use defined paragraphs to define the text • Use capital letters for names of people, places, days, months, etc. • Make sure that your work is neat and legible			WHAT CAN YOU DO TO IMPROVE THIS DESIGN?
WHAT JOINING METHODS, FIXINGS OR COMPONENTS COULD BE USED?				WHAT COULD YOU ADD, REMOVE, INCORPORATE TO THIS DESIGN?
WHAT TOOLS, MACHINES & PROCESSES COULD BE USED TO MANUFACTURE THIS DESIGN?				WHAT OTHER FUNCTIONS COULD YOU INCLUDE IN THIS DESIGN?
WHAT FINISH, DECORATION or PATTERN COULD YOU APPLY?	WHAT IS THE SIZE, SCALE, PROPORTION, DIMENSIONS?	WHAT JIGS, FORMERS, TEMPLATES, MOULDS OR OTHER MAKING AIDS COULD BE USED TO ENSURE ACCURACY?	HOW CAN THIS DESIGN BE ENVIRONMENTALLY FRIENDLY OR SUSTAINABLE?	HOW WILL YOU MAKE THIS DESIGN SAFE TO USE?

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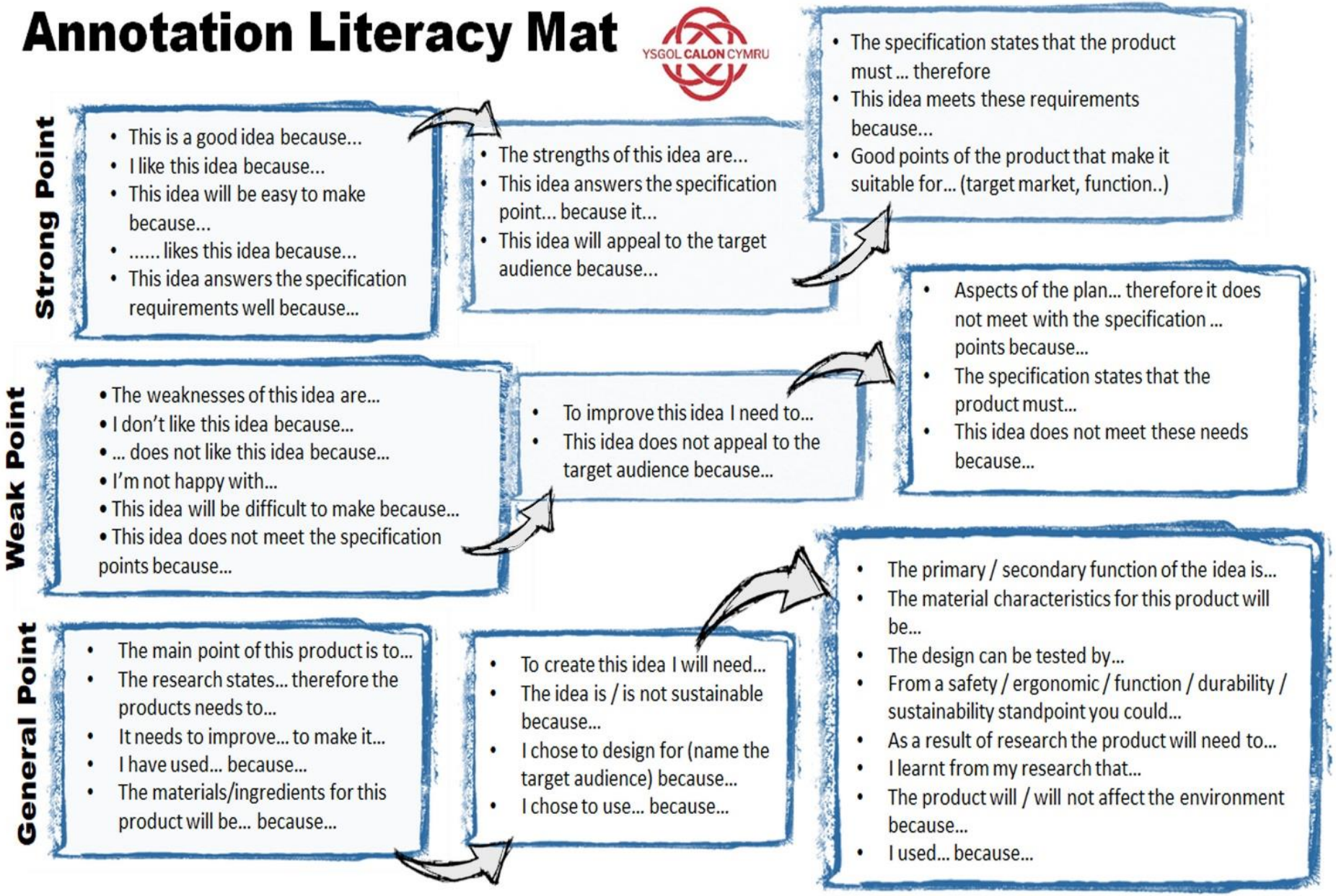
Annotation Literacy Mat



MDF base

1: Measure out all parts correctly using a pencil. Ruler and the help sheets.

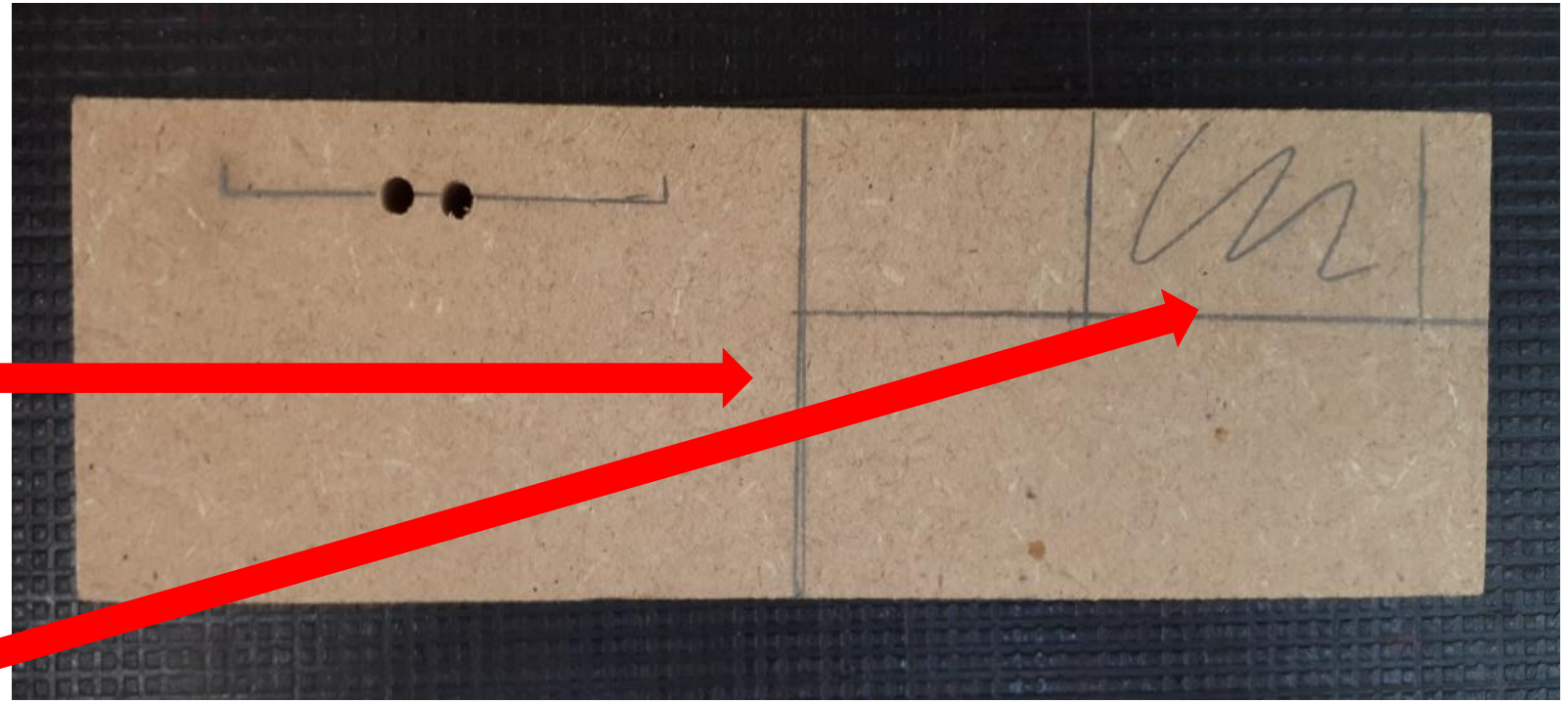
2: Use a tennon saw to cut your MDF in half.

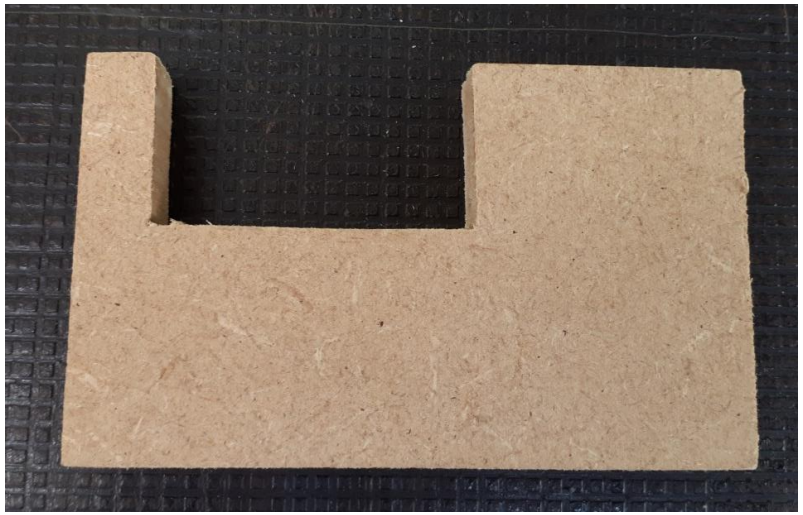
3: Use your tennon saw and coping saw to cut out the waste.

4: Use the pilllar drill to drill holes across the line.

5: Use a coping saw and a file to flatten out the line where the holes have been drilled. Drill bit size 7mm.

6: Use sandpaper to make sure all sides are smooth.





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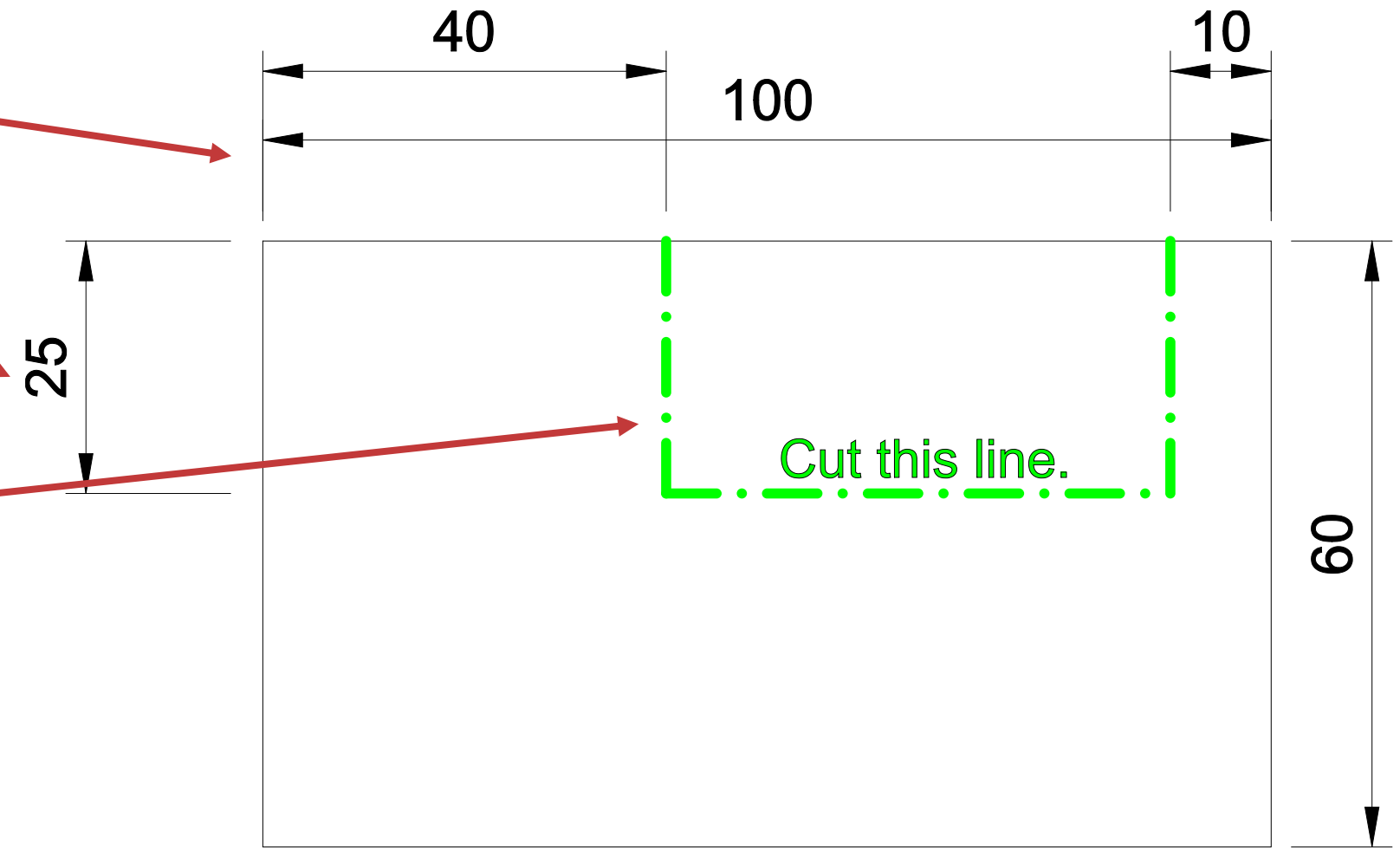
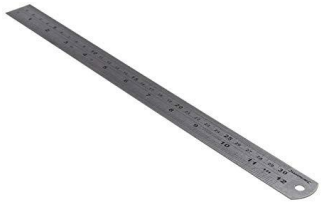
Step one: Mark out the measurements across the top section as is shown in the diagram.

Step two: Measure and mark a line 25mm down from the top.

Step three: Cut the lines shown in green using a coping saw.



Tools:
You will need the following tools;



You will have 1 pieces of MDF cut to size

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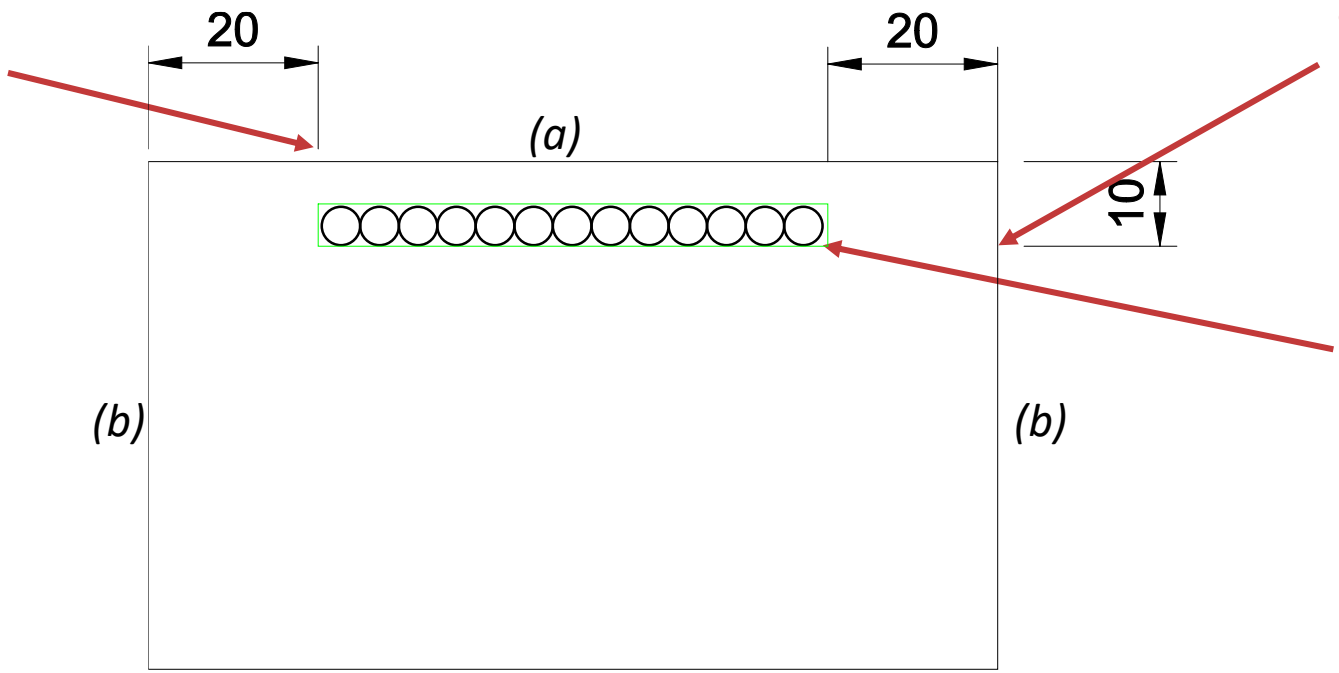
Step one: To mark out the slot to house the acrylic first start by measuring 20mm in from the edges *(a)* and drawing a line using a pencil and try square.



Step two: Next measure a line 10 mm from the back *(b)*

Step 3: Using a 7mm drill bit drill holes across the shape on the line you marked previously.

Step four: Lastly use a file to create a clean slot for the acrylic

Tools:

You will need the following tools;

Hints and Tips:

- Ensure you use a sharp pencil for accuracy.
- Make sure the brass edge of the try square in pushed directly onto the wood.
- Take your time to double check measurements.

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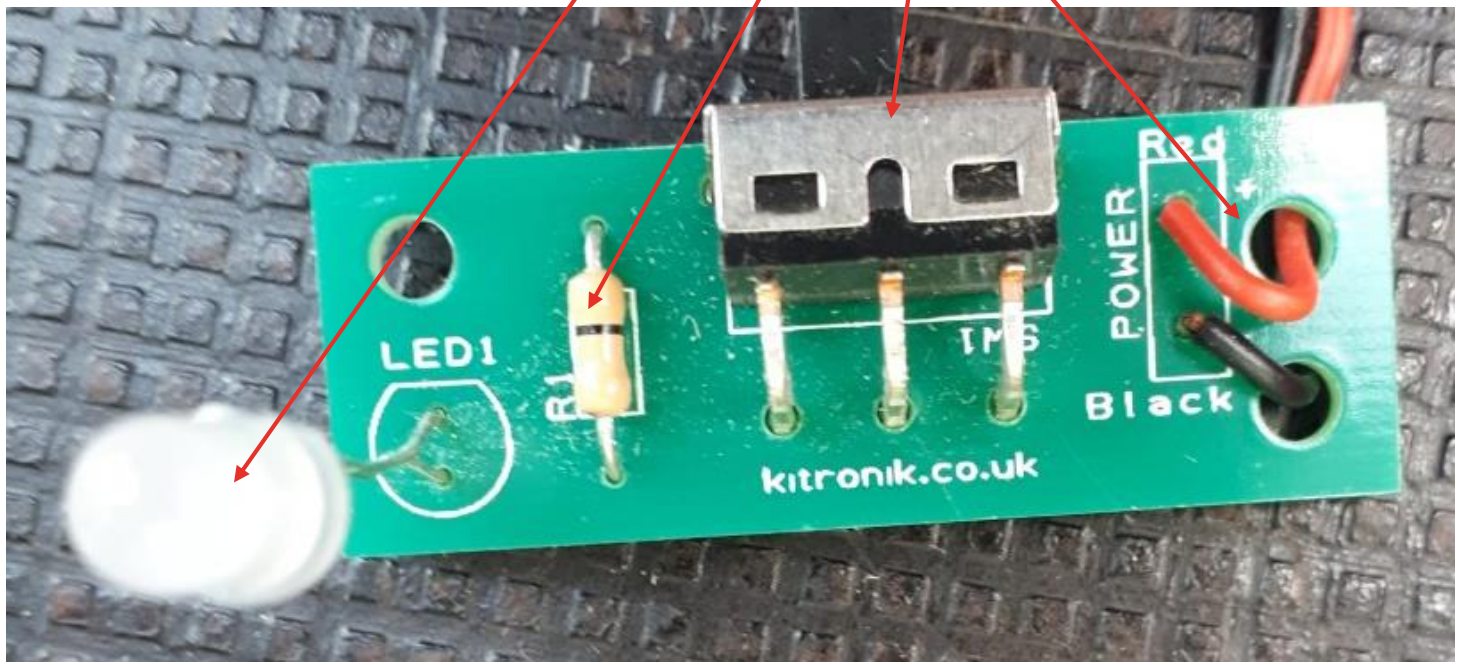
Components

LED — Converts electric into light

Resistor — Limits the current flow

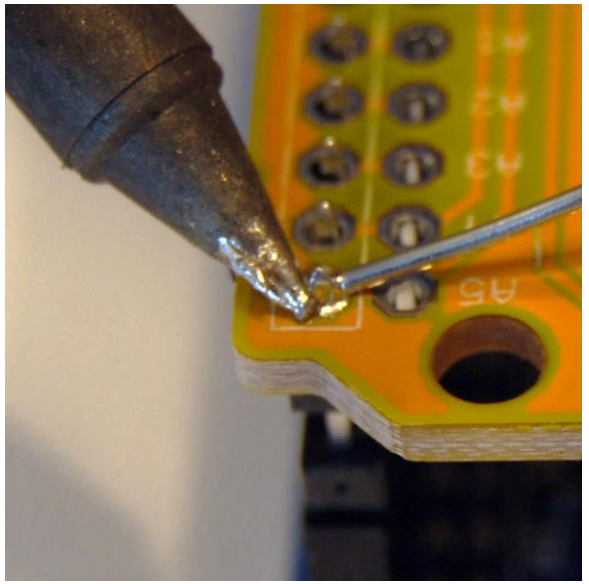
Switch — Controls the flow of electricity

Insulated wire — Carries the electrical current



What is soldering?

Soldering is the process of joining two or more electronic parts together by melting solder around the connection. Solder is a metal alloy and when it cools it creates a strong electrical bond between the parts. Even though soldering can create a permanent connection, it can also be reversed using the soldering iron.



Soldering iron

Solder

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How to solder

Step 1: Health and safety – Always wear goggles when using the soldering iron.

Step 2: Turn on your soldering iron and let it heat up.

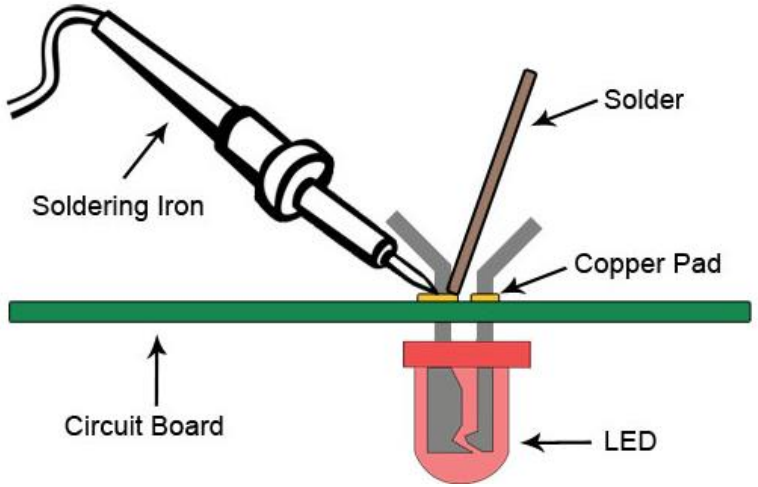
Step 3: Wipe the tip of the soldering iron on a damp wet sponge to clean it.

Step 4: Hold the soldering iron in one hand and solder in the other.

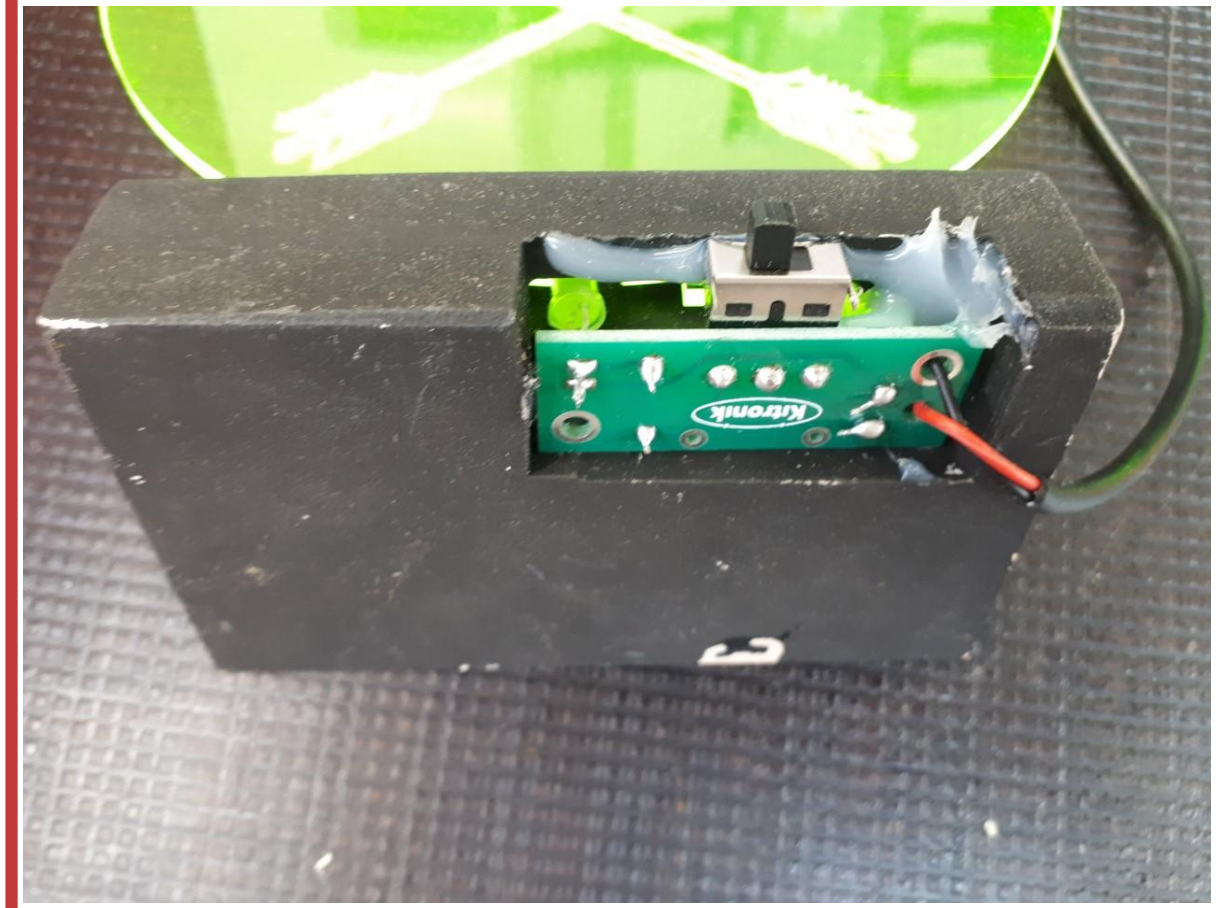
Step 5: Put the solder to the tip of the iron and make sure the solder flows evenly around the connection.

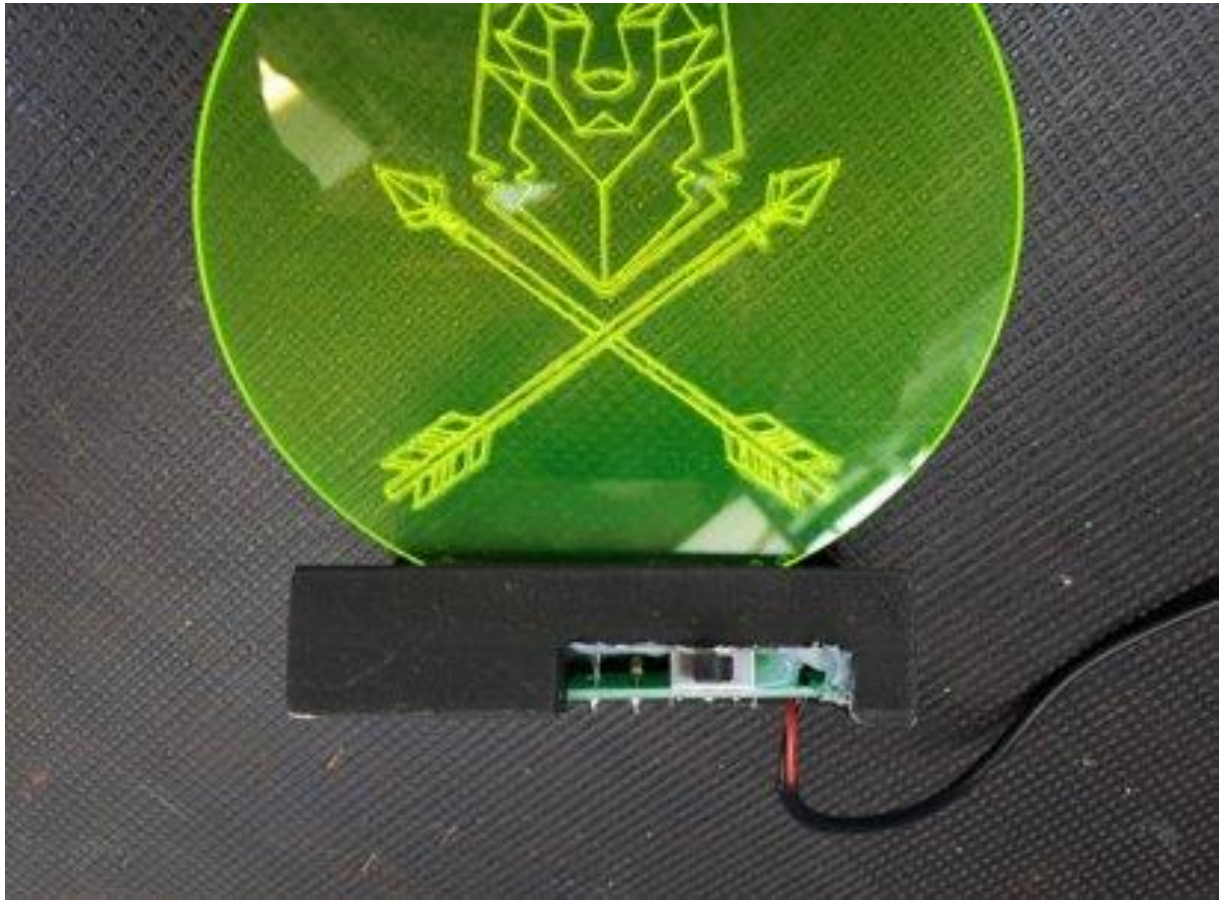
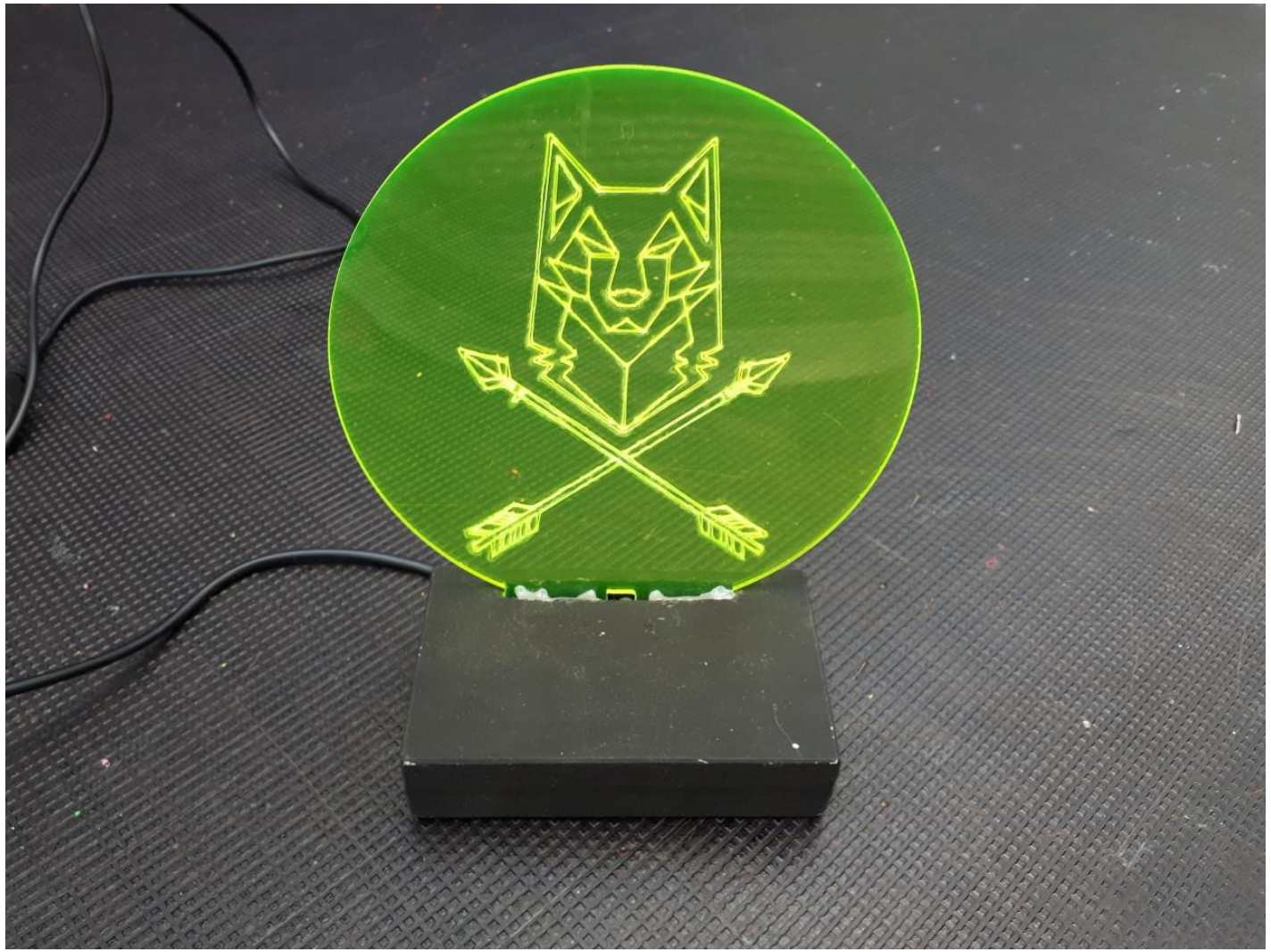
Step 6: Always place your soldering iron in the holder when not in use.

Using a damp sponge will help to keep the soldering iron tip clean by removing the oxidation that forms. Tips with oxidation will tend to turn black and not accept solder as it did when it was new.



Attaching circuit to stand





Finished example