YEAR 7

HEALTH & SAFETY

KEYRING HOLDER PROJECT

YSGOL CALON CYMRU

AMCAN

Introducing the workshop

Identify workshop rules

Explain why we need health and safety in the workshop

Explain why we need health and safety in the workshop by giving examples to support statement

Health and safety

- Workshop safety is put in place so as to ensure that all workers are **safe**.

- This may include having **signs**, using the right **tools** and wearing **protective** clothing in the workshop.

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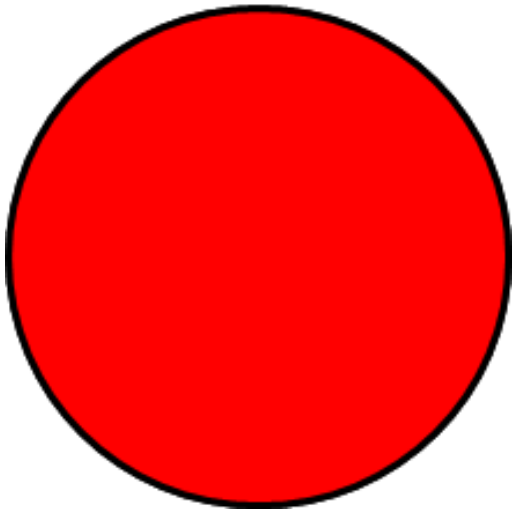
Safety Always job one!
ROCK
PAPER
SCISSORS
TABLE SAW
...at work and at play!

Workshop rules

TASK - In your groups, come up with 5 rules in the workshop, you have 60 seconds!

1 minute



Health and safety rules

- Always **listen** to the teacher and follow instructions
- **Do not run** in the workshop
- Put bags and coats **outside** the room at all times
- Report **ANY** damaged equipment
- Put all equipment **away** safely
- Use all equipment **carefully**
- **Do not use tools** unless shown how to or told to do so by the teacher
- Do not touch other **pupils work**
- **Ask** if you are unsure about anything
- Only **one person** operating a machine at a time
- **Do not use the vices unless told to do so!**

Show pupils the workshop…

What should you do if you break something in the workshop?

I SHOULD…

Tell the teacher
Leave it where it is
Don’t touch it
Stop using the tool

I SHOULD’NT…

Hide or ignore it
Try and fix it
Continue using the tool
Be worried that you will get in to trouble

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What should you do if you hurt someone or yourself in the workshop?

I SHOULD…

Tell the teacher
Stop using the tool
Be honest

I SHOULD'NT…

Hide or ignore it
Continue using the tool
Be worried that you will get in to trouble

What should you do if you don't understand the work in design and technology?

I SHOULD…

Use the resources available to help you
Ask a friend
Ask the teacher
Use the 5 B's – Brain Board Book Buddy Boss

I SHOULD'NT…

Guess what the task is
Copy someone else
Sit there doing nothing
Be worried that you will get in to trouble

To answer booklet…

- **USE YOUR COMMON SENSE**
- **ANSWERS SHOULD BE REALISTIC**
- **DO NOT USE THE SAME ANSWER TWICE**

You will be completing the booklet throughout the term, not all at once.

PLENARY - Health and safety rules

- **Safe**
- **Instructions**
- **Workshop**
- **Equipment**

TASK -Use 15 words to tell me what you know about the <u>importance</u> of health and safety - Use all of the words listed

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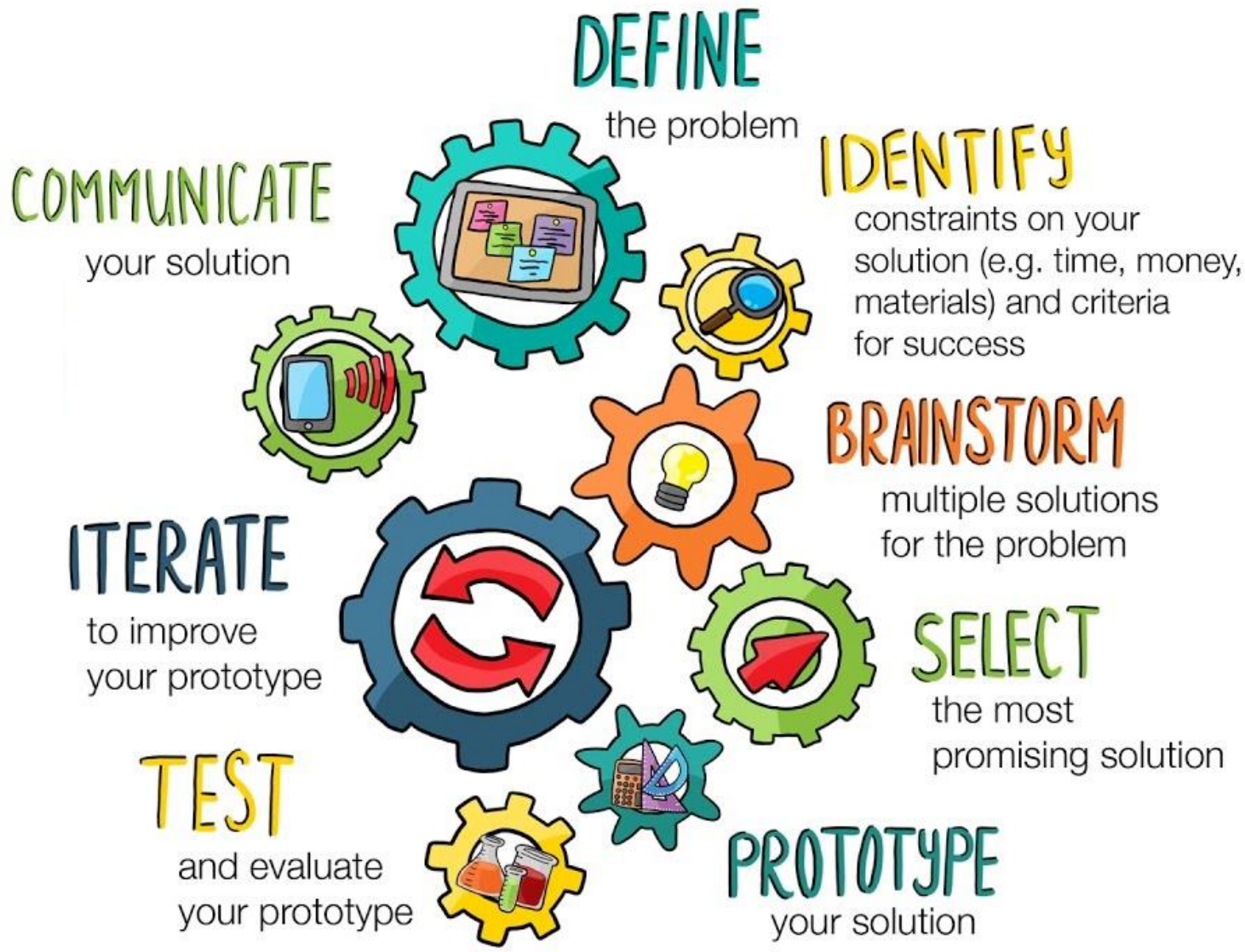
The design process



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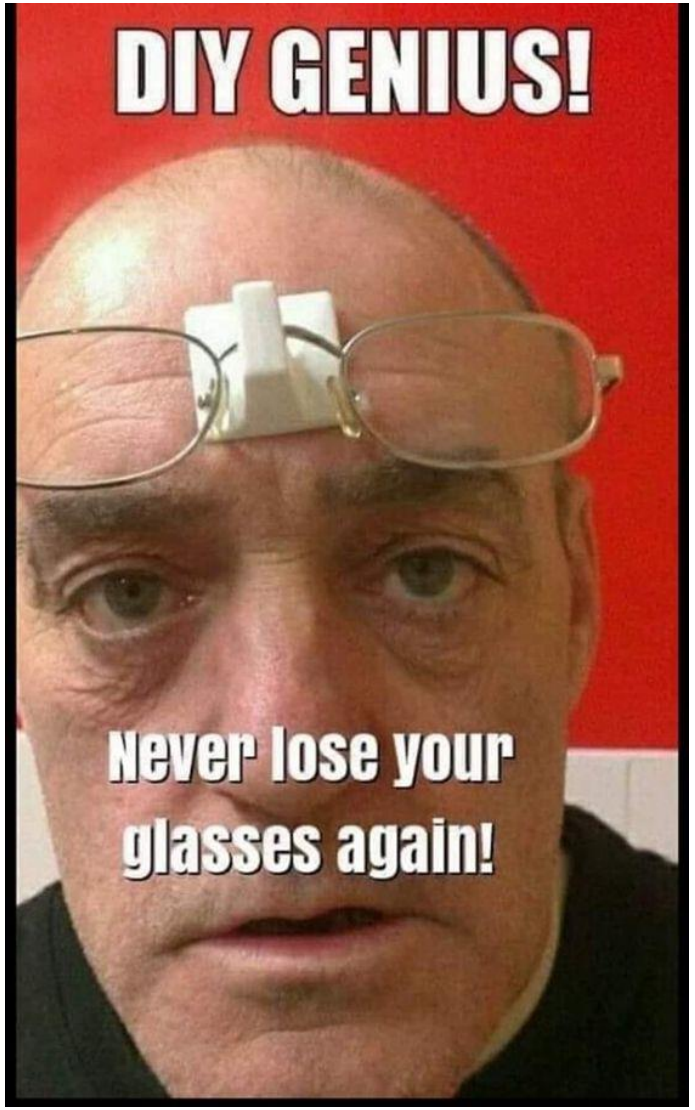
What is a design problem?

- A design problem is something that needs a design to solve a problem.
- What products can you think of that solve a problem in everyday life?



Our design problem – To get access in to anything, you need keys. Households have lots of keys for different things which often get lost.

What problem do these products solve?

Coffee dripping on a surface

Bags hurting your hands/carrying more that 1 bag

Losing screws and small tools

What is a brief?

- A **brief** explanation of the problem that we intend to solve.

Our design brief – Design and manufacture a keyring holder to store keys safely, the customer must be for a family of at least 2 people. The product must be made using CAD/CAM with a range of different materials to suit your product. The keyrings must interest the family members.

Design problem – To get access in to anything, you need keys. Households have lots of keys for different things which often get lost.

Design brief – Design and manufacture a keyring holder to store keys safely, the customer must be for a family of at least 2 people. The product may be made using CAD/CAM with a range of different materials to suit your product. The keyrings must interest the family members.

Existing products

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Shape ideas

Materials needed

MDF

Paint

Coloured acrylic

Keyring

plywood

PVA glue

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Tools needed

Coping saw

File

Sandpaper

Pillar drill

Laser cutter

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Customer

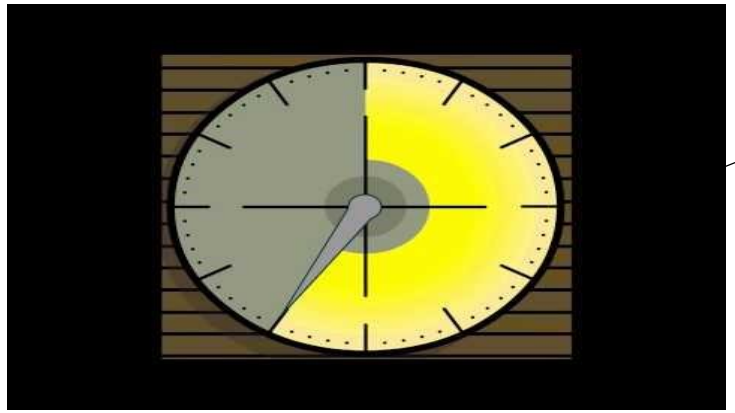
Think about who are you are aiming your product at?

Who will buy the product?

Ensure you think about the persons age, gender and interests.

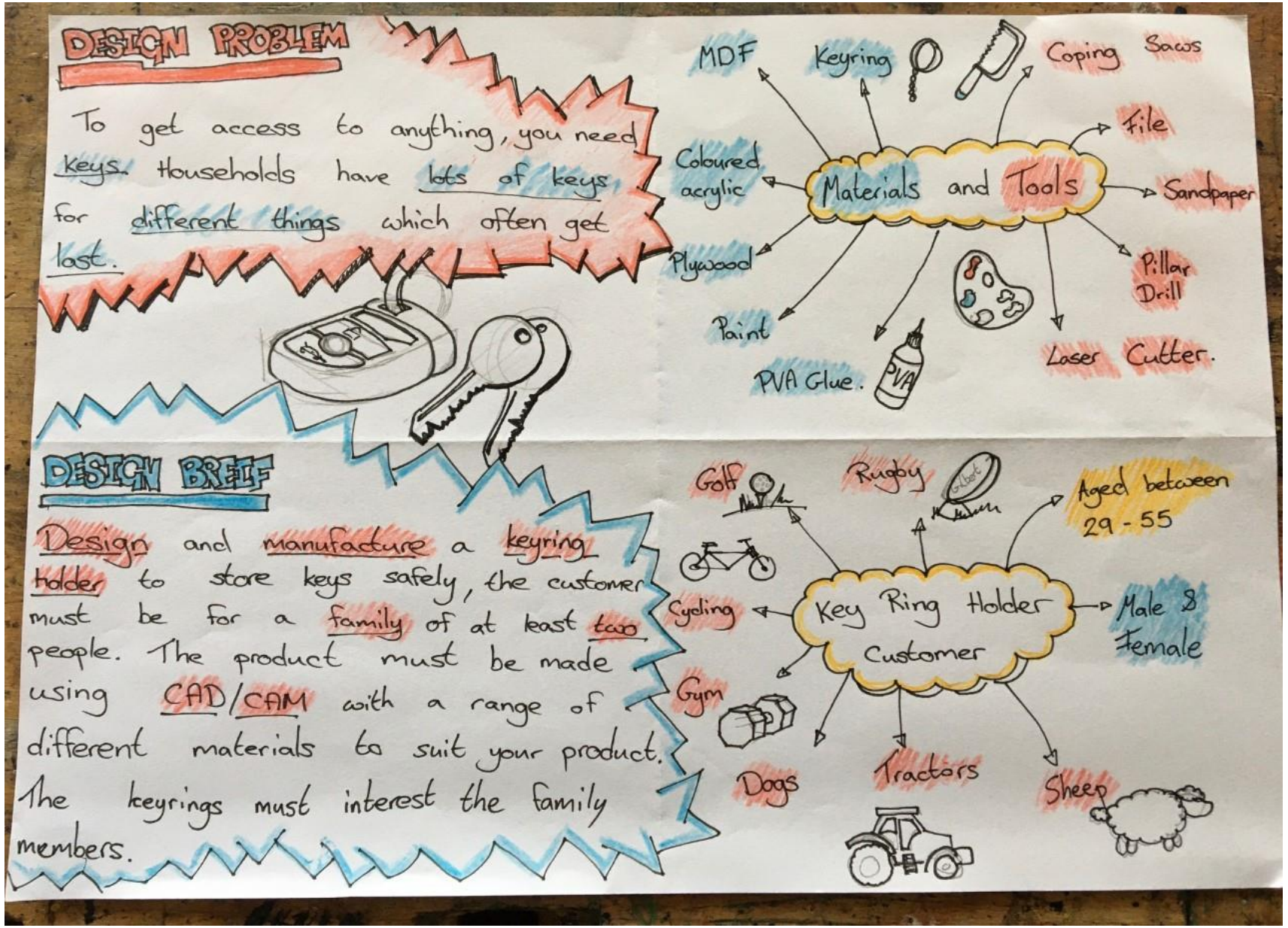
You have 60 seconds to discuss, your customer might be different to others on your table.

Keyring holder customer



Questions to consider before designing your product

- What keys will be stored on the holder?
- What shapes could you consider for the design?
- Will they be for certain things (e.g house) or a variety (house/car/shed)
- How many keys will you add?
- Will you add any engraving to your keyrings?
- Will you personalise your keyrings?
- Are you going to use plywood or acrylic?
- If you are using acrylic, what colour and why?


DESIGN PROBLEM
To get access to anything, you need keys. Households have lots of keys for different things which often get lost.
MDF
Keyring
Coping Saws
File
Coloured acrylic
Materials and Tools
Sandpaper
Plywood
Pillar Drill
Paint
Laser Cutter.
PVA Glue.
DESIGN BRIEF
Design and manufacture a keyring holder to store keys safely, the customer must be for a family of at least two people. The product must be made using CAD/CAM with a range of different materials to suit your product. The keyrings must interest the family members.
Golf
Rugby
Aged between 29 - 55
Cycling
Key Ring Holder Customer
Male & Female
Gym
Dogs
Tractors
Sheep

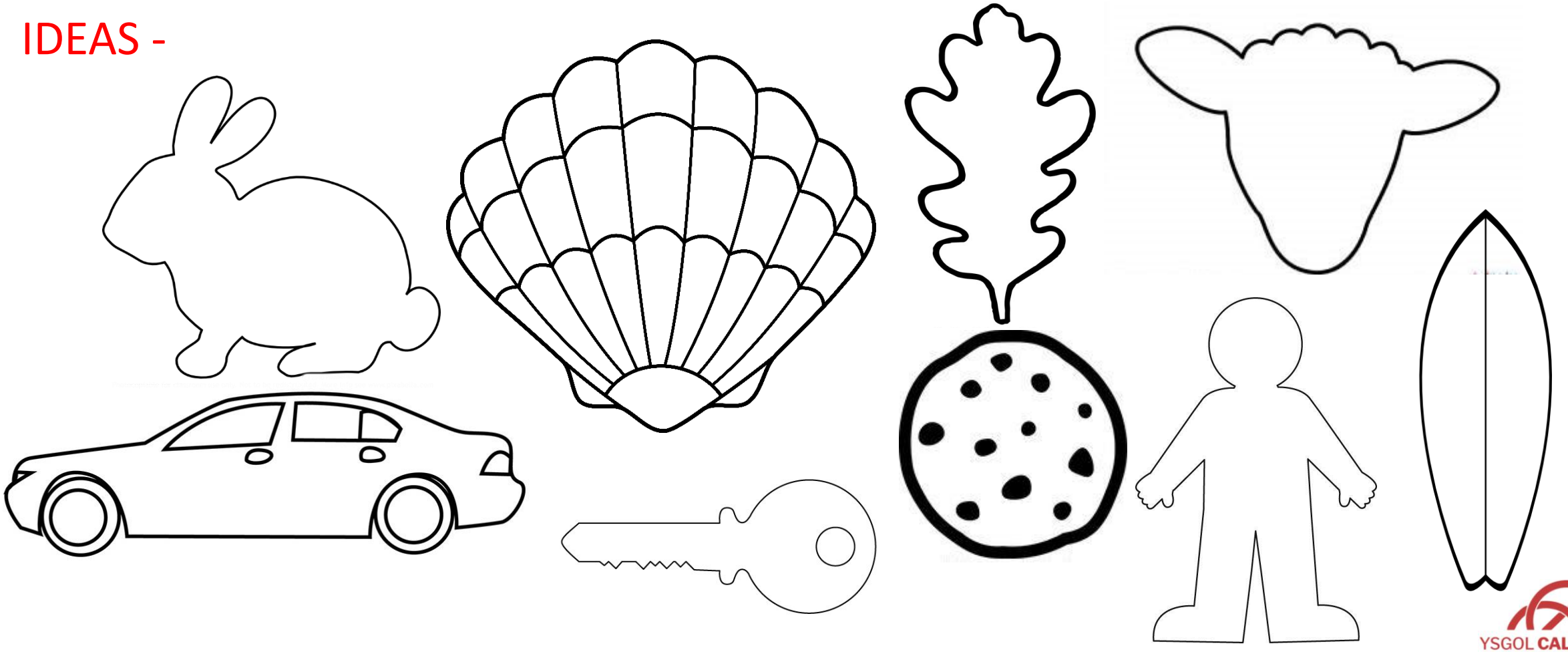
Success criteria

- Use acrylic, MDF or laser plywood for your design
- Use 2D design to create your design
- Must include at least 2 keyrings
- No bigger than 14 x 18cm
- Your keyrings must overlap the holder
- Keyrings must be at the bottom of the design
- All edges must be sanded and smooth
- Keyrings must have appropriate size holes
- Use an interesting shape for the keyring holder

Research images

Use the computer to find shapes/outlines to help you draw your design ideas. You can print some ideas out to copy if needed.

IDEAS -



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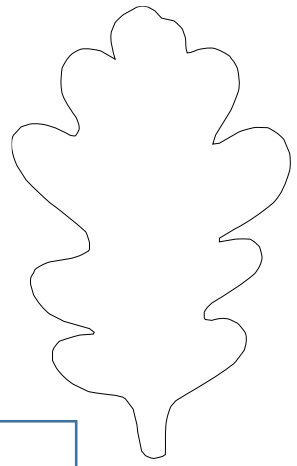
Design ideas

Idea 1

Keyring idea

No small parts to break off

Simple shape idea

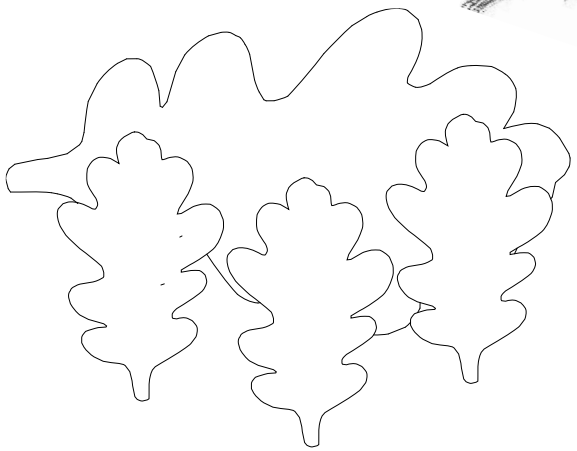


Ideas

Idea 2

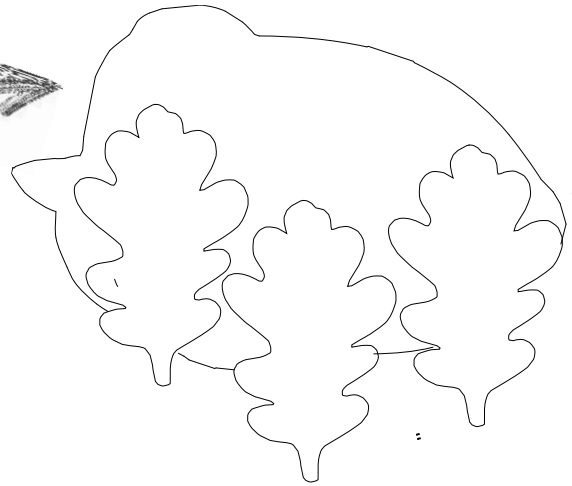
Idea 3

Development 1



Holder would look better if it was different to keyrings

Development 2



Suitable for nature lovers

More interesting holder shape

Acorn shape is different to leaf

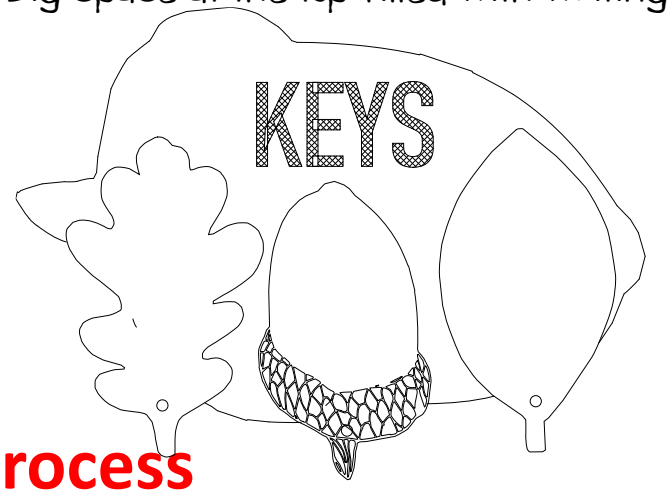
Development 3

Different keyrings

Keyring hole in a suitable place

Space to add names of keys

Big space at the top filled with writing



You must use the iterative design process

Improve the quality of the design, identify the problems and refine the idea. You must also annotate the ideas.

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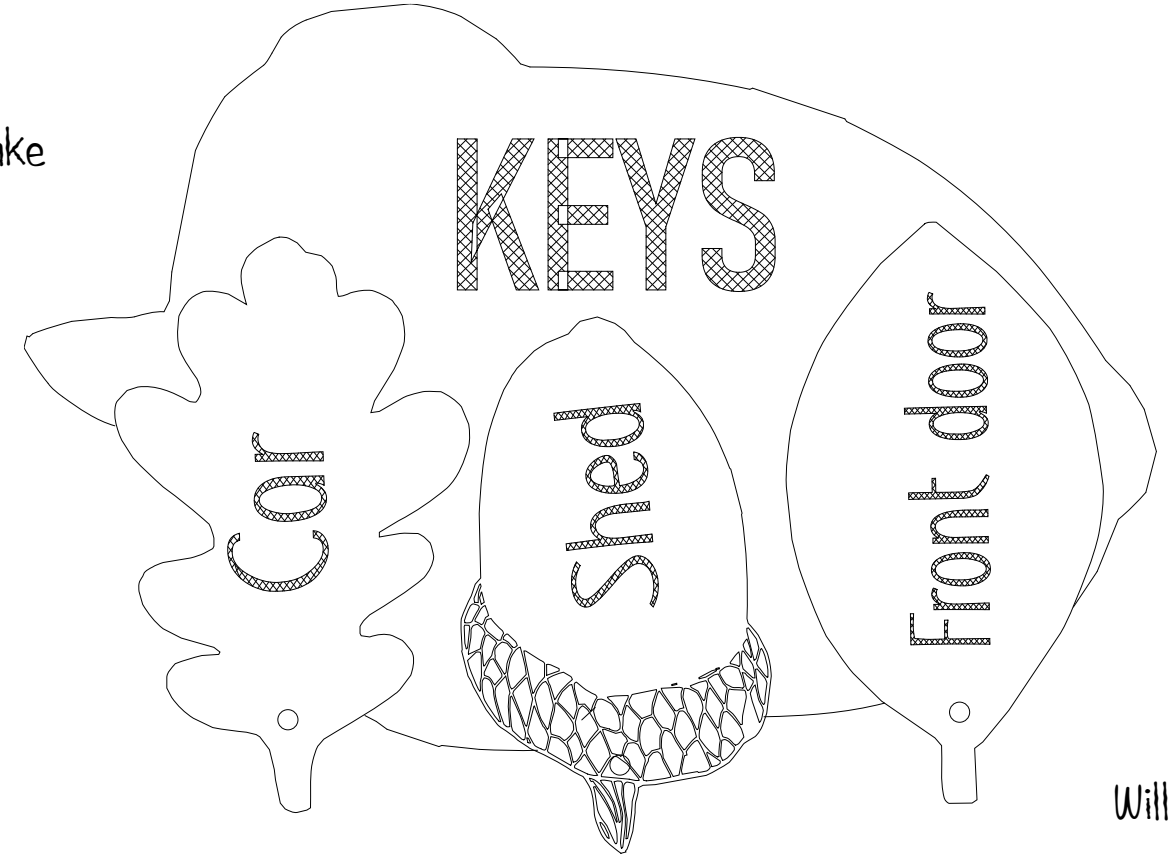
Final design

INCLUDE ANNOTATION

Added names of keys to make it easier to identify

Suitable for families

Suitable for both girls and boys of all ages



Will be made of wood as it suits theme and shapes

Ssuitable for all members of the family

Will attract nature lovers

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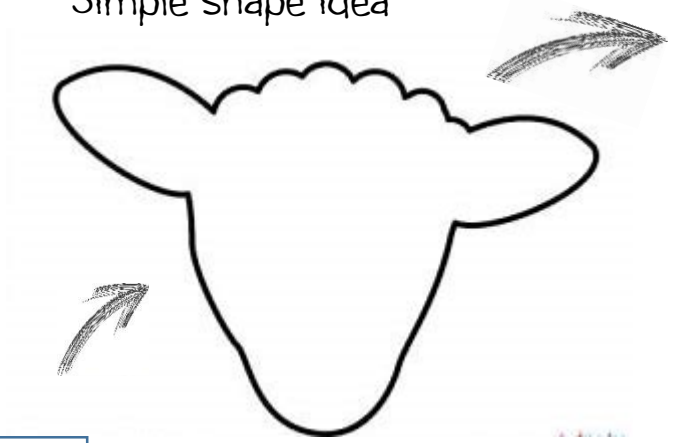
Design ideas

Idea 1

Keyring idea

No small parts to break off

Simple shape idea

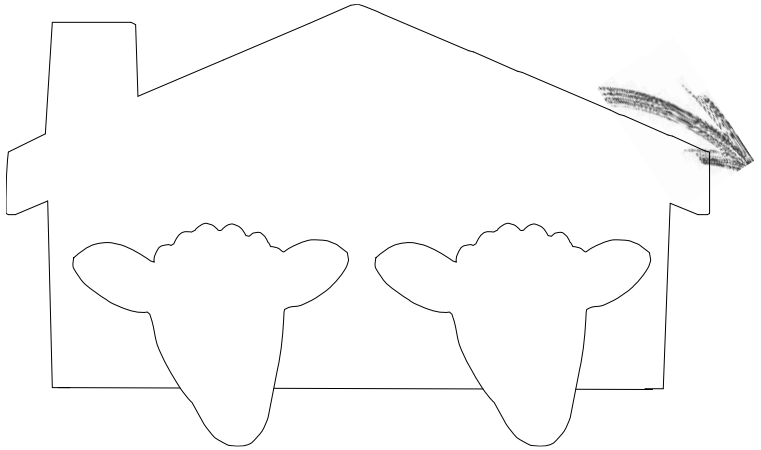


Ideas

Idea 2

Idea 3

Development 1



Suitable for animal lovers

More interesting holder shape

Keyring would look better in the ear

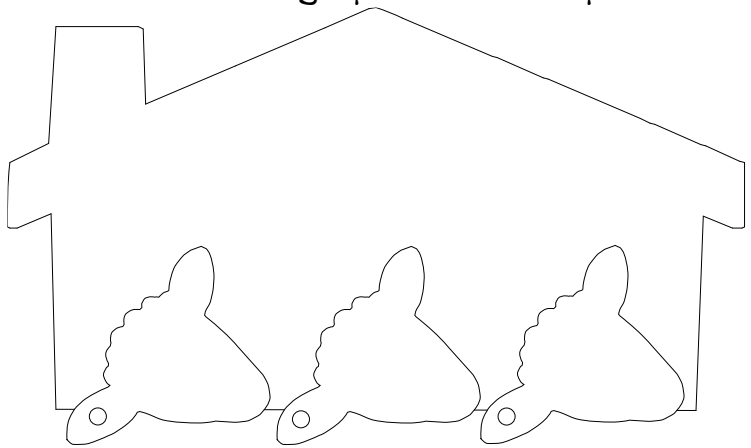
Development 2

More keyrings

Keyring hole in a suitable place

Smaller keyrings

Big space at the top



You must use the iterative design process

Improve the quality of the design, identify the problems and refine the idea. You must also annotate the ideas.

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Final design

INCLUDE ANNOTATION

Success criteria –

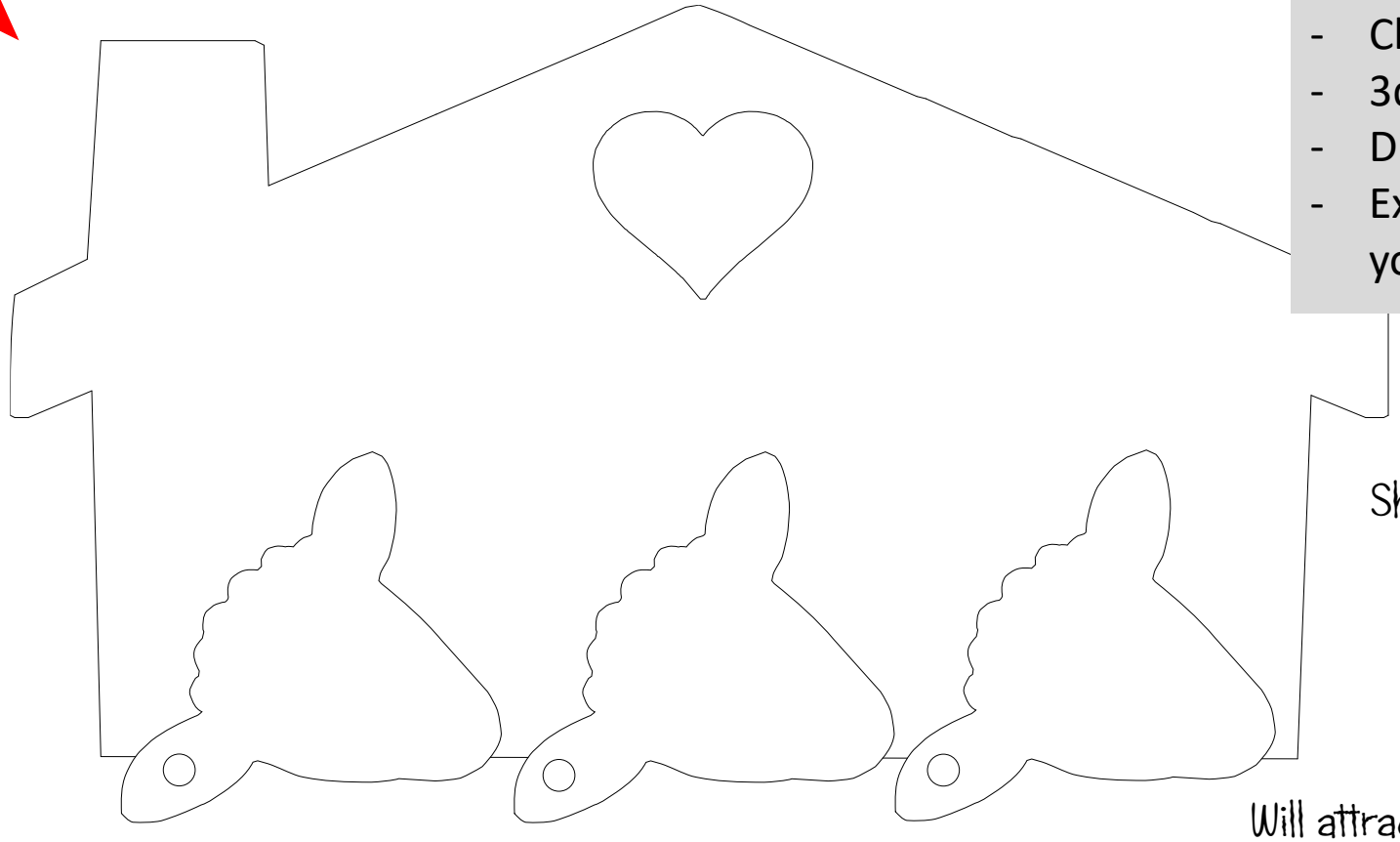
- Well presented
- Hint of colour
- Annotated and labelled
- Clear
- 3d (if possible)
- Dimensions included
- Explanation as to why it is your chosen idea

Added cut out heart

Suitable for families

Suitable for both girls and boys of all ages

Will be made of wood



Sheep will be painted white

Will attract animal and nature lovers

House design is relevant as it will be placed in a home

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Finished products

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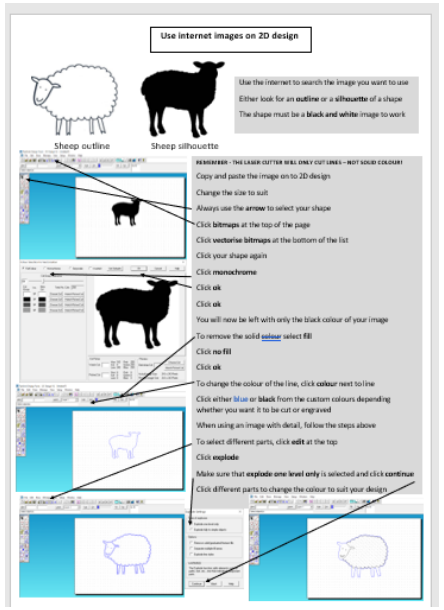
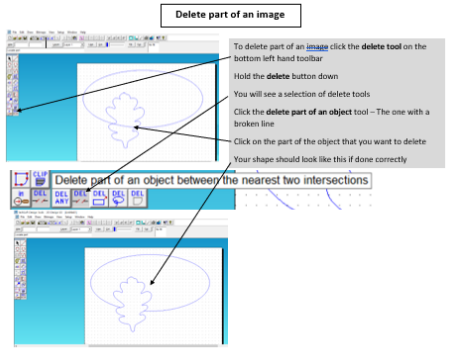
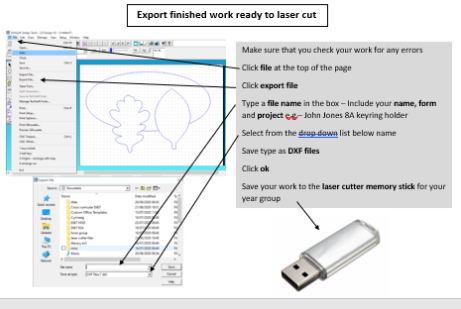
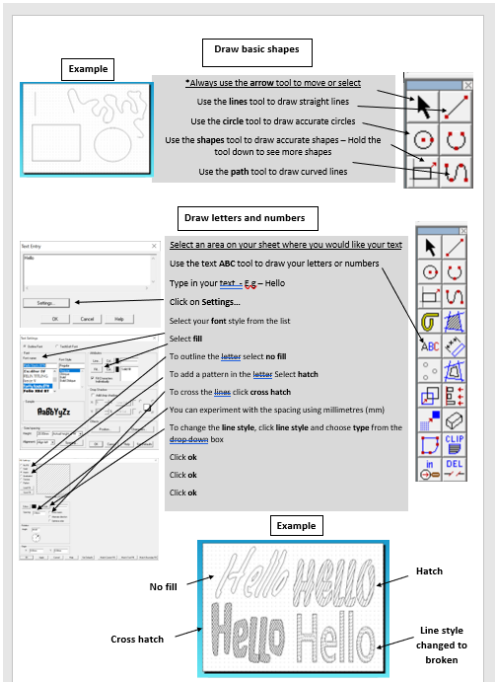
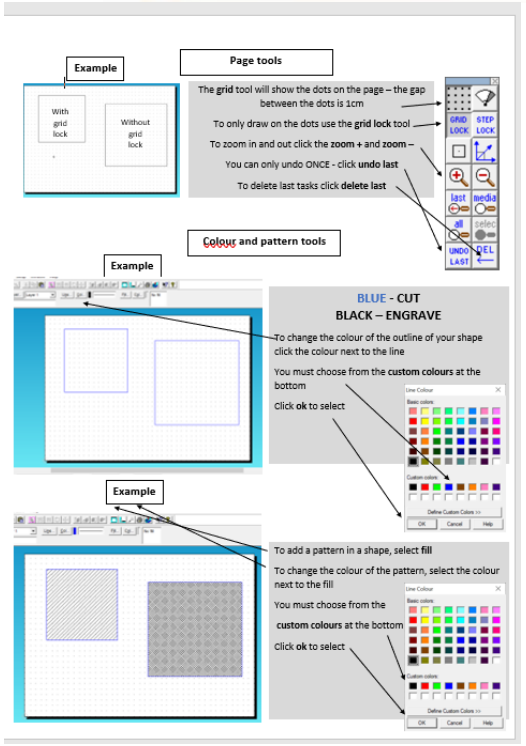
2D design











There are 4 2D instruction sheets that you can use to help you create your design

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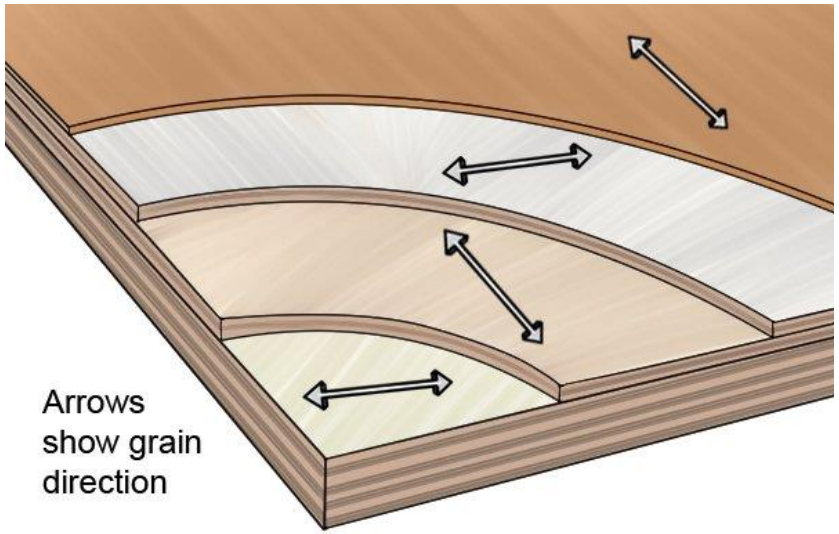
Plywood

- it's made up of several **layers** that are 1mm each.
- The layers are **glued** with their grain at **90 degrees** to each other, that is the reason why it is very strong.
- The exterior plywood is **water resistant**.
- It can **split** when cut.
- It can be **painted**, **waxed** or **oiled**.



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MDF (manufactured density fibreboard)

- MDF is made by breaking down wood into **particles**.
- The particles are combined with **wax** and a **resin.**
- **High temperature** and pressure are applied.
- MDF is goes **soggy** with water.
- It has **smooth faces** and takes paint well.
- It is easy to **cut** and **shape**.

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Pillar drill

Step by step…

1. WEAR GOGGLES,APRON AND TIE HAIR BACK
2. CLAMP WORK TO TABLE OR SECURE IN VICE
3. INSERT DRILL PIECE IN TO CHUCK
4. SECURE DRILL BIT WITH CHUCK KEY
5. CHECK POSITION OF DRILL
6. CLOSE GUARD
7. TURN ON MACHINE
8. DO NOT HOLD MATERIAL
9. LOWER DRILL SLOWLY INTO MATERIAL
10. LIFT AND CLEAR WASTE REGULARLY
11. TURN MACHINE OFF
12. WAIT UNTIL DRILL BIT STOPS MOVING
13. REMOVE WORK

CHUCK KEY

Scroll saw

Step by step…

1. WEAR GOGGLES,APRON AND TIE HAIR BACK
2. SET THE STOP / GUARD TO THE CORRECT HEIGHT
3. TURN ON MACHINE
4. GUIDE MATERIAL TOWARDS THE BLADE
5. TURN MATERIAL WHERE NECESSARY BUT KEEP GOING FORWARD
6. TURN MACHINE OFF
7. WAIT UNTIL BLADE STOPS MOVING
8. REMOVE WORK

KEY

Sandpaper

Sanding tips...

- Sandpaper should be used to smooth edges of the wood not to take large areas of wood away.
- Do not wrap sandpaper around the edges of your wood, it needs to be flat.
- Work from the roughest to the smoothest grain.
- Use the numbers on the back to determine the grade of sandpaper, work from the lowest (rough) to highest (smooth) number.

Coping saw

Cutting tips…

- Draw your design onto your wood close to the edge.
- Stand with legs in front of each other to balance.
- Cut on the waste side of the wood.
- Place your wood low down in the vice.
- Make sure that your blade is straight and facing down.
- Use the full length of the blade.
- Only turn the saw while moving in a sawing motion.
- Use one hand only to hold your coping saw, use the other hand to balance on the table or vice.
- Let the blade do the work for you, do not push down.
- Do not touch the blade at any time, it is sharp and can get hot!

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File

Filing tips..

- Use the file on areas where you need to remove large areas of wood.
- Use different size and shape files for the areas you need to get rid of.
- Use 2 hands when using the files, on the handle and one at the end of the teeth.
- When using larger files use them diagonally across the wood.

Assembly

1- Cut your laser cut / engraved keyring holder out

2- Stick your backing piece on using PVA glue

3- Cut out the backing piece out using a coping saw

4- Sand your pieces carefully and place in the keyring in the holder.

5-Paint or add any detail needed to finish your product.

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CAD and CAM analysis in D&T:

Use the following to help prompt and structure your analysis…

Evaluation

1. Introduce

Introduction:

What product have you designed? What have you designed and why? What problem did you solve? What technology did you use and why? What materials have you used and why?

My product is a … I have designed this because… The design problem I have solved is… I used… to design my product because… I used… to make my product because… The materials I used is… because…

2. Describe

Describing technique and development of ideas

What shapes did you use for your design and why? Why did you chose the shape of the keyring holder? Which design techniques did you experiment with on 2D design? Where did you place the keyrings on the holder? What technique did you chose to use? How did the laser cutter manufacture your design?

The main shapes I focused on are… because… I decided to use a… for the holder because… The techniques I chose to experiment with on 2d design were… I decided to put my keyrings … because… I finally chose… and… because…

I learnt that the laser cutter…

3. Evaluate

Final evaluation

Which aspects of the success criteria did you achieve? Did you come across any problems? Did your design work on the laser cutter? What do you think are the most successful parts of the design work and why? Which aspects of the process do you really like and why? Which aspects of your work could you improve and how? What can you do now to develop my idea further?

I have fulfilled elements of the success criteria by including/using… The problems I had were… My design did/didn't work because…The areas I consider the most successful are… because… My favourite aspect of my work is … because… I believe I can improve… and… because improving these areas would… I can practice… in order to improve further.

CAD and CAM: D&T Key Vocabulary

Formal elements: shape, detail, engrave

Techniques and processes: designing, laser cutting, engraving, cutting

Key words

Silhouette – A dark shape or outline that is used in 2D design
Engrave – To etch or a shallow cut in to a design
Product – Something that is produced from a making process
2D design – A 2-dimensional computer application used to draw an image
Laser cutter - A device that uses a focused beam of light to melt or burn through a material
Technique – A skillful or efficient way of achieving something
Design - A plan or drawing produced to show the look and function or workings of an object
Import (an image) – Sending your 2D design to the laser cutter
Convert (an image) – changing your image to suit the 2D design programme
Edit – Alter or change something to make it better
Aesthetic
Properies

Create – combine, contrast, develop, imagine, design, change, improve, invent
Evaluate- justify, decide, agree, criticise, recommend, test
Analyse – compare, list, distinguish, discover
Apply- build, execute, identify, plan, select, solve, organise, apply, model
Understand – demonstrate, show, clarify, illustrate

CAD and CAM Analysis in D&T

Success criteria:

Challenging

- Organise ideas clearly
- Maintain a formal tone
- Spelling and punctuation should be generally accurate (writing)/maintain standard English (oracy)
- Begin to evaluate chosen design
- Show some understanding of the laser cutter and 2D design
- Explain why you have chosen the materials
- Chose and use 1 of the shape icons for your design

More Challenging

- Use a range of ambitious vocabulary and design terminology with accuracy
- Talk fluently/write with clarity
- proof read to limit errors
- Begin to move away from the scaffolding provided (sentence starters)
- Explain clearly your design choice
- Show a clear understanding of the laser cutter and 2d design
- Include the properties of the materials used
- Chose a silhouette convert image to suit 2D design

Most Challenging

- Use a wide range of ambitious vocabulary and Design terminology with confidence
- Mature and developed analysis of work
- Offers a wide range of opinions and justifications
- Very few errors
- Clearly justify design choices (Target market)
- Show thorough understanding of laser cutter and 2D design and why it is used
- Explain additional uses of CAD and CAM
- Explain clearly the process of converting an image silhouette/detailed image
- Research an existing keyring holder product that is made by using the laser cutter, how did this influence your design?

CAD CAM design analysis

WAGOLL

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Introduce:

My product is a personalised keyring holder. I have designed this because it makes sure that there is somewhere to store keys safely. The design problem I have solved is that people own lots of keys and they often get lost or mixed up. I used 2D design to design my product because it is a programme that can be used to draw designs that are then imported to the laser cutter. I used a laser cutter to make my product because it can be done quickly, and includes cutting and engraving with a laser beam. The materials I used are acrylic and laser ply because the acrylic adds a bright colour to the design and the wood is strong and will not break.

Describe:

The main keyring shapes I focused on are circles because it a basic shape with no thin parts that would break during use. I decided to use a house shape for the holder because the shape is suited and relevant to the product. The techniques I chose to experiment with on 2D design were drawing shapes, copying a silhouette and changing the colour of the lines to suit the laser cutter. I decided to put my keyrings at the bottom of the holder because they are easily taken off and put back on, it also works as a product. I learnt that the laser cutter works by using a laser beam to melt the acrylic and cut my design out quickly.

Evaluate:

I have fulfilled elements of the success criteria by using a creative shape for the holder and keyrings. The main problem I had was selecting the right image to convert in 2D design as some detailed images are not suitable. My design did work because I made sure I converted the images in 2D design using the correct steps. The areas I consider the most successful are the shape of the holder because it is a complicated image that I converted and edited. My favourite aspect of my work is the engraving on keyrings because it is personalised and has a cross pattern. I believe I can improve the shape of the keyrings because improving these areas would make the design more interesting, I can practice converting images on 2D design in order to improve further.

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Student voice

- Did you enjoy the work?
- What was the most enjoyable?
- What didn’t you like?
- What would you do differently?
- Did you look forward to the lessons?
- Do you feel like you know enough about the project before you start the practical?
- Do you like working individually or in groups?
- Do you know which level you are on and are you happy with it?
- What would you like more of in lessons?
- What is your opinion of the project?
- What else could you make using the skills, processes and techniques you have learned doing this project?
- Do you get chances to ask questions in class?
- What advice would you give to someone doing this project?