

Year 7

Design and Technology

Workbook



I will explain the needs of the Design and Technology course and teach a broad range of skills and knowledge to you. I will demonstrate how to use tools and equipment safely and effectively and expect you to apply your new and existing learning to this subject.



WE will learn to use of different materials, tools, processes and understand the importance of health and safety in a practical environment. **WE** will carefully watch and learn from practical demonstrations and apply our learning to our individual project.



YOU will use your skills, knowledge and understanding to independently draw, design, plan, make and evaluate the product to a quality standard.

Name: _____ Class: _____
Grade Achieved: _____

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Subject Specific Vocabulary

In design and technology, there are a great many technical words and phrases that are regularly used in your lessons - both theory and practical

Below are definitions of key terms used in our in your upcoming project that you should be familiar with and gain an understanding of these terms so that you can talk and write like a true designer and maker!

Abrasive: A material which smooths and removes marks from wood, plastics and metal; see glass paper and sand paper

Adhesive: A substance used to stick materials together; examples include PVA glue, low temperature hot melt glue

Annotations: Brief notes added to design sketches to make things clearer or to give more detail

Axle: The shaft on which wheels are carried. The wheels are either fixed so that it will turn with the axle or able to spin freely on the axle.

Batch production: Batch production refers to the process of making several, single items at the same time to give a 'batch' of those items. In school, you can carry out batch production in making food products. A baking tray of jam tarts would be a batch

Bench hook: A device to make it easy for pupils to saw strips of wood to length

Biodegradable: Able to be broken down by the action of microorganisms eg wood will 'rot'

Cam: A non-circular wheel that rotates and moves a **follower**. It converts the rotary movement of the cam into **reciprocating** or **oscillating** movement of the follower. Sometimes a circular wheel mounted off-centre onto a shaft is used as a cam, see **eccentric**

Characteristics of a material: The physical properties of a particular material; e.g. **hardness, strength** and **stiffness**

Client: A person using the services of a designer. In the primary school the client is likely to be the person who is going to use the final product but in the world outside school the client is often a manufacturer and it is their customers who use the final product

Component: The name given to one of the parts that make up a product

Consumable materials: Materials used to make products e.g. Paper, card, wooden strip, plastic sheet, metal rod. These materials get used up and have to be replaced if pupils are to continue designing and making.

Consumer: Anyone who purchases goods or services

Decoration: The application of colour, texture and pattern to a surface to improve its appearance

Design brief: A summary of the aims of a design and the kind of product that is needed. A **closed** brief says what the product will be. An **open** brief leaves it for the designer to decide

Design criteria: A list describing the standards that a design must meet if it is to be successful

Design proposal: A response to a design brief, a description of the product to be made in sufficient detail that the designer and/or the client can decide whether it is worth developing the proposal further

Designer: Any person who designs things

Drill: A tool used for making small round holes in wood, plastic and metal

Drill bit: The cutting tool used in a drill. It is held in the chuck and cuts into the material as it rotates

Eccentric or Off centre cam: A circular wheel with an off-centre **axle**

Evaluate: Assess how well a product or service meets the design criteria or specification

File: A tool for removing burs from freshly sawn metal or other resistant materials

Finishing techniques: Methods used to make the surface of wood, metal and plastic smooth; these usually involve the use of **abrasive** papers

Fixings: Things used to fix materials together, e.g. Nails, screws, nuts and bolts

Focused practical tasks: Short practical activities that teach a specific piece of knowledge, understanding or skill

Follower: Usually a **slider** or **lever** that is moved by a **cam**

Function: The purpose of a product or part of a product as in the function of a whisk is to mix the eggs with the milk and the function of the handle in the whisk is to make the gear go round to drive the blades

G-clamp: A device you can use to clamp bench hooks to tables for added stability and/or to hold work steady or to keep parts assembled while glue dries

Glass paper: An **abrasive** paper used to smooth the rough edges of freshly sawn wood

Health and safety: The activities carried out in your classroom must meet health and safety requirements. You can ensure that this is the case by carrying out risk assessments and organising the activities so that all risks are controlled.

Identifying needs: The process of looking at the behaviour and conditions of people and other living things and identifying what they need to be healthy, comfortable, interested, at ease etc.

Joint: A means of connecting two pieces of material, some joints are permanent e.g. Joints that are held together with an adhesive. Other joints are temporary e.g. Joints held together by Velcro or wire

Linear movement: Movement in a straight line

Manufacturing: This is the word used to describe the way that products are made in industry. It usually implies making in quantity. For example confectionery such as Kitkats are manufactured at a rate of many thousands per hour.

Mass production: Mass production (sometimes called 'Volume production') refers to the process of manufacturing in the world outside school where products are made in there thousands. This requires the use of machines as well as people. Increasingly people are being replaced by machines that are computer controlled which work 24 hours per day without rest.

Materials: The matter from which things are made e.g. Wood, metal, plastic, fabric, food

Mechanical component: A part of a product that is used in a mechanism e.g. A **wheel**, a **gear**, a **pulley**

Mechanism: A set of mechanical components assembled together to perform a particular task e.g. A gear train to increase the speed of rotating parts as in a rotary whisk

One-off production: This is the way children usually make things in school. They make a single item of their design idea, sometimes referred to as a one off. In the world outside school one offs are often very expensive to buy as a lot of time and effort goes into producing the item.

Quality: The degree of excellence in a product or service. It is important that children are taught to understand the difference between quality of design and quality of manufacture (or making).

Reciprocating movement: Movement backwards and forwards in a **straight line**

Risk assessment: The process by which you consider the seriousness of any risks in a learning activity and then devise ways to reduce the hazard e.g. Clear instruction and close supervision

Sand paper: The common (but incorrect) term for an **abrasive** paper used to smooth the rough edges of freshly sawn wood

Sanding block: A piece of cork or wood or plastic wrapped round with sandpaper. It is often easier for young children to work with a sanding block than with a piece of sandpaper when they are smoothing a flat surface

Sheet material: Material in a form where the length and width are much greater than the thickness e.g. Paper, card, fabric, corrugated plastic

Sliding fit: A fit that will allow two parts so fitted together to move independently. You can use a sliding fit to join a **wheel** to an **axle** so that as the wheel turns the axle does not. In this case you will have to find a way to prevent the wheel from sliding completely off the axle.

Target audience: A particular group for whom a product or service has been designed; often used in the design or media industries to describe the group of listeners or viewers

Template: A template is a device that allows a shape to be drawn accurately and repeatedly onto a sheet of materials e.g. Paper, card, fabric. It can be a thin sheet of plastic in the shape of the shape to be transferred, in which case a pencil is held against the *outside* edge and follows the edge around the shape thus drawing the shape on the sheet of material beneath. Or it can be a thin sheet of plastic in which there is a hole in the shape of the shape to be transferred. In this case the pencil is held against the *inside* edge and follows the edge around the shape thus drawing the shape on the sheet of material beneath.

Testing: Investigating a product or material to find out how it performs in use

Tools: Devices to cut, shape, form and mix materials

User needs: People who use goods and services do so because those goods and services meet their needs e.g. A food product meets the need of hunger, a pair of gloves meets the need of keeping warm

User preferences: People who use goods and services show preferences towards particular goods and services that appeal to them in some way e.g. A woolly hat that is bright red with yellow bobbles might appeal to a child but is unlikely to appeal to an adult

User reaction: People who use goods and services react towards them in particular ways. In some cases the reaction is negative, in other cases positive. The intensity of the reaction can also vary.

User wants: People may want particular products in order to meet a need e.g. If a person is thirsty they need a drink but they might say, "I want a Coke."

Vice: A device for holding materials or parts so that they are easy to work on

Working drawing: Plans which show how a product may be made. Drawings are drawn to scale and dimensioned.

Date: _____

Big Questions

As part of your learning journey each week you will be asked to think about a number of important questions to help improve your understanding skills and knowledge. Some quite direct and others that might require more thought. Examples include:

- 1. How could you use sentence starters to help to explain your ideas?**
- 2. Do you know the importance of using a ruler?**
- 3. What is the relationships between centimetres (cm's) and millimetres (mm's)?**
- 4. Why is Health and Safety important in a Design Technology workshop?**
- 5. Which factors need to be thought about when designing and making a suitable base for Dave?**
- 6. Why is a Design brief important in Design?**
- 7. Why is ACCESSFM helpful in designing a product/idea?**
- 8. How Do Cam and Follower Mechanisms Work?**
- 9. What are CAMS?**
- 10. What safety equipment do you need to wear when using the pillar drill?**
- 11. What is needed to write a good evaluation?**

Literacy Skills: Sentence Starters

Big Question: How could you use sentence starters to help to explain your ideas?

In Design and Technology, **its important that you can communicate your thoughts and ideas through a range of methods.** Speaking and writing are often used but it can be difficult, sometimes, to get your ideas across to others, eg a teacher, a student or an Examiner. Using sentence starters to get your ideas across is a great way to get yourself started!

If explaining or writing a **Design Brief**

- *I am going to design and make...*
- *...the problem I am solving with my [product] is...*
- *My [product] will be made of...*
- *The aesthetics will be in the style of...*
- *The exterior will feature smooth curves and bold colours to capture.....*
- *The design should engage and educate children...*
- *The intended function of the [product] will be...*
- *The [product] will demonstrate various movements such as.....*
- *The [product] will be used...(When?) (Where?)*

If explaining or writing a **Design Specification**

- *The style of the [product] will be...*
- *The finish I intend to use on the [product] will be...*
- *To ensure my [product] is safe to I will...*
- *The intended user for my [product] is aimed at...*
- *I will be making my product out of...*
- *My research tells me that...*
- *The [product] needs to be the following dimensions.... mm*
- *I intend to spend £...making the [product] and I intend to sell the [product] for £... making a profit of £....*

Annotations– these are often used when designing a product or listing out ideas and thoughts

- *In this design I have used...this style....*
- *I intend to use this finish... with my design*
- *I will use... processes to create this design*
- *I feel this will be a suitable design to make because ...*
- *I don't like this design because...*
- *By making these changes I can improve and develop my design by adding (or taking away)...*

Evaluation- use this to explain how successful/not an outcome or product is

- *Overall I am feel my [product] is a [success/failure] because...*
- *I found the making process [hard/difficult/easy]... because...*
- *If I was going to do the project again I would change... to improve it*
- *I would like to add this... to the [product]*

Product Analysis– here, think about cost, materials, quality, aesthetics, etc. of existing products already in use

- *I have found that products in my target market have a similar...*
- *I will take inspiration from this product by...*
- *This product has... which I can use in my design*
- *I like the way this product has been made to...*
- *This product could be adapted by adding...*

Date: _____

Numeracy Skills

Big Question: Do you know the importance of using a ruler? What is the relationships between **centimetres** (cm's) and **millimetres** (mm's)?

Being able to use a ruler in D&T is very important to let you measure the length and width of different objects.

To draw straight lines and lots of other times where accurate measurements are needed



Your task: Use the ruler, above, to convert the **centimetres (cm)** into **millimetres (mm)** or vice versa

	<i>Your answer...</i>		
25mm		75mm	
10mm		1mm	
100mm		110mm	
150mm		162mm	
15mm		5mm	
1.5cm		1.8cm	
5.8cm		8.8cm	
20.5cm		270.5cm	
How many centimetres are there in 50 millimetres?		How many millimetres are there in 1.2 centimetres?	
How many millimetres are there in 4 centimetres?		How many centimetres are there in 208 millimetres?	

Numeracy Skills



Estimating dimensions is a very useful skill that can be used to quickly decide if spacing is 'about right', material length is 'about enough' or ingredients look 'far too much' for what you need or want

Task A:

Look at the ruler, above, and **estimate** the length of each line. Write your estimate in centimetres

1. My estimate _____ cm

2. My estimate _____ cm

3. My estimate _____ cm

4. My estimate _____ cm

5. My estimate _____ cm

Task B:

Now use your own ruler to measure the exact **REAL** length of each of the 5 lines

1. Length _____ cm

2. Length _____ cm

3. Length _____ cm

4. Length _____ cm

5. Length _____ cm

During Year 7 you will....

Progress your skills by: Key skills & Knowledge: - Understand Health & Safety/Workshop rules – Carefully use a pencil and ruler to conduct basic measuring & marking – Understand Machine Safety - Laminate – Use a range of finishing techniques – Make design considerations - Test & Evaluate a product – Produce dimensioned engineer style drawings – Understand and use Basic Standard Components – Identify material properties (basics) – Understand the work of existing designers & iconic design

Develop Literacy skills:	Develop Numeracy skills:	Develop Scientific skills:
<p>Literacy: There are a range of extended writing opportunities for each of the projects delivered</p> <p>Oracy: In line with TDS policy, students are expected to answer questions in full sentences during discussion work and encouraged to read out loud where appropriate</p> <p>Keywords: Research, Design, Manufacture, Rendering, Materials, Health & Safety Techniques, Construction, Investigate, Evaluate, Identify, Generate, Original, Target, Market, Evaluate, Develop, Creative</p>	<ul style="list-style-type: none"> • Calculations of sizes • Use of metric systems • Data interpretation • Scaling drawings • Determining the amount of materials required • Measurement and marking out • Graphic presentation of ideas to others 	<ul style="list-style-type: none"> • Use of scientific principles when developing a brief or specification • Measurement of materials and selection of components • Classification of materials and their properties • Knowledge of material properties to be applied when designing and making • Knowledge of function of mechanical devices- movement, forces, changing magnitude

Final Endpoints– by the end of the project, you should be able to:

Safely and confidently, interpret and use a range of drawing conventions and sketch methods, hand tools, scroll saws, pillar drills and sanders to design, realise and modify a personalised product. Understand the principles of motion via a simple mechanism. Understand the work of others. Be able to interpret and then write a personalised brief and specification and analyse and develop outcomes in light of feedback

LINES

What do each of following lines mean

parallel, horizontal, vertical, bisect, diagonal, perpendicular, arc

SHAPES

How to measure different shapes

Diameter (d), Radius (r), Circumference $C=2\pi r$, Area length x width, Volume length x width x height, Volume $\pi r^2 h$

ANGLES

Use the right tool to get the right angle

90°, 45°, 30°

A try square is used to mark a 90° angle.
A mitre square is used to mark a 45° angle.
A sliding bevel is used to mark irregular angles.

NUMERACY SUPPORT IN D&T

MEASURES OF AVERAGES

This help you draw conclusions from data

The mean is the most common measure of average. To calculate the mean add the numbers together and divide the total by the amount of numbers:
Mean = sum of numbers ÷ amount of numbers

If you place a set of numbers in order, the median number is the middle one.

The mode is the value that occurs most often.

MEASURING

Measuring in millimetres is more accurate than measuring in centimetres. In the workshop you will frequently use the steel rule.

1mm = 0.1cm
10mm = 1cm
50mm = 5cm
57mm = 5.7cm
100mm = 10cm

To convert mm to cm ÷ 10
To convert cm to mm x 10

Personal Machine Training Record

As part of your D&T course, you will be expected to use a range of equipment to help make your work to the highest standard. You will be taught how to use the equipment either individually, or as part of a group and as this happens you will be asked to tick and date the chart, below, to show that you are trained and confident.

Under no circumstances should you use equipment that you have not been trained to use!

Equipment Name	Date	Trained (tick)
Tenon saw		
Chisel		
Hegner (scroll) Saw		
Sander/ Linisher		
Pillar Drill		
Flame Torch		
Ceramic Chip Hearth		
Strip Heater		
Centre Lathe		
Kitchen knives		
Ovens		
Hobs		
Kitchen utensils		

Note: Make sure that you have made yourself aware of the safety signage and information located within your practical area. **If you require further instruction on the machinery during your lessons, ask!**

Date: _____

Engage Questions

1. How many millimetres are in 1.5 centimetres?
2. Name 3 types of saw
3. Name 3 types of manufactured board
4. What is a try square used for?
5. What is the correct name for 'glue'?

1. Name two ways that a piece of MDF could be held down securely

2. Sketch an 'off centre cam'

3. Wooden rod is more correctly called...?
4. Which specific tool is used to tap a chisel?
5. Name 2 pieces of PPE

1. What colour are workshop emergency stop buttons?
2. Why should hair be tied back in a practical environment?
3. As a rule, which way should you cut- towards yourself or away from yourself?
4. How many centimetres make up 35mm?
5. How many millimetres make up three and a half centimetres?
6. Name three measuring and marking tools that could be used in a workshop

Engage Questions

Date: _____

1. What are the 3 'families' of wood?
2. Name 3 types of file (think about the end profile)
3. Does a bench vice tighten up clockwise or anticlockwise?
4. Which workshop saw is best for cutting curved lines?
5. What is a 'bench hook' used for?

1. Name 3 pieces of equipment that would be needed to measure and mark out a material
2. Name 3 methods/ tools or equipment that can be used to finish off the edge of a piece of cut wood
3. Name 3 Health and Safety rules that need to be observed in a practical environment
4. Which units of measurement are to be found on a ruler? Name them
5. Name 3 methods by which wood can be joined

1. Why is it important to plan ahead of actually making a product?
2. Name 3 lengths of a panel pin that can be found in the school workshop
3. What is a try square specifically used for?
4. Which graphical symbol is used to show a place where a drill hole needs to be?
5. How many 'stop' switches does a pillar drill have?
6. Name three methods of joining wood

Notes

Project 1

“Dave the Desk Tidy”



I will introduce the workshop environment and expectations to you. Then, I will introduce the first project and teach a range of skills and knowledge to you. I will demonstrate how to use all tools and equipment safely and accurately and expect you to apply your new and existing learning to this project.



WE will learn to use of different materials, tools, processes and understand the importance of health and safety in a practical environment. WE will carefully watch and learn from practical demonstrations and apply our learning to our individual project.



YOU will use your skills, knowledge and understanding to independently make ‘Dave the Desk tidy’ to a high quality standard.

Date: _____

Why do this project?

This project has been designed to give you new skills and knowledge and help prepare you for the many projects that you will do for years to come!

You will need to be self reliant, work with others and apply a good level of safe, common sense.

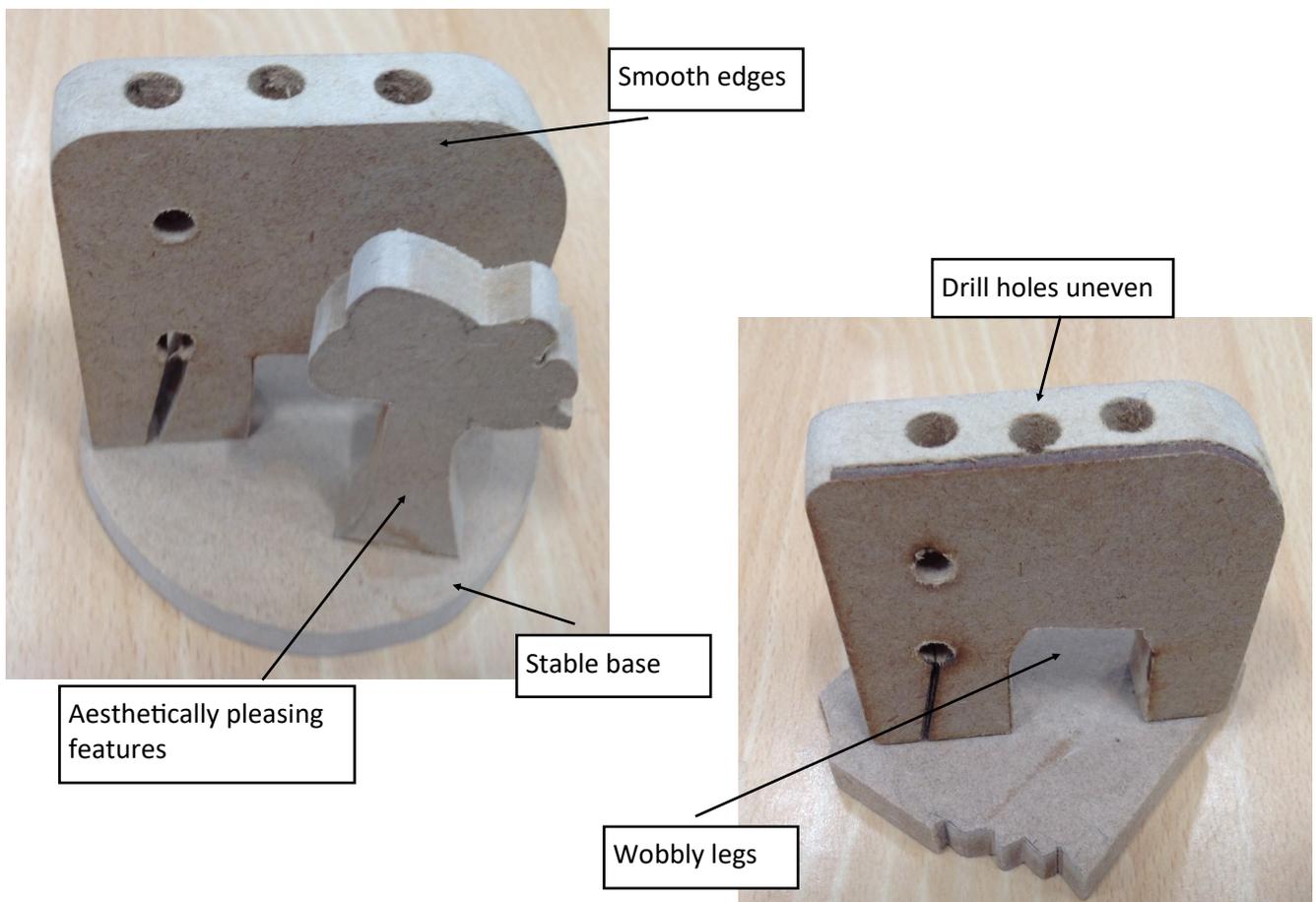
You will be learning lots of new things in your lessons, including:

- Joining techniques
- Machine and tool section and use
- Processing of materials using a variety of skills
- Quality Control– for example, accurate measuring and marking out of materials
- Finishing techniques
- Health and Safety– for you and people around you

Assessment:

You will be given lots of verbal feedback from staff as well as a final percentage grade for your product

What does success look like:



Year 7 D&T: The Elephant desk tidy

Objective: To introduce basic skills and knowledge

Key skills that you will learn
Accuracy
Wasting
Finishing
Designing
How to be safe in a work room



- BRAIN!
- BOARD!
- BUDDY!
- BOSS!

ToDo:
Drop cut legs

DRILL eye and mouth

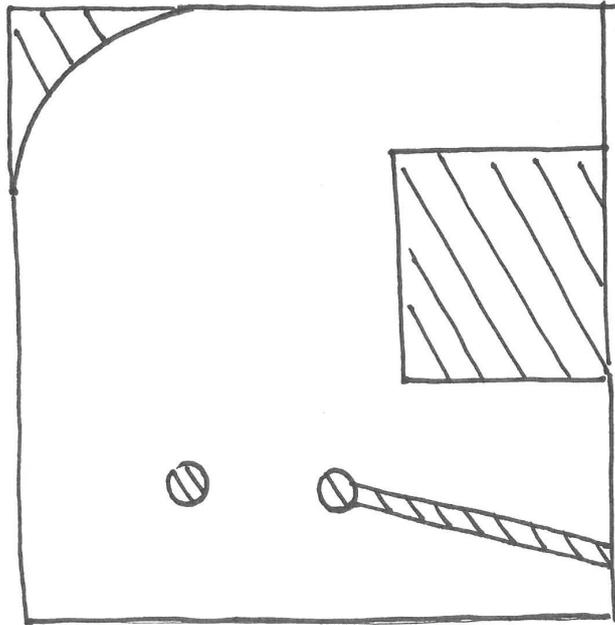
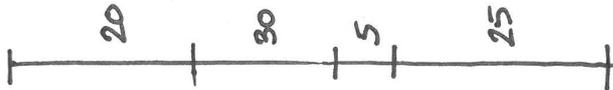
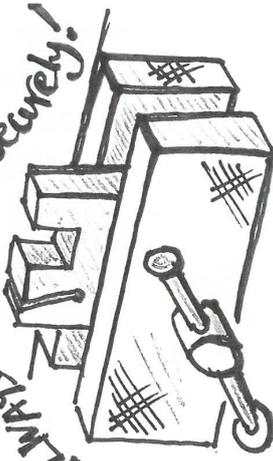
/// = WASTE MATERIAL!

Health and Safety - remember the basics!
Always cut AWAY from your body
CLAMP work down firmly with a vice or similar tool
ALWAYS wear eye protection when using machinery
Tie long hair back and wear an apron
Be AWARE of others around you
BEHAVE sensibly at all times

Scroll saw trunk → Sand to perfection!

Scroll saw turning back → Sand back curve

ALWAYS hold work securely!



MEASURE TWICE
CUT ONCE

What is MDF?

'MDF' stands for MEDIUM DENSITY FIBREBOARD. Made from wood waste which is bonded together using a plastic resin to become a smooth, flat and durable material which can be cut, drilled, joined and painted easily. MDF is used for lots of products eg furniture

Key Vocabulary

Laser cutter	A machine that uses a laser to vapourise materials very accurately
Quality Control	A process to check your work to be sure it is the best it can be
Aesthetics	The appearance of your product- good or bad!
Precision	How accurate something is or needs to be eg a measurement
Wasting	Removal of material- eg sawing away some wood from a larger piece
Abrasive paper	A strong paper coated with grit- used for smoothing or polishing

Making Dave the Desk tidy– Order of work

Planning out how you do tasks is very important. In the table below is a suggested order of work that you could follow to create your product– tick off tasks as you go! Once you have finished making “ Dave” look again at the list and think about how you could improve **efficiency**. If you were to do the project again eg do task 7 before task 3.

What to do?	Tools needed?	Done?
Accurately, hold Dave upside down in a bench vice . Use a tenon saw to make two drop cuts to his tummy line	Bench vice, tenon saw	
Carefully, use a G clamp to hold Dave down onto a bench hook	G Clamp, bench hook	
Very carefully, line up a chisel blade onto Dave’s tummy line, hold the chisel firmly and then tap the chisel with a mallet	Chisel, G clamp, bench hook, mallet	
Safely, use a pillar drill and 6mm diameter drill bit, clamp your work down securely and drill a hole on the eye and mouth crosshairs	Pillar drill, safety glasses, 6mm drill bit, G clamp	
Carefully use the electric sander to remove excess material around the edge of Dave’s body	Electric sander, safety glasses	
Accurately, measure and draw a centre line along Dave’s back and mark out 3 drilling points, 20 centimetres apart	Ruler, sharp pencil, bench vice	
Carefully, use an drilling vice to hold Dave before drilling the 3 holes to a depth of 20 millimetres	Drilling vice, pillar drill, safety glasses, 10mm drill bit, G clamp	
Use glass paper to clean up and smooth all of Dave’s edges	Glass paper	
Creatively, design a base for Dave using the materials available	Paper, pencil and your imagination!	

Activity: Pick out 6 of the **bold keywords** and write down a definition for each one in the table, below:

Keyword	Meaning

Big Question: Why is Health and Safety important in a Design Technology workshop?

Date: _____

Big Question: How is MDF Made?

MDF, standing for Medium Density Fibreboard, is a type of engineered wood product. It's very widely used across the world in furniture making, interior decoration, flooring and far beyond.

How is it made?

Step-By-Step:

Step 1: Collection and Preparation of Raw Material

Every great story has a beginning. For MDF, it's the collection of wood waste and offcuts. These timber industry by products, sourced mainly from forestry operations and timber mills- Harleston Firs, for example, undergo chipping into small pieces. Afterward, a drying process removes any remaining moisture

Step 2: Processing

Next, a machine called a 'defibrator' enters the scene. It subjects the chipped wood to heat and pressure, leading to the emergence of individual fibres that looks and feels like a pulp-like substance (think cooking flour) that forms the main component in MDF production

Step 3: Application of Resin

As the journey continues, bonding agents get their turn. The most common choice is urea-formaldehyde resin, but alternatives like phenol-formaldehyde occasionally make an appearance for moisture-resistant MDF- you can tell which MDF is which because the moisture resistant type usually has a green colour to it. Additionally, certain additives contribute to enhancing fire and pest resistance

Step 4: The Pressing of the Fibre-Resin Mixture

In manufacturing, 'resins' are often used- they are often similar to 'glues' or 'adhesives' in that they bond together materials. Resins tend to be very thin and watery which makes them great for mixing in with loose materials- think water and sand?(!). Following the resin application, the fibre-resin mix gets fed into a hot press. Here, heat and pressure flatten the fibres into a unified, solid sheet. The flexibility at this stage allows for a variety of product thicknesses- such as 6mm, 9mm, 12mm, and 18mm

Step 5: Final Touches to the Product

After pressing, the MDF sheet cools down and undergoes a sanding process in a huge sanding machine. This step guarantees a smooth surface. Depending on its destined use, the MDF might receive a veneer or real wood, or a plastic laminate as a finishing touch to make it more attractive or hardwearing

Answer the following questions:

- What is a 'resin'?
- Where does the raw material to make MDF come from?
- How can the look of MDF be improved?
- What does 'MDF' stand for and where might you find MDF being used?
- Name 3 thicknesses of MDF sheet

Dave needs a base!

Big question: Which factors need to be thought about when designing and making a suitable base for Dave?



I will explain the purpose of the base, the key materials available to you and explain some important considerations you need to think about, such as:

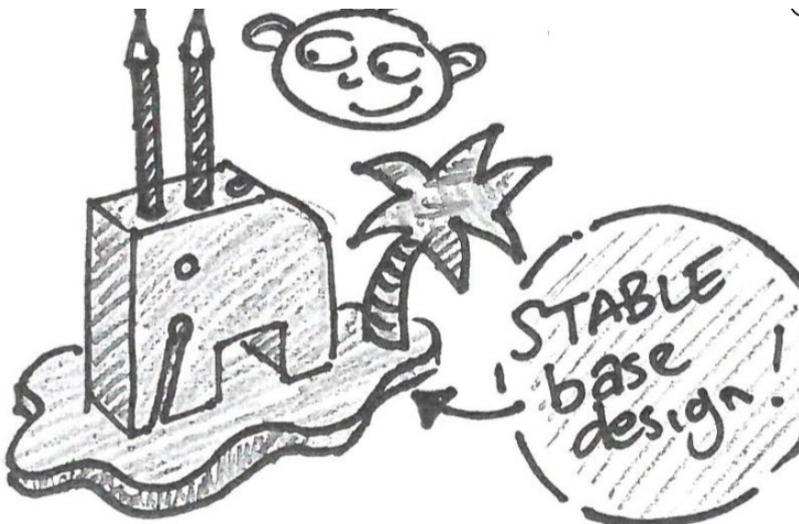
- Why have a base?
- Which materials can I use?
- How do I design my base and why is it important to sketch out my ideas?
- Which methods can I use to make my idea?
- Who– or where– is my idea intended to be for? Why is it important to know?



We will look at a selection of examples of bases so that we can see which ideas work well... or not!



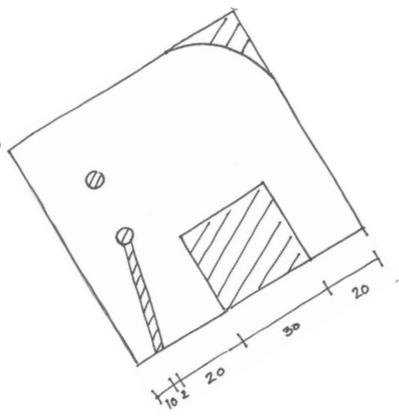
Using the next 2 pages of your Workbook, sketch out your design ideas. Think about where the different parts of your desk tidy will be placed, what type of materials you want to use and how they will be made and joined together. **Make sure to show a PLAN view of your idea and a SIDE view too**



Date: _____

Design idea 1:





Project 2

“Door Mouse”



I will explain the needs of the project and teach a broad range of skills and knowledge to you. I will demonstrate how to use tools and equipment safely and effectively and expect you to apply your new and existing learning to this project.



WE will learn to use of different materials, tools, processes and understand the importance of health and safety in a practical environment. WE will carefully watch and learn from practical demonstrations and apply our learning to our individual project.



YOU will use your skills, knowledge and understanding to independently draw, design, plan, make and evaluate the ‘door mouse’ product to a quality standard.

The 'Door Mouse': Evaluation

Big question: *What is needed to write a good evaluation?*



I will explain the purpose and value of completing a project evaluation and explain all of the main elements needed to make it a success!

1. What do you think of the overall design? What changes would you make ?
2. Are you happy with the materials you chose? Would you make adjustments next time?
3. Did the project take too long to make?
4. Would it be easy to set up a production line for the manufacture of your solution?
5. Is your solution safe? Could it be made safer?
6. Are the techniques you used to make your solution adequate or would you use a different range of manufacturing techniques?
7. Is the solution the right size/shape?
8. What are the views of other people about your design?
9. Does it work? What changes are required to improve it?
10. Which were the most **and** least successful parts of the project for you?
11. What skills and knowledge have you learnt?
12. If you were to make your product again, what would you do differently?

Refer to pg7 to help you complete this task

Evaluation-use this to explain how successful/not an outcome or product is

- *Overall I am feel my [product] is a [success/failure] because...*
- *I found the making process [hard/difficult/easy]...because...*
- *If I was going to do the project again I would change... to improve it*
- *I would like to add this... to the [product]*



We will read through the model example and highlight the key details that have been discussed:

Example:

I made a door wedge out of softwood and it looks like a mouse. I used a tenon saw to shape it. The wedge is small and easy to use. The mouse face and ears make it cute and fun. The wood is soft, so it was easy to cut and shape. The wedge works really well at keeping the door open. I'm proud of how smooth I made the surface, and burning the eye features on to the wood brings the mouse to life. Making this door wedge was a fun project, and it makes me happy every time I see it holding the door open.

Project 3

Mechanisms Project



I will explain the needs of the project and teach a broad range of skills and knowledge to you. I will demonstrate how to use tools and equipment safely and effectively and expect you to apply your new and existing learning to this project.



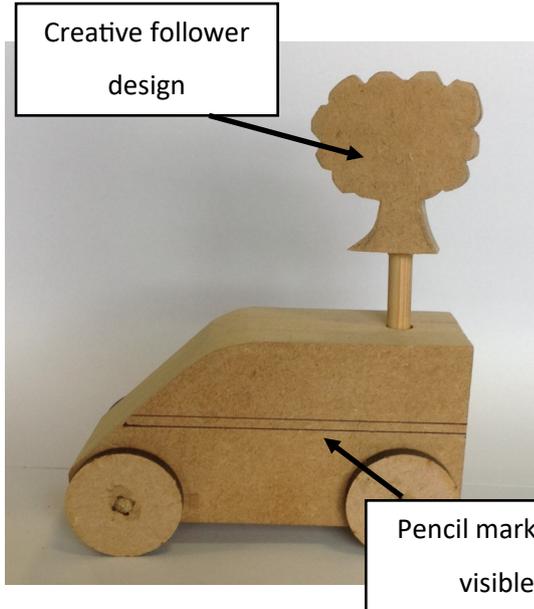
WE will learn about mechanisms and motion. WE will learn to use of different materials, tools, processes and understand the importance of health and safety in a practical environment. WE will carefully watch and learn from practical demonstrations and apply our learning to our individual project.



YOU will use your skills, knowledge and understanding to independently draw, design, plan, make and evaluate a 'Cam car' mechanism product to a quality standard.

Date: _____

What does Success look like?



How do I know it's a success?

Good points	Bad points
<ul style="list-style-type: none"> • Smooth edges • The motion of cam/follower works • Creative follower design • Glued together neatly 	<ul style="list-style-type: none"> • Rough edges • Pencil marks still visible • Simple follower design • Glue stains on edges

How you will be assessed?



THE DUSTON SCHOOL

Art, Design and Technology Marking Crib Sheet



Group: _____ Big Question: *How can motion and movement be described and illustrated?*

<p>Praise:</p> <ul style="list-style-type: none"> • Most completed their design brief applying the 5W's to the product they are designing. • All students could identify the need to analyse existing products • All students were able to identify the different types of motion. Some could identify the individual parts of an automaton. 	<p>Developments:</p> <ul style="list-style-type: none"> • Some needed to add justification into why they are make the decisions in their design brief. • Make sure you state the specific type of material you are using eg. What type of wood? MDF? • Clearly describe the motion and differences between the different types of cams 	<p>SPaG:</p> <p>Rotary motion Linear motion Reciprocating motion Aesthetics</p>
<p>To do now:</p> <p>Consider how the research into motion and mechanisms could be used in the practical making of your mechanical toy.</p>		<p>Wow!</p> <p>Clear understanding of the different types of cams and motion</p>
		<p>C4C:</p> <p>Use a pencil for drawing and a pen for writing!</p>

Design Scenario and Brief

Your scenario:

A large, Birmingham based, toy retailer is in need of a new range of stylish, educational mechanical products to help teach young children different forms of motion and movement. They have approached you to design a mechanical cam driven toy which can be included in a new range.

Activity: Consider a personal response to this scenario and create your own personalised design brief. Making sure you think about the following points:

- Target user– **who** is the cam car for?
- The aesthetics– **what** style are you going to choose to personalise it to a user/ user group?
- Function-**what** is it going to do?

What? - are you asked to design?		25% +
		To be able to write a design brief applying the 5W's.
Why? - is it needed?		45% +
		To be able to write a detailed design brief applying the 5W's and including specific decisions you've made.
Where? -a house, a shop, a room? Which?		65% +
		To be able to create a detailed design brief including the 5W's. Explain and justify the decisions you've made. With some considerations of the target user.
When? -Is the product going to be used?		85% +
		To be able to create a very detailed design brief which explains and justifies the decisions you've made. Consider your target user and how the product will solve real and relevant problems.
Who? -Is the target market or user?		

Activity: Write your own Design Brief - Use your sentence starters on page 7 to help

Peer Assessment

Grade:

Developmental feedback:

Date: _____

We use **ACCESS FM** to help us write a **specification** - a list of requirements for a design - and to help us **analyse and describe** an already existing product.

ACCESS FM - Helpsheet

A is for **Aesthetics**



Aesthetics means **what does the product look like?**
What is the: Colour? Shape? Texture? Pattern? Appearance? Feel? Weight? Style?

C is for **Cost**



Cost means **how much does the product cost to buy?**
How much does it: Cost to buy? Cost to make?
How much do the different materials cost? Is it good value?

C is for **Customer**



Customer means **who will buy or use your product?**
Who will buy your product? Who will use your product?
What is their: Age? Gender?
What are their: Likes? Dislikes? Needs? Preferences?

E is for **Environment**



Environment means **will the product affect the environment?**
Is the product: Recyclable? Reuseable? Repairable? Sustainable?
Environmentally friendly? Bad for the environment?
6R's of Design: Recycle / Reuse / Repair / Rethink / Reduce / Refuse

S is for **Size**



Size means **how big or small is the product?**
What is the size of the product in millimeters (mm)? Is this the same size as similar products? Is it comfortable to use? Does it fit?
Would it be improved if it was bigger or smaller?

S is for **Safety**



Safety means **how safe is the product when it is used?**
Will it be safe for the customer to use? Could they hurt themselves?
What's the correct and safest way to use the product? What are the risks?

F is for **Function**

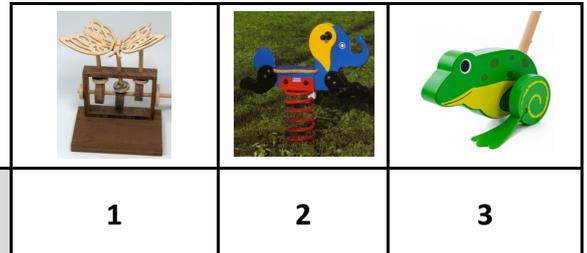


Function means **how does the product work?**
What is the product's job and role? What is it needed for? How well does it work? How could it be improved? Why is it used this way?

M is for **Material**



Material means **what is the product made out of?**
What materials is the product made from? Why were these materials used? Would a different material be better? How was the product made? What manufacturing techniques were used?



Circle the product number you have chosen from selection:

1

2

3

Product Analysis- Explain how your product will meet ACCESSFM

Aesthetics	
Cost	
Customer	
Environment	
Size	
Safety	
Function	
Material	

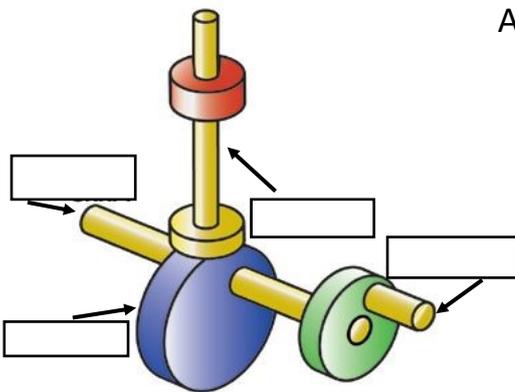
Cams, Mechanisms and Motion

Big Question: How can motion and movement be described and illustrated?

A **cam** is used with a **follower** to turn a **rotary** motion into **linear** or **reciprocating** motion.

Rotary motion is _____ _____	Linear motion is _____ _____	Reciprocating motion is _____ _____
Give one example:	Give one example:	Give one example:
List of possible motion examples:		
<ul style="list-style-type: none"> • Ferris Wheel • Tire pump • Rocket launch • Spinning top 	<ul style="list-style-type: none"> • Car on straight road • Fruit falling from a tree • Fan • Lift 	<ul style="list-style-type: none"> • Sewing machine • Drill • A train • Scroll Saw

Motion types word descriptions:



Add the correct labels to this diagram of a cam mechanism.

- Cam
- Shaft
- Crank
- Follower

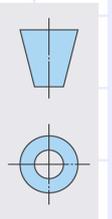
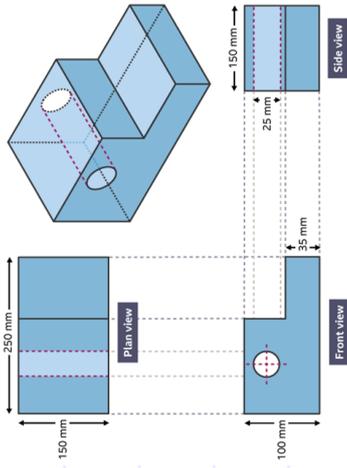
There are lots of different shapes of cam—the most common are **PEAR**, **SNAIL** and **OFF CENTRE**.

A PEAR cam looks like:	A SNAIL cam looks like:	An OFF CENTRE cam looks like:
And makes the follower _____ _____ _____	And makes the follower _____ _____ _____	And makes the follower _____ _____ _____

Orthographic Projection

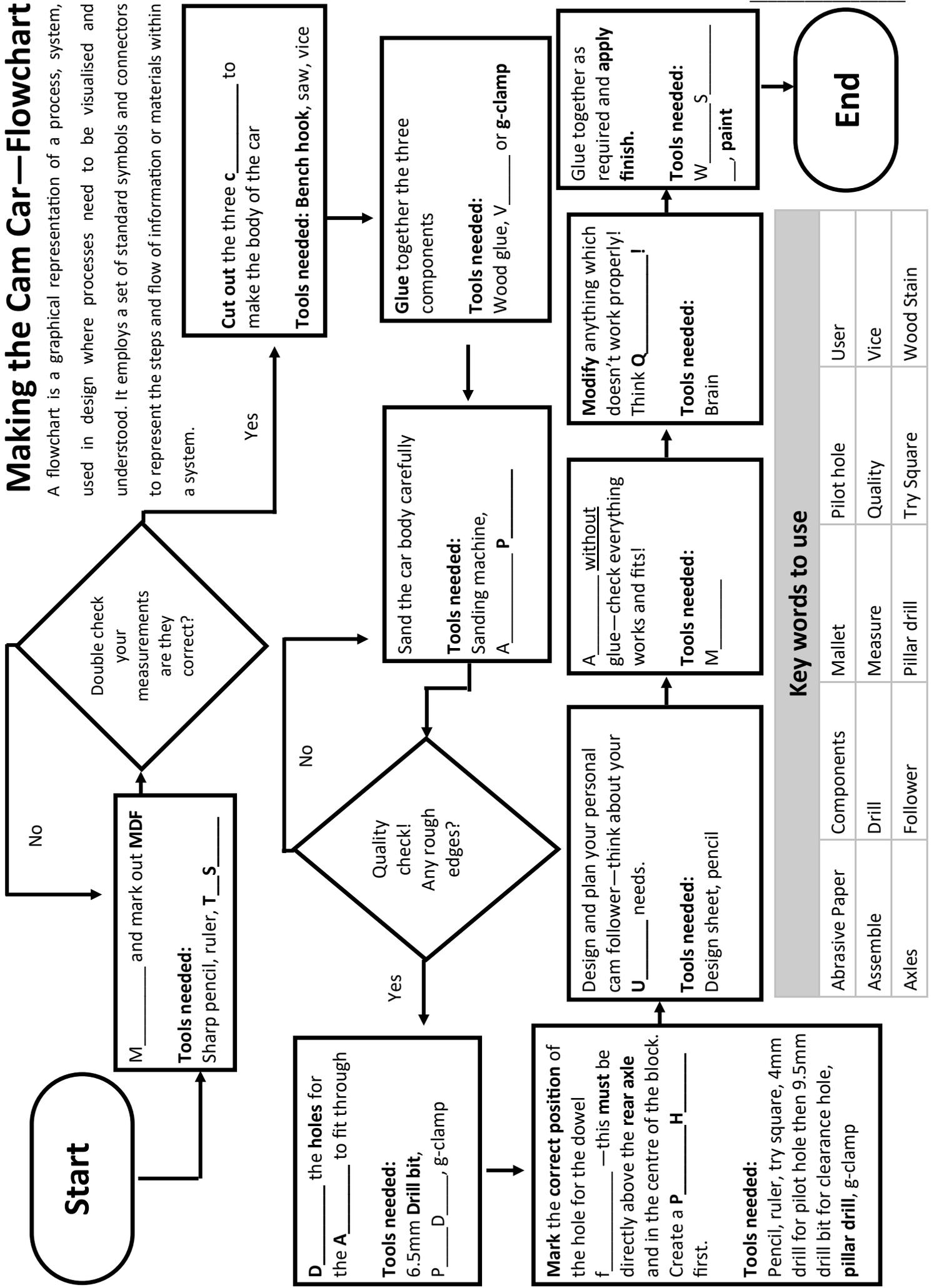
The ability to sketch and understand 3rd Angle Orthographic Projection is an important aspect of your current and future learning in Art, Design and Technology. Use the space below to sketch your component(s) to scale and with care—it is expected that a **third party** could use your sketch to make this component.

Datum point ●



Making the Cam Car—Flowchart

A flowchart is a graphical representation of a process, system, used in design where processes need to be visualised and understood. It employs a set of standard symbols and connectors to represent the steps and flow of information or materials within a system.



Date: _____

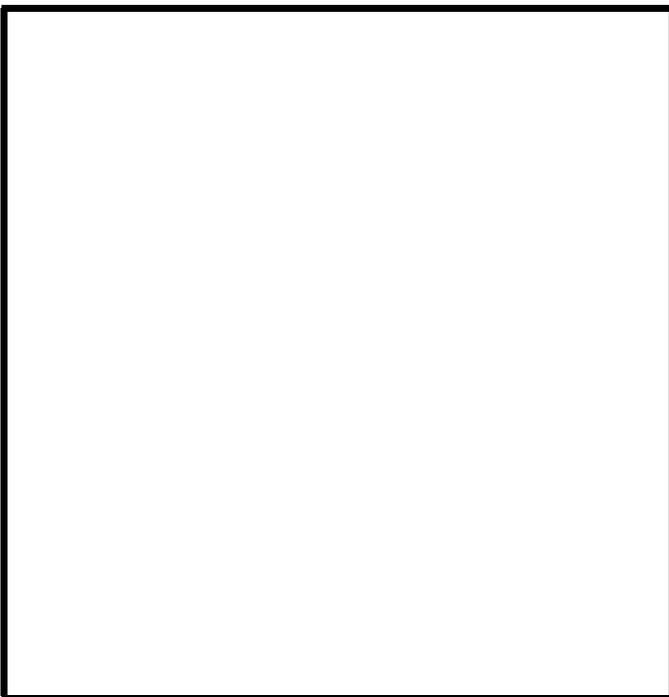
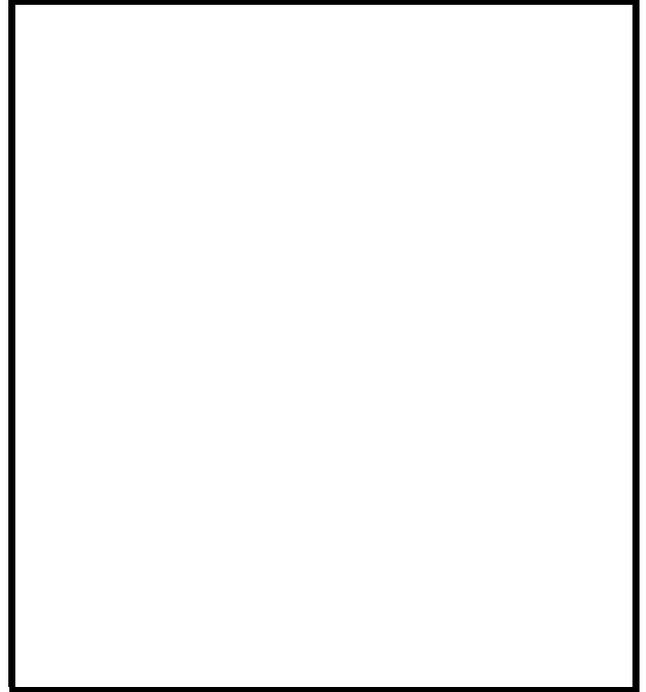
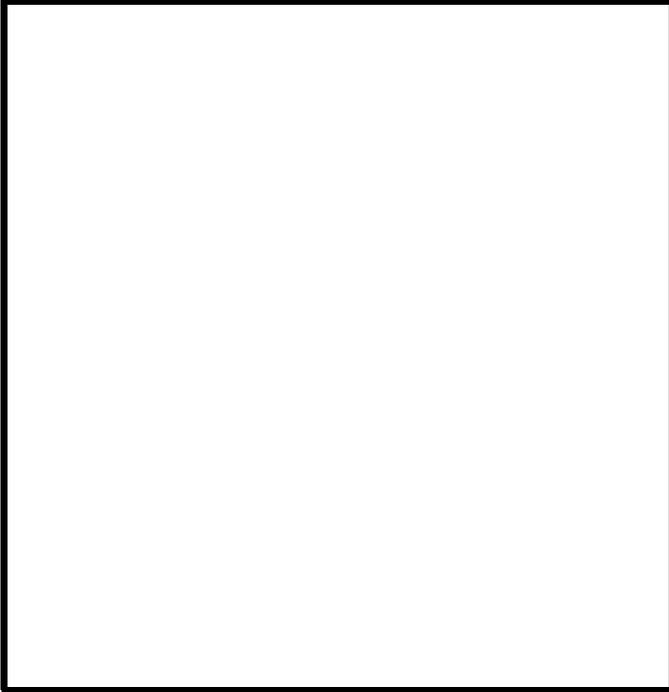
Key words to use

Abrasive Paper	Components	Mallet	Pilot hole	User
Assemble	Drill	Measure	Quality	Vice
Axles	Follower	Pillar drill	Try Square	Wood Stain

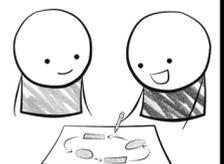
Date: _____

Cam Follower: Design Sheet

Use the boxes below to **sketch** out some ideas for a 'character' that can be attached to the top of your cam follower rod. Try to use as much of the box as possible— **FILL THE SPACE**, think about how you will make and finish it e.g. with abrasive paper or a file. You must be sure to leave an area on the design that can be drilled with a 10mm drill bit for attaching to the follower rod.



Feedback Responses:



Risk Assessment

Health and Safety is an essential element of your course. Now and in future years, you will be expected to be able to plan your work as safely as possible for yourself and others before you start work—this can be the potential risks and dangers from the processes, finishes, joins and tools that you intend to use. Use the table below, to identify the potential risks to yourself/others and how you could either avoid or minimise the problem.

Date: _____

Tools or Process	Use	Risk	Avoidance	Minimisation
Tenon saw	Cutting different types of materials eg softwood or MDF	<ul style="list-style-type: none"> • Cuts to hands • Breathing in of wood particles 	<ul style="list-style-type: none"> • Use of a scroll saw 	<ul style="list-style-type: none"> • Ensure room is well ventilated • Work is clamped down firmly using a G clamp • Use of a bench hook • Concentration on task

Cam Car: Evaluation

Big question: What is needed to write a good evaluation?



I will explain the purpose and value of completing a project evaluation and explain all of the main elements needed to make it a success!

1. What do you think of the overall design? What changes would you make?
2. Are you happy with the materials you chose? Would you make adjustments next time?
3. Did the project take too long to make?
4. Would it be easy to set up a production line for the manufacture of your solution?
5. Is your solution safe? Could it be made safer?
6. Are the techniques you used to make your solution adequate or would you use a different range of manufacturing techniques?
7. Is the solution the right size/shape?
8. What are the views of other people regarding your design?
9. Does it work? What changes are required?
10. Is the car easily pushed or pulled along?
11. Do the wheels turn round?
12. Does the follower move up and down?



We will read through the sentence starters and consider how they can be used to improve your evaluation.

Evaluation- use this to explain how successful/not an outcome or product is

- *Overall I am feel my [product] is a [success/failure] because...*
- *I found the making process [hard/difficult/easy]...because...*
- *If I was going to do the project again I would change... to improve it*
- *I would like to add this... to the [product]*

Feedback Sheets

Glue your whole class feedback sheets here