WOODWORK

FIELD NOTES



PUPIL NAME

TEACHER

INTRODUCTION

In this unit you will learn about the craft of constructing frames. Frames are used everywhere, from construction joinery through to furniture making. Knowing how to construct a frame is an essential practical skill for any crafts-person.

You will be learning a range of hand and machine tools in this unit.

You will have a series of skill-builder projects. How many you complete will depend on the time you have and the effort you make.

This unit will conclude in a final practical model that you must manufacture independently. You will also have a series of written assessments.

COMMON TOOLS











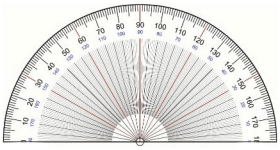














TASK 1

Research and **calculate** the cost to purchase all the tools for a school workshop.
You can download a tool list from DesignClass.co.uk

INTRODUCTION SKILLS

Before learning to make anything, there are certain core-skills that you must have. These include:

1. Understanding Health & Safety.
2. Reading sizes from a rule and tape measure.
3. Marking sizes using a rule and tape measure.

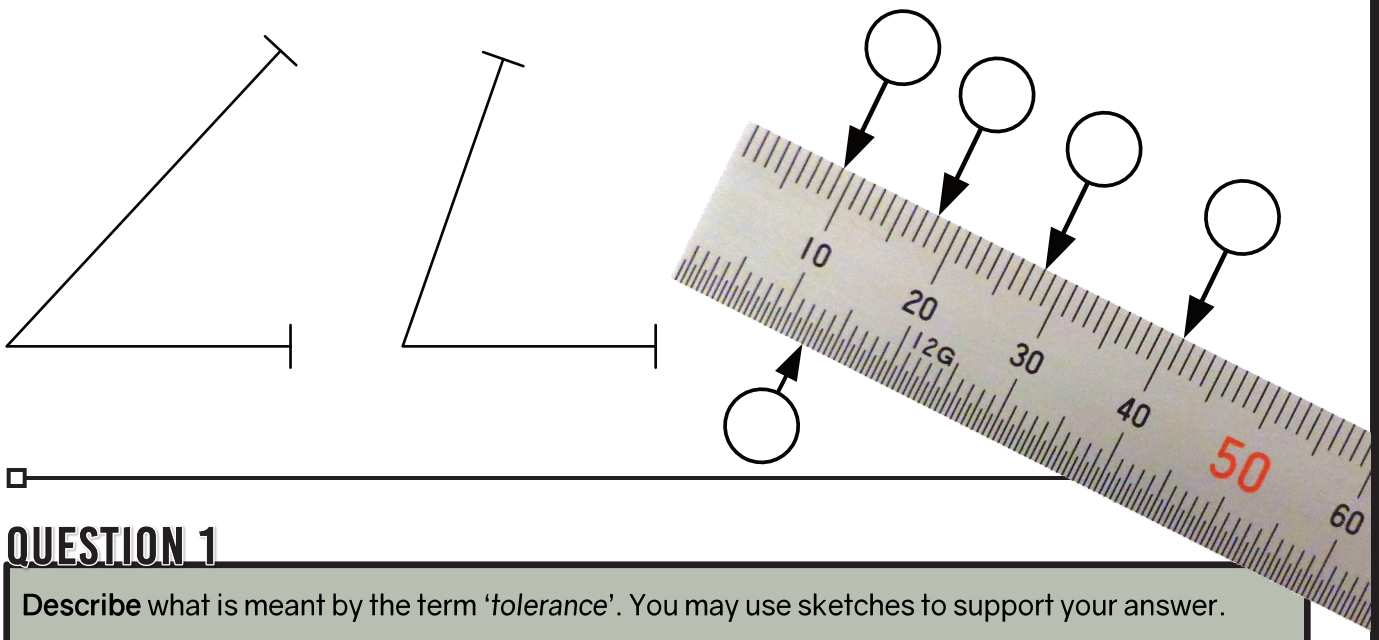
In this woodwork course you will be expected to work to a tolerance of +/- 3mm. This means you must be incredibly accurate in your marking, cutting and assembly.

Never rush your marking out! Take time to mark accurately and check your sizes before you commit to cutting material.

TASK 2

Reading and understanding technical drawings is an essential skill.
Download the practice drawings from DesignClass.co.uk and add in the sizes.

Measure these lines below and write the size above them. Try to work within 1mm.



QUESTION 1

Describe what is meant by the term '*tolerance*'. You may use sketches to support your answer.

MARKING OUT

Marking out is arguably a more important skill than cutting. Precision is key to everything you do, and it is always worth double-checking your sizes before committing your work to the saw.

Remember, a saw has an actual thickness. When completing your marking out, always leave a small gap for your saw. This is called a '*kerf gap*'.

You should also not take your dimensions from the very end of your timber. The end of the wood may not be square, and at the very least, you will want to sand it -reducing the length of the piece.

Draw a line at the end of the wood and take your sizes from the line. This is line is called a '*datum*'.



Mark into four, 40mm long pieces.



Mark into three, 52mm long pieces.



Mark into five, 18mm long pieces.

QUESTION 2

Explain the difference between a 'rule' and a 'ruler. You may use sketches to support your answer.

MARKING GAUGES

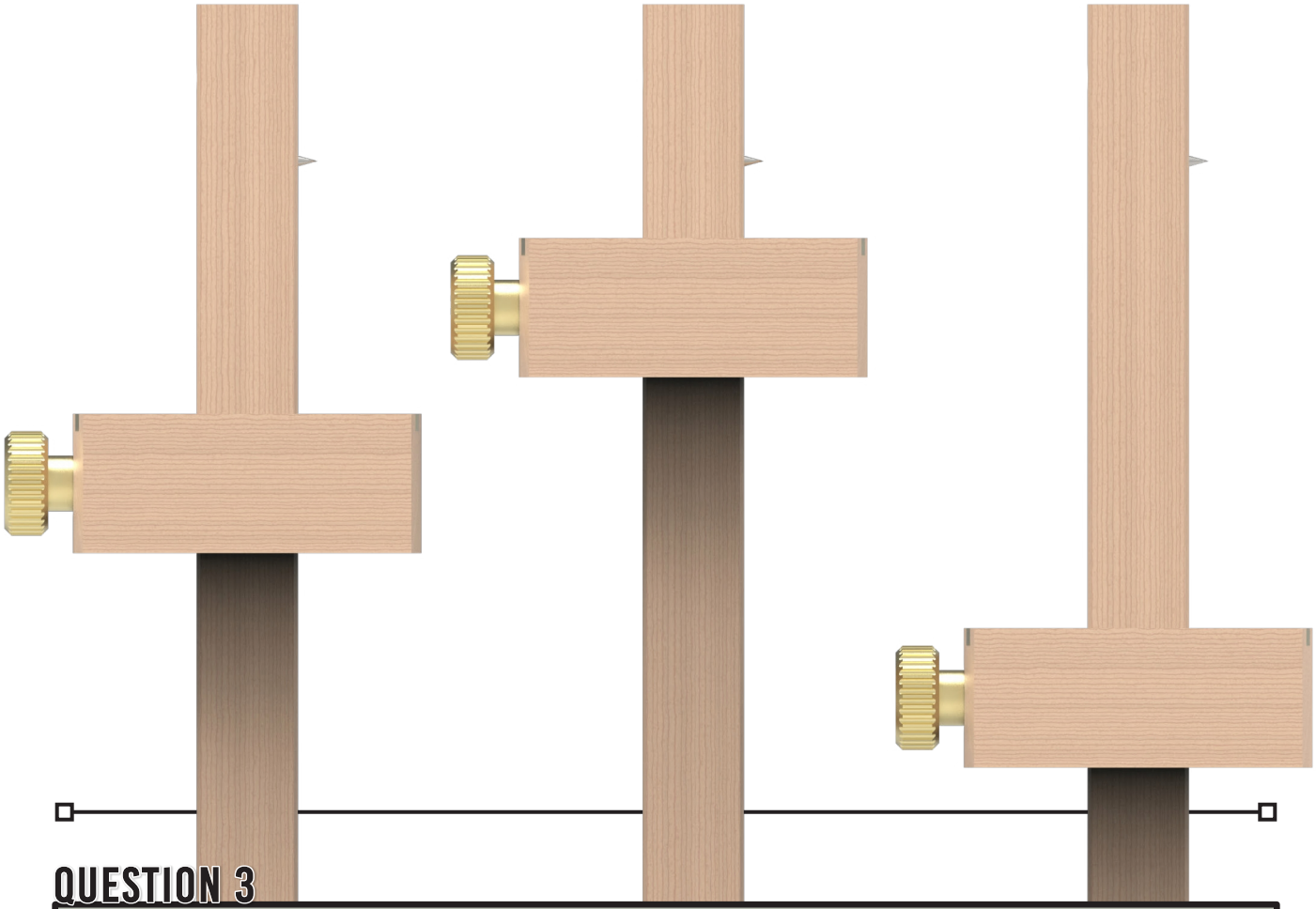
The marking gauge is an excellent tool for marking lines parallel to an edge. For newcomers, the marking gauge can be one of the most tricky tools to use.

Setting the marking gauge is the first challenge. The 'length' is set by measuring from the stock to the tip of the spur. A steel rule is used.

Your teacher will demonstrate how to use it.

TASK 3

Three marking gauges are shown below. (i) Measure from the stock to the spur and write down the size set for each marking gauge. (ii) Set a real marking gauge to these sizes.



QUESTION 3

Describe how a marking gauge can be used to find the centre of a face, without using a steel rule. You may use sketches to support your answer.

FRAMING JOINTS

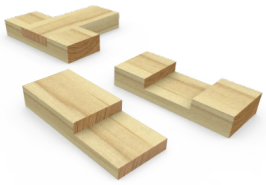
There are a huge range of joints that can be used to construct a frame. Each can have specific advantages; from ease-of-manufacture, aesthetics, mechanical strength and resistance to 'movement'. Which joint you use will depend on several factors.

There is a range of joints that you must be confident in manufacturing. We have included this list below. Practice making these until you are confident and have your teacher sign this booklet as you make each one. (We haven't included butt-joints)

PRACTICE JOINTS



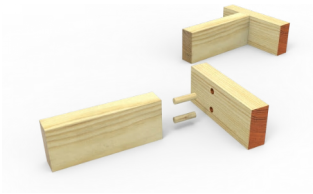
Corner Halving
Manufactured ☐



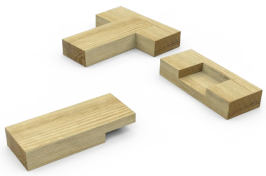
T-Halving
Manufactured ☐



Cross-Halving
Manufactured ☐



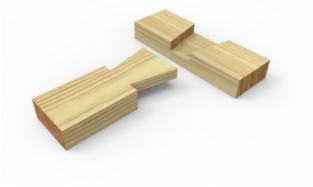
Dowel Joint
Manufactured ☐



Corner Halving
Manufactured ☐



Half-Mitre
Manufactured ☐



Dovetail
Manufactured ☐



Mortise and Tenon
Manufactured ☐

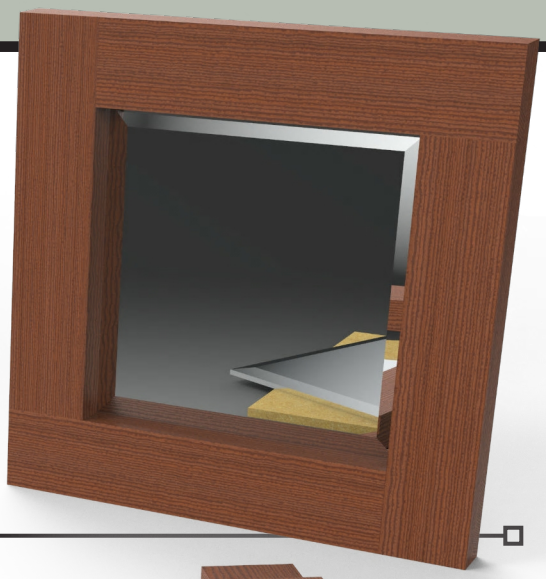


Bridle
Manufactured ☐

QUESTION 4

Describe what is meant by the technical terms; '*square*' and '*racking*'.
You may use sketches to support your answer.

SIMPLE FRAMING | MIRROR

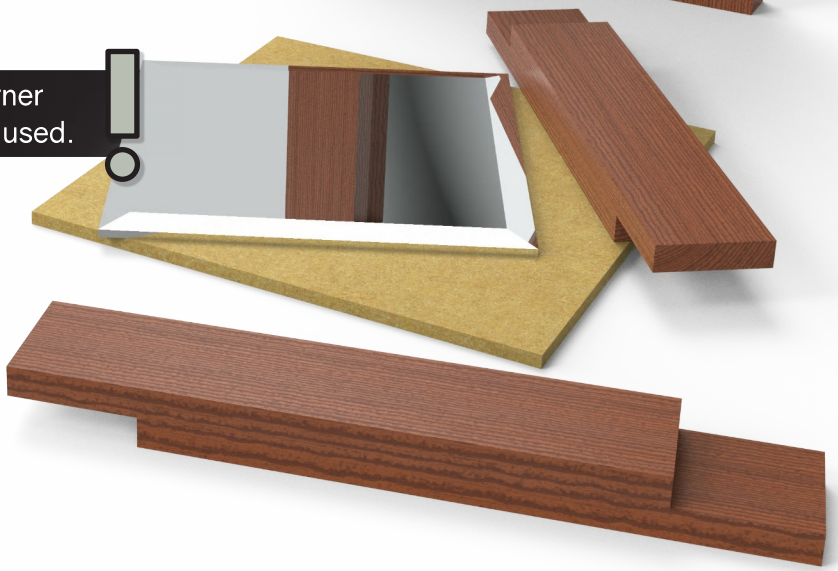


Most frames will have wood join at 90°, or '*square*'. Getting a frame to be square is vitally important. To get a frame that is square you must make sure your marking out is at right-angles to an edge. To do this, we must use a try-square properly. Your teacher will demonstrate how to use a try-square.

Your cutting must also be perfectly straight; you must cut a '*vee-groove*' and hold a tenon saw correctly.

TASK 4

Sketch a story board how to cut a corner halving joint. Clearly label your tools used.



CUTTING LIST

Part	Length	Breadth	Thickness	Quantity	Material
Spars				4	
Back				1	
Mirror	150mm	150mm	5mm	1	Glass

QUESTION 5

Describe two methods for checking a frame is square.
You may use sketches to support your answer.

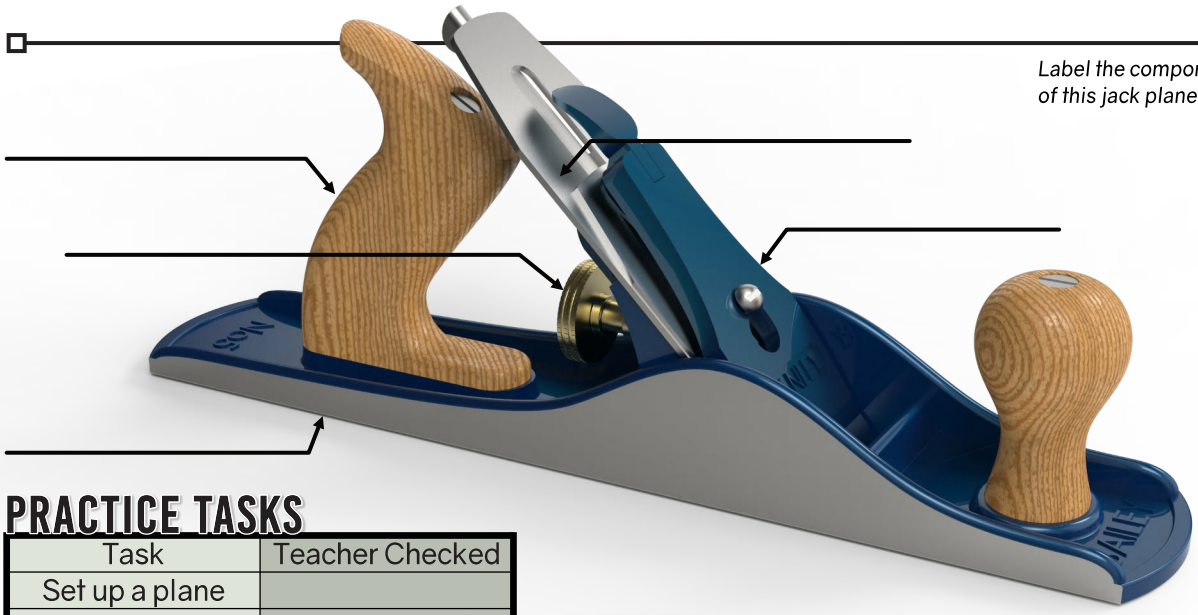
PLANES

Planes come in many different shapes and sizes. There are only a handful you need to know for this woodwork course. All planes work on the same principle of passing a sharp, angled blade over the surface of the wood. This removes a thin shaving from the wood.

Planes can be used to reduce the size of wood, or if your plane is very sharp, make the surface of wood very smooth.

It takes practice to set and use a plane confidently. Your teacher will demonstrate how.

Label the component parts of this jack plane.



PRACTICE TASKS

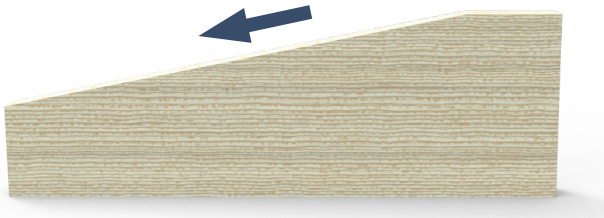
Task	Teacher Checked
Set up a plane	
Plane-to-a-line	
Plane a 'chamfer'	
Plane round	

A plane must always follow the direction of the grain of the wood.



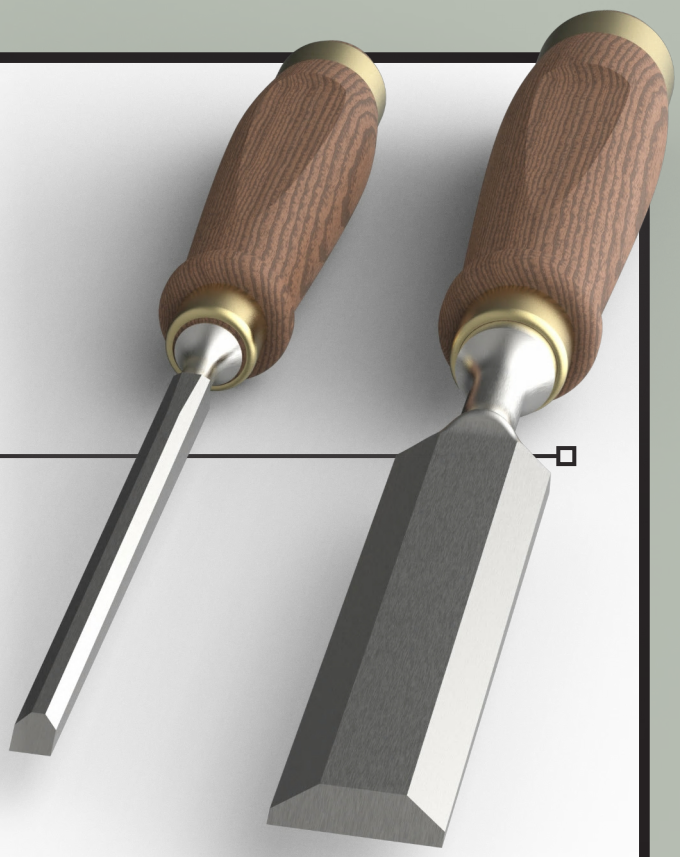
QUESTION 6

A piece of wood requires a long slope to be planed.
Explain why the plane must be used in the direction shown by the arrow.



BEVEL-EDGE CHISELS

Generally, the bevel edge chisel is the best for all round furniture and cabinet making. Strong yet versatile, comfortable in the hand, holding a good edge, and be easy to sharpen. As the edges are sloped, or 'beveled', bevel edge chisel are excellent for making dove tail joints.

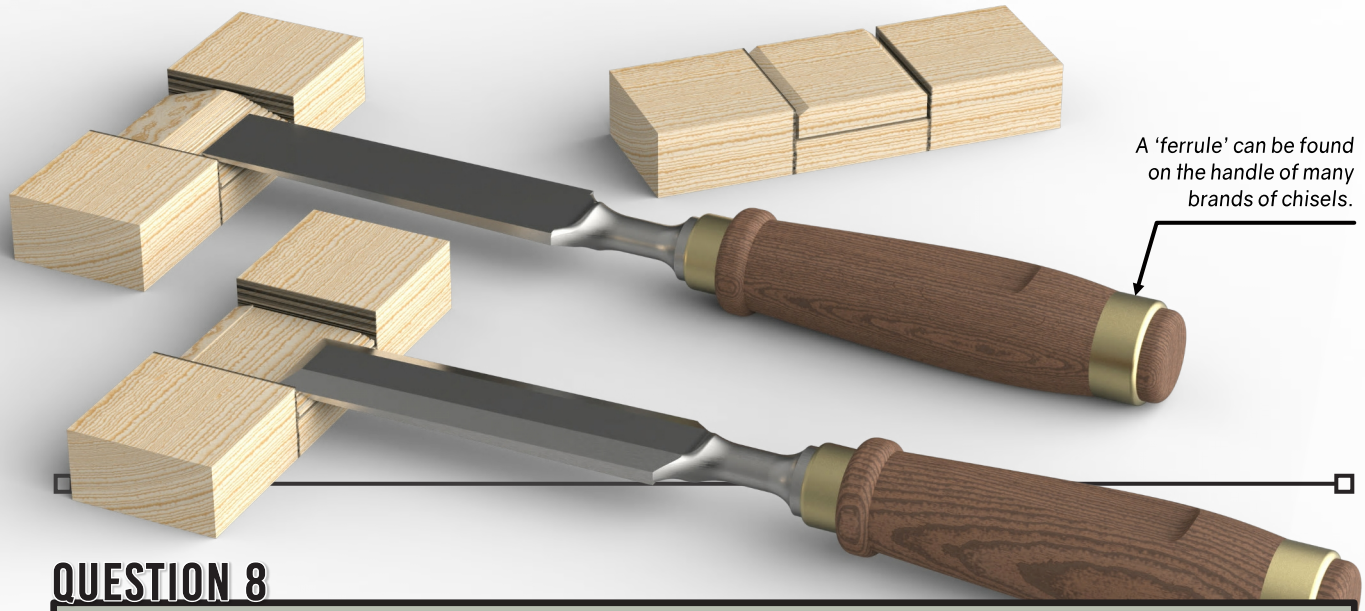


QUESTION 7

Describe two safety checks you must do with a chisel before use.

PRACTICE TASKS

Task	Teacher Checked
Sharpen a chisel	
Hone a chisel	



A 'ferrule' can be found on the handle of many brands of chisels.

QUESTION 8

Explain the purpose of the 'ferrule' at the end of a chisel.

INTERMEDIATE FRAMES | CLOCK

Some wood joints are more complex to create than others. You are expected to be able to mark out, cut and assemble some of these joints to pass your woodwork course.

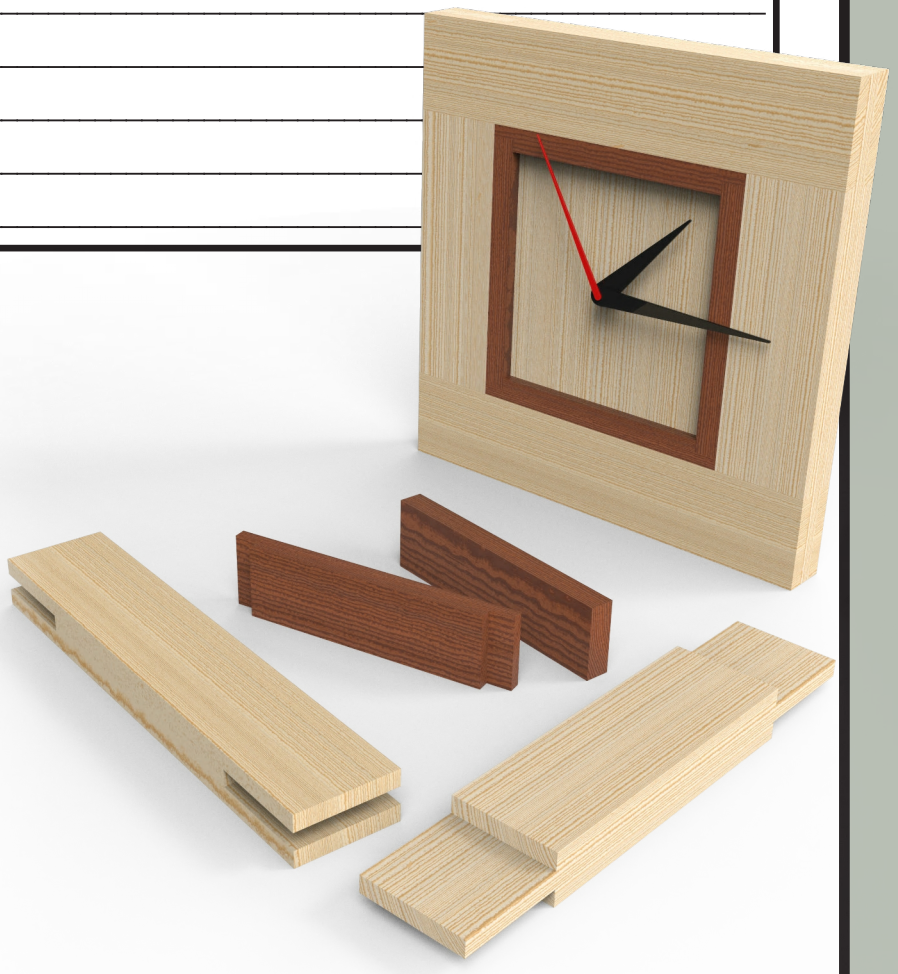
The mortise gauge is similar to the marking gauge, that is marks lines parallel to an edge. Instead of marking one line, a mortise gauge can mark two parallel lines set to a specific width.

A mortise gauge is used with both '*mortise and tenon*' joints and '*bridle*' joints.

The gap between the two spurs of a mortise gauge is typically set to the width of chisel to be used. Your teacher will show you techniques for setting the mortise gauge, or you can watch a short video on DesignClass.co.uk

QUESTION 9

Wooden products need a finish applied for aesthetics and protection.
Describe the process of preparing wood for applying a finish.



QUESTION 10

State the name of three clear finishes that could be applied.

CUTTING LIST

Part	Length	Breadth	Thickness	Quantity	Material
Mitre horizontal				2	
Mitre vertical				2	
Inner frame A				2	
Inner frame B				2	
Face	100mm	100mm	5mm	2	
Clock	80mm	80mm	12mm	1	Plastic

INTERMEDIATE FRAMES | PHOTOFRAME

Mitres are common framing technique, used everywhere from picture frames through to wall skirting. Mitres are typically at 45°, but different angles can be used.

To mark out a mitre, a '*mitre gauge*' or a '*sliding bevel*' may be used. A mitre gauge is better, as the 45° will be set by the manufacturers; there will be less chance for error.

Mitres are particularly challenging to manufacture. Any small gap in the mitre can ruin the look of the product. Carefully cutting a '*vee grove*' and using a fine-toothed saw can help get a clean cut.

A mitre-saw which has a preset '*jig*' can also help cut these challenging joints. Importantly, don't rush!

QUESTION 11

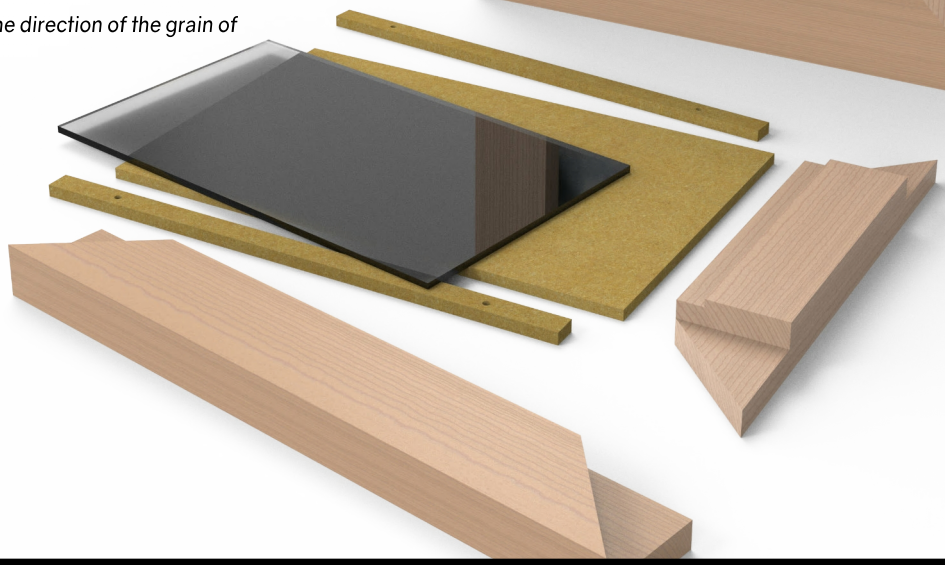
Describe how you can set a 'sliding bevel' to a specific angle.
You may use sketches to support your answer.

TASK 5

Practice reading angles. Download the sliding bevel angle reading task from DesignClass.co.uk



A plane must always follow the direction of the grain of the wood.



CUTTING LIST

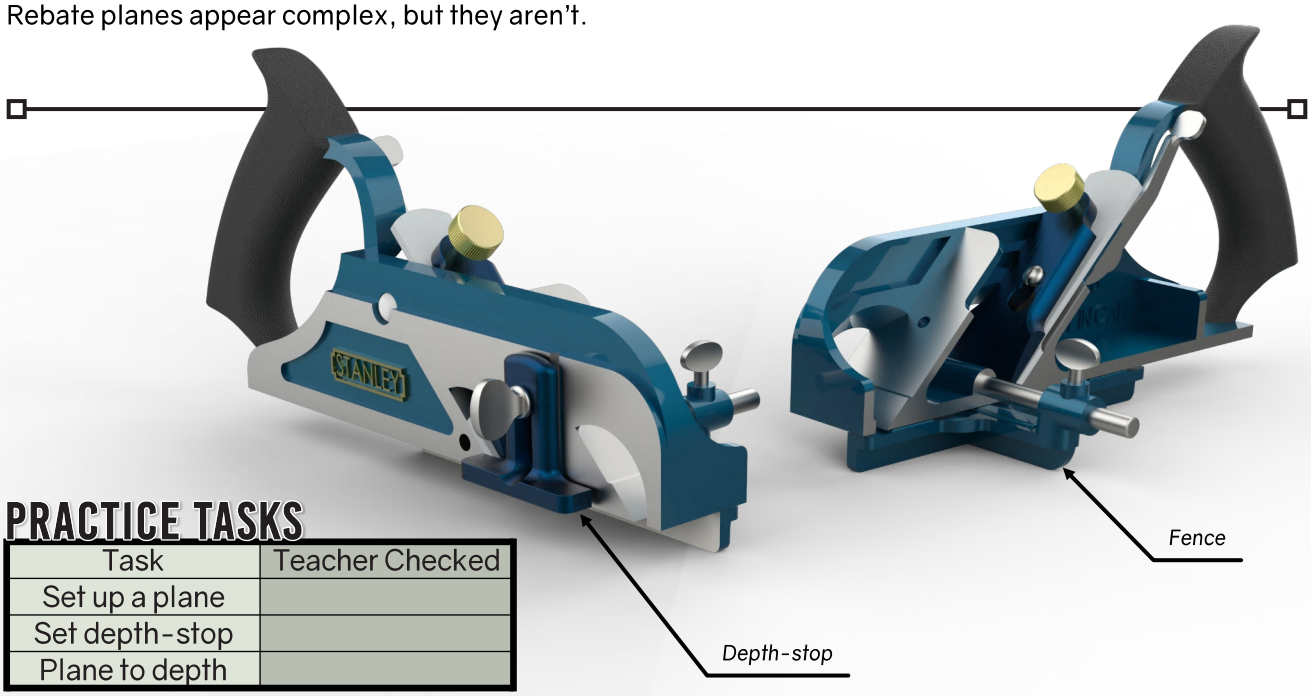
Part	Length	Breadth	Thickness	Quantity	Material
Mitre horizontal				2	
Mitre vertical				2	
Back				1	
Strips				2	
Screen			3mm	1	Acrylic

REBATE PLANES

Rebate planes are a specialist tool designed for removing the corner edge of material. This creates a small lap, or recess, that a board material can fit into.

Rebate planes appear complex, but they aren't.

Your teacher will demonstrate how to set up and use a rebate plane.



PRACTICE TASKS

Task	Teacher Checked
Set up a plane	
Set depth-stop	
Plane to depth	

QUESTION 12

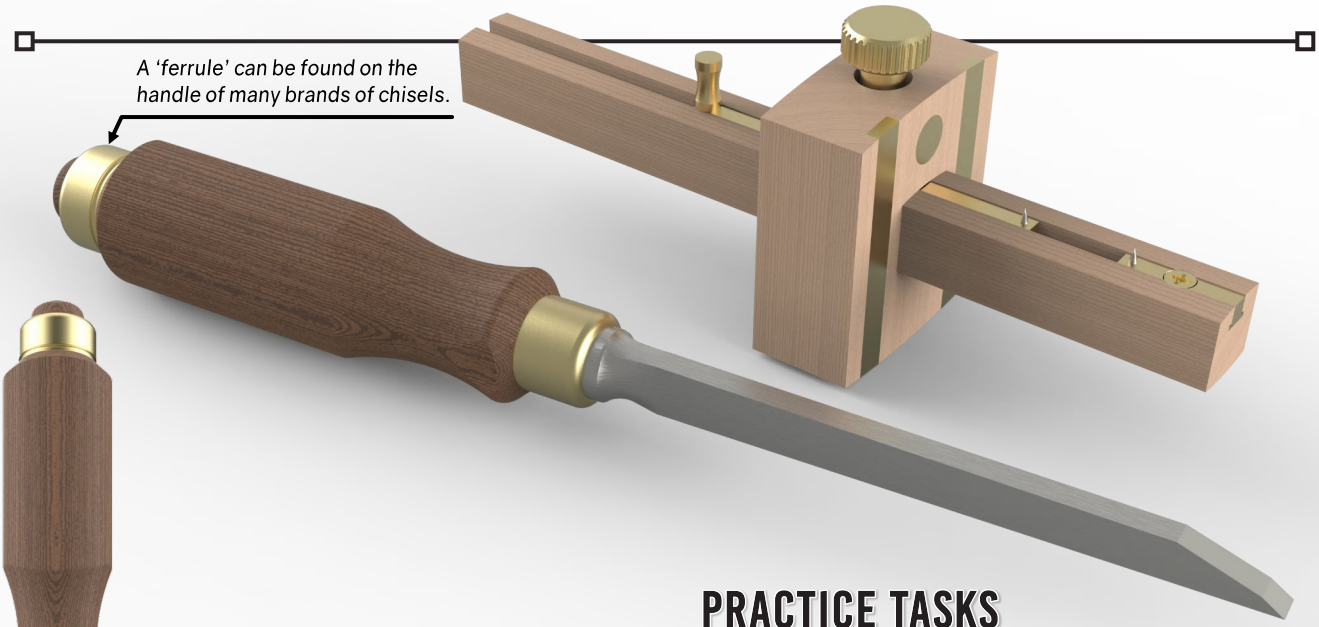
Describe the purpose of the (i) depth stop and (ii) the fence.
You may use sketches to support your answer.

QUESTION 13

Manufactured boards are often used for backings.
State the name of three manufactured boards that could be used.

MORTISE CHISELS

In the classic tradition of mortising, a chisel is malleted into the wood and then levered out to remove waste. Mortise chisels have the thickness to withstand the levering out, and a stout blade angle that can apply the force into the wood. Mortise chisels also have the length to put leverage behind the levering out.



PRACTICE TASKS

Task	Teacher Checked
Sharpen a chisel	
Hone a chisel	
Set Mortise gauge	

Mortise chisels require you to take your time. Don't use too much force, as you could easily split your wood or injure yourself.

Start by cutting the 'shoulders' of the joint. Make sure you ***do not*** *lever backwards onto the shoulder, or you will compress the wood and ruin the look of the joint.*

Strike straight down into the wood.

Make a series of strikes along the length of the joint. Small shavings of wood will gradually be removed and you will cut your mortise deeper.

Always use the back of your chisel for the shoulder sections of the joint, with the bevelled edge of the blade pointing in towards the waste material.

QUESTION 14

Describe one method knowing what depth you are chiselling to. You may use sketches to support your answer.

COMPLEX FRAMES | TABLET STAND

Mortise joints come in a range of forms; through, stubbed, haunch. Your teacher will demonstrate each of these. They are all broadly the same, with one piece of wood with the '*tenon*' (insert) and the other the '*mortise*' (hole).

Mortise and tenon joints are exceptionally strong, especially with wooden products used in changeable environments.

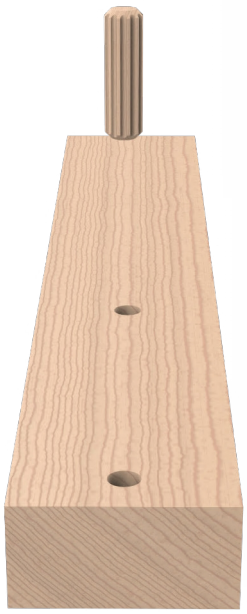
Remember. wood can swell or contract to to different environmental conditions.

A joint like a mortise and tenon is perfect in these circumstances.



DOWEL JOINTS

Dowel joints are 'knock-down' fittings, that are simple to assemble and good for flat-pack projects. Dowel joints require PVA glue to make the fitting permanent.





CUTTING LIST

Part	Length	Breadth	Thickness	Quantity	Material
Sides				2	
Top & Bottom				2	
Legs				2	
Pegs	40mm	ø12mm		2	

QUESTION 15

Explain why wooden dowels have the tops and bottoms chamfered, and flutes/ridges along the length.

ANGLED FRAMES | POT STAND

What do all the angles in a triangle add up to? That's right, 180°.

Marking, cutting and assembling products with complex angles can be a real test of your abilities. It almost entirely relies on your marking out abilities. All marking tools have a tolerance. Even the width of a pencil lead can knock sizes out. Remember, using a making knife can help make more precise markings.

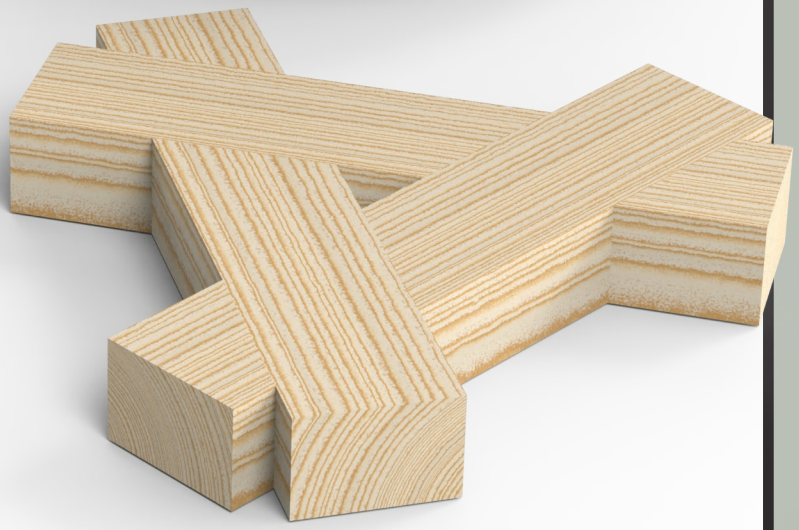


QUESTION 16

State the name of 4 softwoods.

QUESTION 17

State the name of 4 hardwoods.





CUTTING LIST

Part	Length	Breadth	Thickness	Quantity	Material
Strut				3	

FINISHING TOUCHES

A product is only as good as the finish. It can take the same length of time to finish a product as it takes to cut and shape it.

It is a good idea to apply a finish before final assembly - getting into small gaps after assembly can be challenging.

Your teacher will show you a range of finishes available to you. The choice of finish will depend on several factors:

- Will the product touch food, or go in the mouth?
- Will the product go outside?
- Will the product be frequently touched or scuffed?
- Do you need to change the colour of the product?



Surface preparation is everything.

Make sure you have no pencil marks!



Many light coats are better than one heavy coat.



Finishing will not hide mistakes...But will make the model look fantastic.

PRACTICE TASKS

Finish	Teacher Checked	Finish	Teacher Checked
Danish oil		Polyurethane varnish	
Bees wax		Paint	
Wood stain		Sunflower oil	

QUESTION 18

Explain what is meant by the term '*sustainable forest*'.

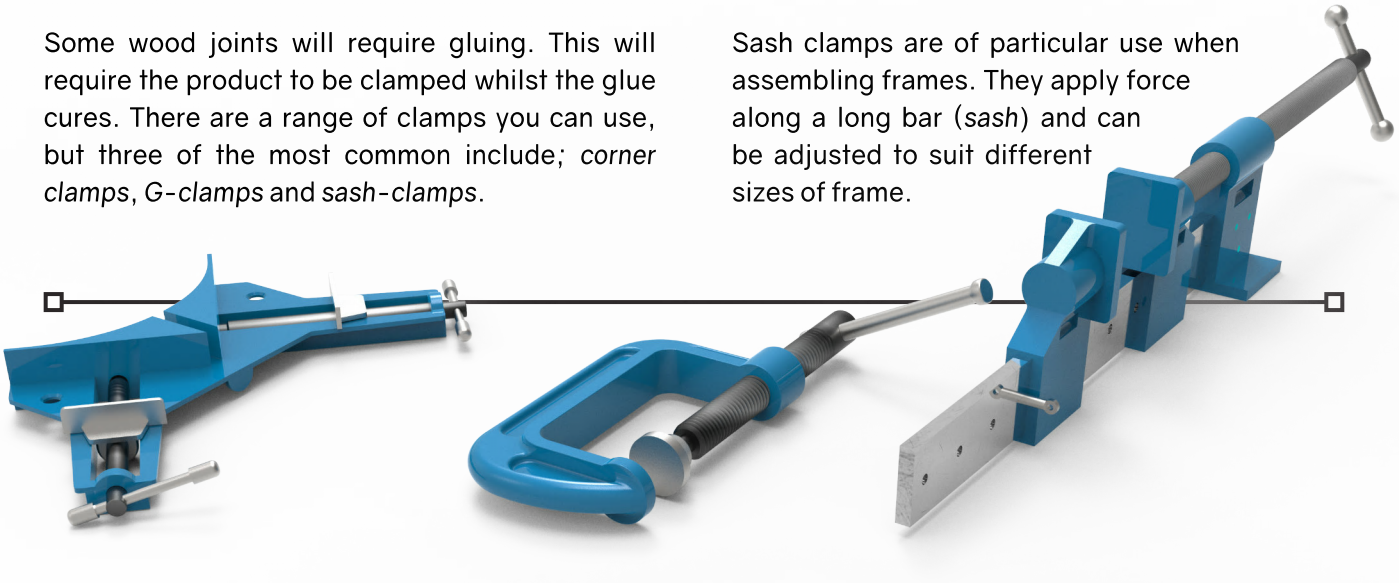
QUESTION 19

State the name of a suitable finish for wood product that will be used in cooking or touching food.

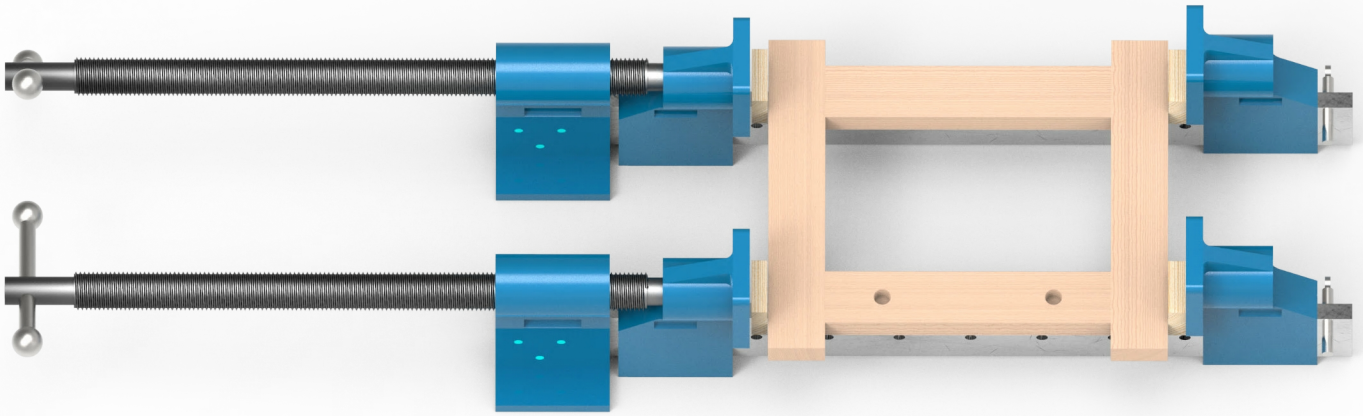
GLUING AND CLAMPING

Some wood joints will require gluing. This will require the product to be clamped whilst the glue cures. There are a range of clamps you can use, but three of the most common include; *corner clamps*, *G-clamps* and *sash-clamps*.

Sash clamps are of particular use when assembling frames. They apply force along a long bar (*sash*) and can be adjusted to suit different sizes of frame.



Mitre clamp *G-clamp* *Sash clamp*



Take care when using a sash-clamp. It can be very easy to knock a frame 'out-of-square', by tightening one sash-clamp more than another.

Sash-clamps can also be heavy, so be careful if moving your model once clamped.

Make sure that the direction of the clamp faces the same direction as the wood joint. The clamp should also be directly over the joint so the maximum force is applied in this area.

Take care not to over-tighten - It is possible to snap your work!

QUESTION 20

Explain why scrap wood should be used between clamps and a model.

FRAMING PROJECT ASSESSMENT

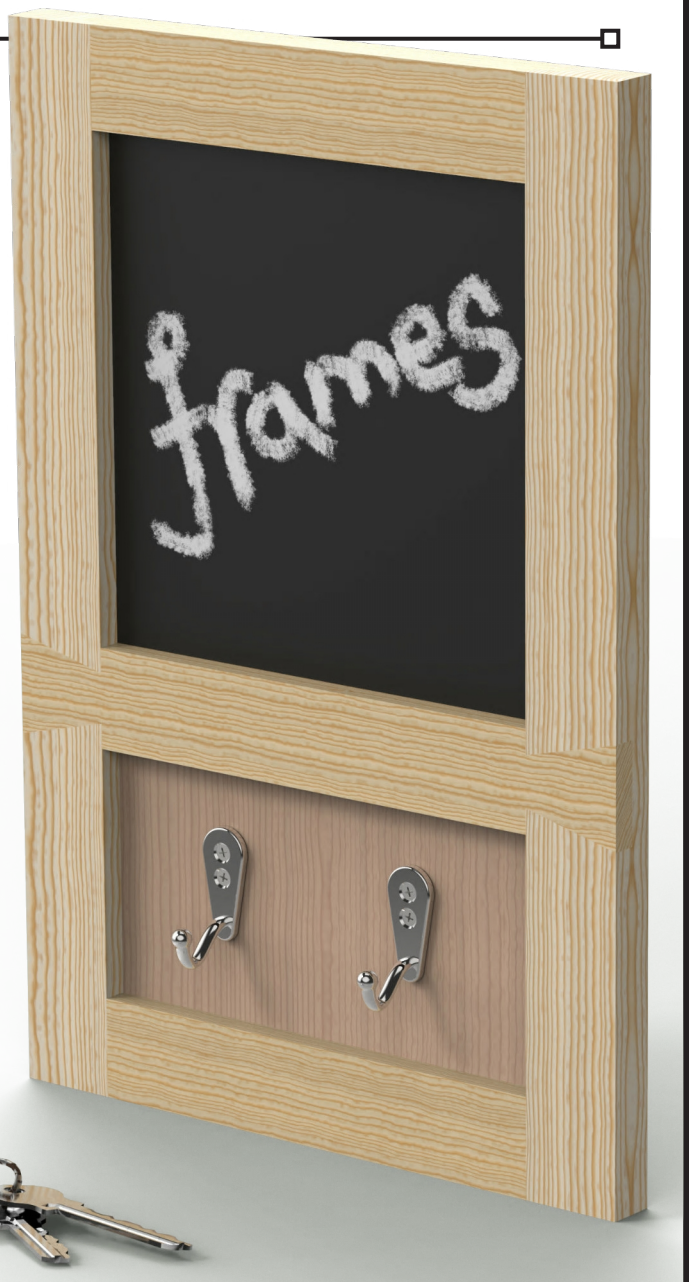
This is your unit assessment for woodwork. You are expected to complete this practical activity entirely independently.

The project has six joints; four haunch mortise and tenon and two dovetail. The tolerance for each joint is +/-1mm, with overall sizes being +/-3mm.

You will need to apply different finishes, including chalk-paint for the notice board. The quality of finish will form part of your grade.

You may wish to practice making the joints in this project before you begin the assessment.

Good luck!



QUESTION 21

State the name of a suitable adhesive for the frame.

QUESTION 22

Justify a specific clear finish for this frame.

CUTTING LIST

Part	Length	Breadth	Thickness	Quantity	Material
Sides				2	
Top & Bottom				2	
Middle spar				1	
Chalk board				1	
Lower Back				1	Birch ply
Hooks	N/A	N/A	N/A	2	Metal

ASSESSMENT

You have hopefully learned a lot about frames. This is only the beginning of this topic and there are other joint types and techniques for you to master.

Now is a good time to review your learning. Check-off how many topics your understand from the list below. If you struggle with any, read your notes and speak to your teacher.

LEARNING CHECKLIST

- [ ] I can state the name of nine framing joints
- [ ] I can explain what is meant be the term 'square'.
- [ ] I can name parts of a marking gauge.
- [ ] I can describe the differences between a bevel-edge and mortise chisel.
- [ ] I can describe two methods of checking a frame is square.
- [ ] I can describe how to set a sliding bevel to a given angle.
- [ ] I can describe how to set and use a mortise gauge.
- [ ] I can describe how to set the depth-stop on a mortise machine.
- [ ] I can describe how to prepare a wooden surface for a finish.
- [ ] I can mark out, cut and assemble nine different framing joints
- [ ] I can name three different softwoods and three different hardwoods.
- [ ] I can describe the purpose of a 'cutting list', and complete one.

MODEL CHECKLIST

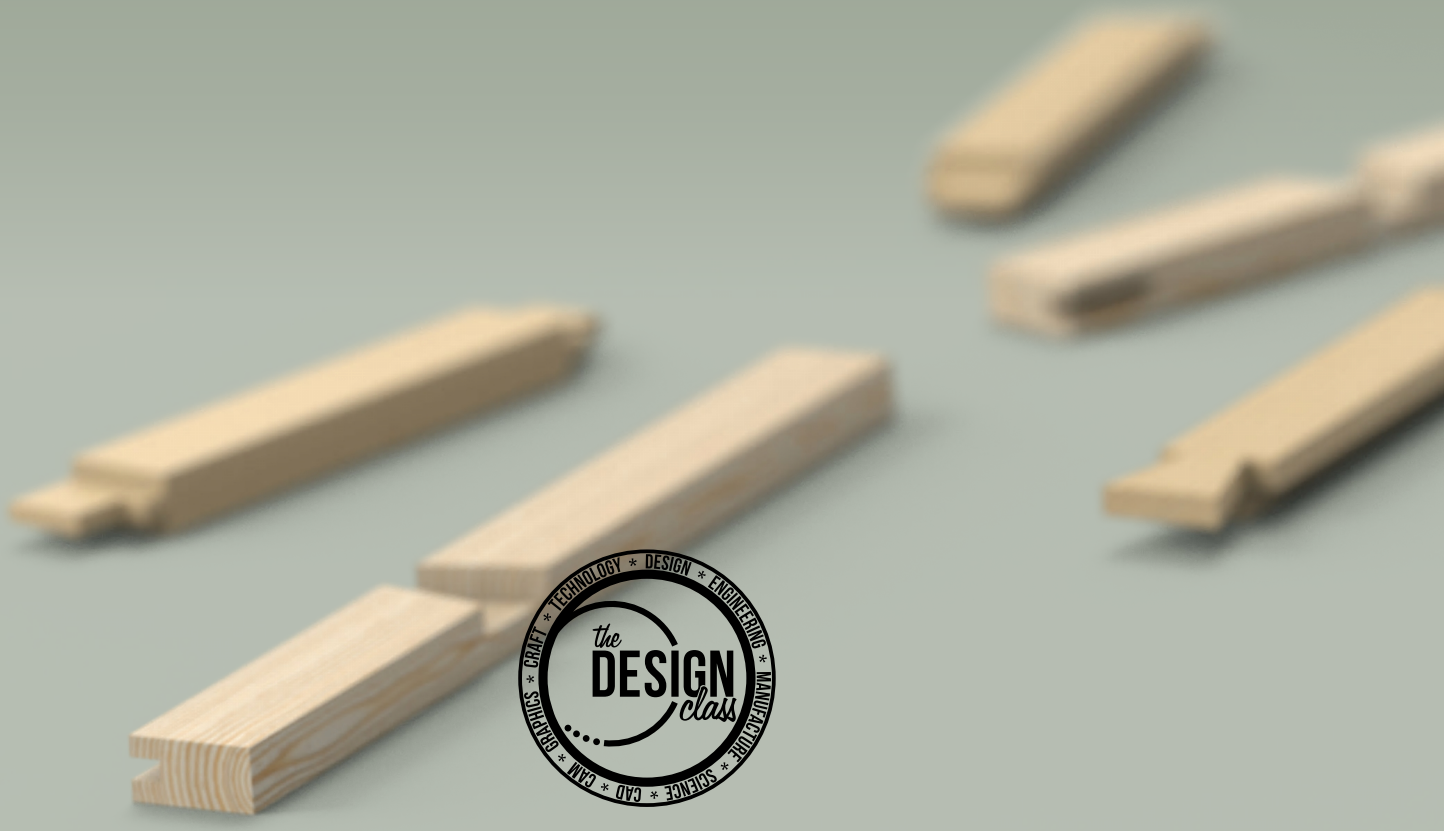


Mirror Frame *Clock* *Photoframe* *Tablet Stand* *Pot Stand* *Memo Board*

GRADE

Record here the grade your teacher awards you for each of the projects.

☐ ☐ ☐ ☐ ☐ ☐



COURSE NOTES V 1.3

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