



ROUTE B · PLANNING MANUFACTURE
Wood by hand

LEARNING INTENTION

Plan and make my EarBuddy from 6 mm birch plywood using hand tools and a pillar drill.

SUCCESS CRITERIA · I can...

- ☐ mark out plywood accurately
- ☐ cut, shape and drill plywood safely
- ☐ prepare the surface and apply a finish

Birch plywood · 6 mm

Type	Manufactured board
Made from	Thin layers (veneers) glued with the grain at 90° to each other
Properties	Strong, stable, does not split easily; edges show the layers
Finish	Sand smooth, then paint, varnish, wax or oil



Tools & equipment

Steel rule measures in mm	Pencil sharp, for fine lines	Try square marks lines at 90°	Marking gauge lines parallel to an edge	Bradawl marks hole centres	Coping saw cuts curves
V-board / bench hook supports the work	Bench vice holds the work	Files shape to the line	Glasspaper & block coarse → fine	G-clamp clamps to the bench	Pillar drill drills holes

WORKSHOP SAFETY

- Wear **goggles** when drilling and using machines.
- Keep both hands **behind** the coping saw blade. Let the saw do the work.
- Clamp the work — never hold small pieces by hand at the pillar drill.
- Pillar drill: guard down, hair tied back, sleeves and tie tucked in, chuck key removed.
- Sand in a well-ventilated area and clear dust with a brush, not by blowing.
- Read the label on paints and varnish; use them where your teacher tells you.

CHECK YOUR UNDERSTANDING

1 Choose two safety rules from above. **Explain** why each one keeps you safe.

How to make it

1 Mark out

- Place the template so the **outer grain** runs the way you want and draw round it with a **sharp pencil**.
- Use a **try square** for 90° lines and a **marking gauge** for lines parallel to an edge.
- Mark hole centres with crossing lines and press in a **bradawl** to stop the drill wandering.



2 Cut

- Clamp the plywood on a **V-board** or low in the vice. Cut on the **waste side** of the line.
- A coping saw's teeth point **towards the handle**, so it cuts on the pull stroke. Keep the blade upright and use the full length.
- For a slot or hole inside the shape: drill a hole, unhook the blade, thread it through and re-tension.



3 Shape

- File down to the line, working **along** the edge. A half-round file is ideal for curves.
- Don't file the corners of the face — plywood's top layer can **splinter**.
- Round all edges slightly so there are no sharp corners.



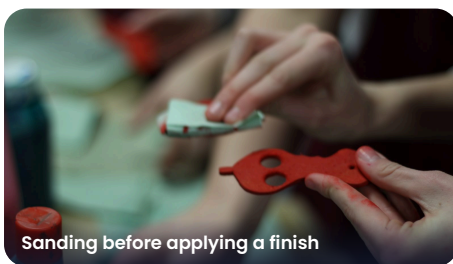
4 Drill

- Clamp the work with **scrap wood underneath** — this stops the back of the hole splintering (breakout).
- Use a twist drill for small holes; a **Forstner bit** gives a clean, flat-bottomed large hole.
- Lower the drill slowly and lift it out with the motor still running.



5 Finish

- Sand with **glasspaper wrapped round a block**: coarse → medium → fine. On the faces, sand **with the grain**.
- Brush off all the dust before applying any finish.
- Apply your finish: thin coats of **paint** or **varnish** (sand lightly between coats), or rub in **wax** or **oil**. Leave to dry.



Sanding before applying a finish



Applying a painted finish



A belt sander (bandfacer) — only with your teacher

COMMON MISTAKES

- Sawing on the line — your EarBuddy ends up too small.
- Forcing the coping saw so the blade snaps. Use gentle, steady strokes.
- No scrap wood under the hole — the back splinters.
- Painting over dust or scratches — the finish shows every mark.

Extension

Two plywood parts with halving slots can slot together to make a desk stand. Slot width = the thickness of the plywood!

My manufacturing plan

SEQUENCE OF OPERATIONS

2 Plan every step in order. Use page 2 to help. For each step, list the tools and a safety point.

#	What I will do	Tools & equipment	Safety
1			
2			
3			
4			
5			
6			
7			
8			
9			

CUTTING LIST

3 What size of material do you need? Add 5 mm to each side of your design.

Part	Material	L	W	T	Qty
Main body	Birch plywood			6 mm	1

L = length · W = width · T = thickness, all in mm

MY FINISH

4 Which finish will you use and why?

QUALITY TARGETS

Professionals work to a **tolerance** — how far a size is allowed to be from the drawing. Check your work against these targets as you go.

Outline matches the template	±1 mm
Edges smooth, no splinters	smooth
No saw marks or scratches on faces	clean
Holes clean on both sides	no breakout
Even finish with no drips or patches	even

Making log & evaluation

MAKING LOG

5 At the end of each workshop lesson, record your progress.

Lesson	What I did	A problem & how I solved it	Next lesson I will...
9			
10			
11			

MY EARBUDDY

Sketch or stick a photo of your finished EarBuddy.

FINISHED PRODUCT

LESSON 12 • EVALUATION

6 Test your EarBuddy against your specification.

Specification point	Met?	Evidence
	☐ ☐	
	☐ ☐	
	☐ ☐	
	☐ ☐	
	☐ ☐	

Tick first box = met, second box = not met.

REFLECT

What went well in the workshop?

IMPROVE

If you made it again, what would you change and why?

Teacher check: quality targets met ☐ all ☐ most ☐ some

Signed