

4.4.4.4 Section D: Developing design ideas (20 marks)

Students will develop and refine design ideas. This may include, formal and informal 2D/3D drawing including CAD, systems and schematic diagrams, models and schedules. Students will develop at least one model, however marks will be awarded for the suitability of the model(s) and not the quantity produced.

Students will also select suitable materials and components communicating their decisions throughout the development process. Students are encouraged to reflect on their developed ideas by looking at their requirements; including how their designs meet the design specification. Part of this work will then feed into the development of a manufacturing specification providing sufficient accurate information for third party manufacture, using a range of appropriate methods, such as measured drawings, control programs, circuit diagrams, patterns, cutting or parts lists.

Mark band	Description
16–20	Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype.
	Excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements.
	Fully appropriate materials/components selected with extensive research into their working properties and availability.
	Fully detailed manufacturing specification is produced with comprehensive justification to inform manufacture.

Student Guide – Developed prototype testing and evaluation

Introduction- Have you:

Introduction to developed prototype specific sampling – why are you completing this page. Explain why practicing different manufacturing methods specific to your prototype is a useful step at this stage of development.

Evaluation of materials and processes:

- Identify which part of the product you have tested a potential material/ manufacturing process/ finishing process for and explained why you have chosen this.
- Next to each sample add annotation which explains how you have created each technique, how easy each material was to work with (cutting, shaping etc.), other relevant factual information/research about materials and their properties. This should be written using sophisticated subject vocabulary.
- Evaluate the process and the sample you have completed. It is important to put in aspects that didn't work or materials/processes/finishing you have tried then discounted here too and explain why they aren't suitable and your next steps (*note the laser cutter and 2D Design should be separate processes, as some people could use 2D Design to make a template which they will then cut using another method*).

- Add further annotation that explains key aesthetic features and personal reflections (e.g. likes, dislikes, further development ideas.)

Possible extra ideas for inclusion:

- Add all of the samples around your initial model and create a photo that shows all of the samples as patches of a final prototype concept.
- Client feedback – speak to your client about your intended final material/processes choices and record any feedback they have.
- Review against spec/brief – does this design fully meet the developed design brief and spec? Are there any areas you still need to develop?
- Add in sketching of design developments that have occurred as a result of this sampling development work and/or client feedback and spec/brief.

Summary - Have you:

- Identify and justify the processes you will use in your final prototype manufacture. Explain what your next steps will be (*to create a third angle orthographic drawing showing your final measurements of your prototype concept*)

Developed prototype testing and evaluation – key vocabulary

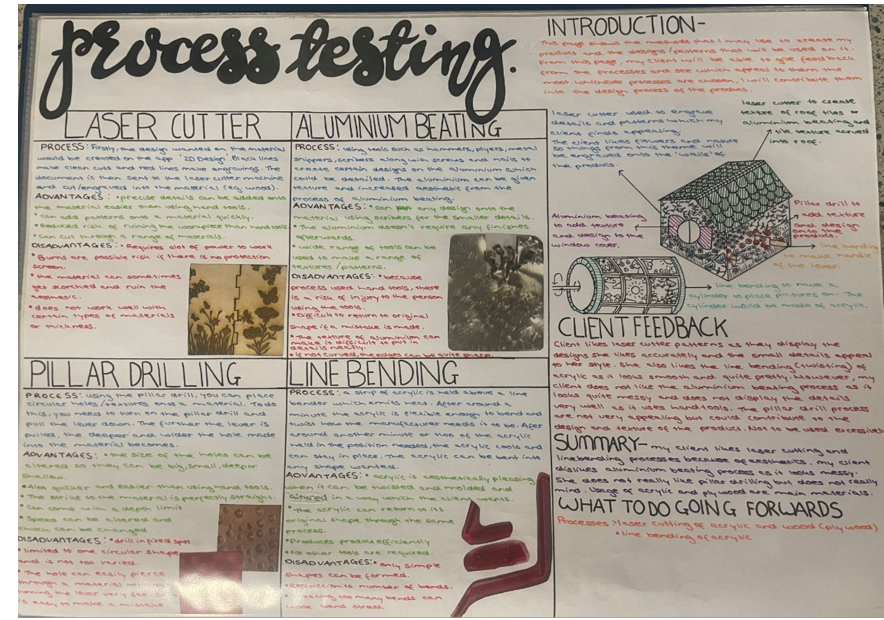
- Material Options –**
- 1mm laser plywood
 - 3mm laser plywood
 - 3mm acrylic – variety of colours
 - 0.7mm sheet aluminium
 - 1mm sheet brass
 - 1mm sheet copper
 - 1mm copper wire
 - Styrofoam
 - Pewter
 - 6mm dowels/12mm dowels
 - Mylar
 - Mod rock
 - Sheet Polypropylene
 - PVA wash

- Joining Options –**
- Living hinge
 - Finger joints – laser cut
 - Butt joint
 - Dowel joint
 - Mitre joint
 - PVA glue – Wood to wood
 - Contact adhesive – 2 different materials
 - Tensol cement – plastic to plastic

- Process Options –**
- Line bending
 - Convection oven
 - Laser cutting
 - Laser engraving
 - Pillar drilling
 - Disc sanding
 - Aluminium cutting and forming
 - Aluminium beating
 - File forming
 - Foam Coating – PVA wash
 - Spray painting
 - Living hinge
 - Plywood lamination
 - Pewter casting
 - Vacuum forming

- Finishing Options –**
- Wood – stain, polyurethane varnish, Danish oil, bees wax
 - Foam – PVA wash and stray paint

Page example



Parent guide – Developed prototype testing and evaluation

Introduction to this page

This page is a chance for students to complete further sampling to test processes in a way that is more specific to their final prototype or samples that they have not yet tested e.g. spray painting as a finishing technique.

The sampling should be very relevant to their final prototype and test all the specific materials and processes they intend to use. These may be using the same techniques as the 'materials and process testing' pages but with the file forming for example being in the shape of their final product, or it could be additional testing e.g. using wire to mould aesthetic 'branches' as a hanging method in their product.

By the end of this page, students should be able to name the exact materials and processes they will use in their final prototypes.

How can you support your child at home?

Look over your child's page:

- Have they identified and created a sample to test how they will make each part of their final prototype including identifying how they will join pieces and finish the materials and justified why it would be appropriate.
- Read each process description, does it explain how the sample was created in a depth that you understand what they have written?
- Have they included evaluative comments about the materials and processes (e.g. things that went well or not so well/ likes and dislikes) not just descriptive comments?

Could you encourage them to add in the extra ideas for inclusion (in green) to help them gain more marks.