Understanding Standards

Support pack for National course assessment

C819 75

Design and Manufacture (National 5) assignment

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Contents

Please note:
The materials in this pack were used during Workshop 2 as part of the Design and Manufacture Understanding Standards event in November 2017.

Overview

Purpose

Understanding Standards packs are intended to provide teachers, lecturers and assessors with a clear understanding of the marks that have been awarded to specific examples of candidate evidence and the reasons why these have been awarded. They may be used in centres:

- to prepare for the assessment of the relevant course component
- as benchmarks to help assessors judge the evidence produced by their own candidates
- for training purposes

The commentary and candidate evidence in this pack should be read in conjunction with the relevant coursework assessment task and the marking instructions.

Commentary on candidate evidence

The candidates have achieved the following marks for each section of the assignment.

Candidate A

Analysing a brief (2/8)

Carrying out research
The candidate was awarded **1 mark** for the information gained from their mum. The rest of the material on the page (mind map and existing shelves) is not valid research and does not generate specification points.

Incorporating research findings into a specification
The candidate was awarded **1 mark** for their limited specification which includes some information from the brief and one point from the research.

Generating ideas (2/9)

The candidate demonstrated limited skill in generating ideas and was awarded **2 marks**. Three of the ideas are copies of the existing shelves and the other three are very slight adaptations of the existing shelves.

Developing ideas (2/20)

Exploring ideas towards a proposal
The candidate demonstrated very limited exploration of their idea towards a proposal and was awarded **1 mark.** The only real change being the alteration from the shelf being enclosed to open. There is very limited evolution of the initial idea and very limited consideration of alternatives. The alternative colours for the notes are superficial and awarded no marks at this level.

Refining ideas towards a proposal
The candidate demonstrated very limited refinement of their idea towards a proposal and was awarded **1 mark.** The mark was awarded for the refinement of the size of the note. The rest of the refinement, eg limited information on joints and sizes, is superficial and awarded no marks at this level.

Applying knowledge and understanding of design
The candidate was awarded **0 marks** because there is no evidence of application of design knowledge.

Applying knowledge and understanding of materials and manufacture
The candidate was awarded **0 marks** because there is no evidence of application of materials and manufacturing knowledge. Simply naming joints or materials does not attract marks at this level.

Using models (0/6)

Applying modelling techniques
The candidate was awarded **0 marks** because there is no evidence of application of modelling techniques.

Using graphics (2/6)

Applying graphic techniques
The candidate was awarded **2 marks** because they made limited use of graphics to explore and refine the design proposal. There was also limited use of the graphics to communicate detail. The lack of exploration resulted in limited use of graphics.

Planning for manufacture (2/6)

Producing a plan for manufacture
The candidate was awarded **2 marks** because the information on the planning sheet is limited. Although all three sections (sequence, cutting list and drawing) have been completed, there is very little detail with much of the key information missing.

Measuring and marking out (6/9)

The candidate was awarded **6 marks** because a good level of skill is demonstrated in accurately measuring and marking out the four cross halvings and the joint for the back piece. The material was supplied cut to length and the back piece and the ‘notes” were marked out using templates which had been sketched.

Using hand and machine tools (14/18)

The candidate was awarded **14 marks** because a good level of skill was demonstrated in use of hand tools in accurately cutting the joints and the back piece. The ‘notes’ were cut using a fret saw and are fairly accurate.

Assembling components (5/5)

Preparing for assembly and assembling the prototype
The candidate was awarded **5 marks** because resources were prepared and used with minimal guidance. There is strong evidence of accurate and sound assembly.

Finishing (4/9)

Preparing surfaces, application techniques, and final finishing
The candidate was awarded **4 marks** because although there is strong evidence of appropriate surface preparation, the application of finish is limited with evidence of brush marks, runs and missed patches.

Evaluating (0/4)

Evaluating the design proposal
The candidate was awarded **0 marks** because the evidence presented does not demonstrate any of the evaluation skills required at this level.

Candidate B

Analysing a brief (8/8)

Carrying out research
The candidate was awarded **5 marks** because they conducted valid and effective research using a range of methods. The candidate measured the items to be stored and used a questionnaire to: identify an instrument for the music theme, the style of bedroom it had to fit into, and the items the teenagers wanted it to store. Note that the music theme image board is not valid research as it does not generate points for the specification.

Incorporating research findings into a specification
The candidate was awarded **3 marks** because they produced a detailed specification. The candidate included the specifics given in the brief and added several other specification points drawn from their research such as aesthetics, the items to be held and their sizes.

Generating ideas (9/9)

The candidate was awarded **9 marks** because they demonstrated effective skill in generating ideas. The candidate generated creative and diverse ideas using modelling. All ideas were clearly aimed at the specification and show clear differences between them.

Developing ideas (20/20)

Exploring ideas towards a proposal
The candidate was awarded **6 marks** because they effectively explored their idea towards a proposal. The candidate clearly considered alternatives for the orientation, storage and themed aesthetics of the solution. The candidate thoroughly explored how to ensure their solution would allow them to demonstrate their practical skills. There is clear evolution from the initial idea.

Refining ideas towards a proposal
The candidate was awarded **6 marks** because they effectively refined their idea towards a proposal. Modelling activity allowed the candidate to refine the angle and sizes of the final solution. There was sufficient detail to permit manufacture of the product.

Applying knowledge and understanding of design
The candidate was awarded **4 marks** because they applied knowledge of function, aesthetics and ergonomics to explore and refine the proposal. There was clear evaluation taking place and the candidate's decisions demonstrated good use of the specification.

Applying knowledge and understanding of materials and manufacture
The candidate was awarded **4 marks** because they applied knowledge of materials, processes and assembly to explore and refine the proposal. The comments were relevant and used to advance the proposal. The candidate

demonstrated effective knowledge in their decisions to ensure a high level of practical skill was required to manufacture the proposal.

Using models (6/6)

The candidate was awarded **6 marks** because they used models effectively to generate ideas, explore and refine the proposal. The candidate generated creative ideas though modelling. This on its own would not have allowed the candidate to merit marks in the top band. Modelling was also used to test the angle of the hairdryer holder, to work out the largest size to allow the shelf to fit in the box, to work out sizes for the joints on the top frame.

Using graphics (6/6)

The candidate was awarded **6 marks** because they used graphics effectively to explore and refine the design proposal. Recognised graphic types were used and were appropriate to their purpose. The graphics clearly communicate throughout the folio. Graphics are used to communicate an increased level of detail as the design is refined towards the proposal.

Planning for manufacture (6/6)

The candidate was awarded **6 marks** because the information on the planning sheet provides clear detail of sizes, parts, materials, processes and assembly, equipment and a logical and detailed sequence for manufacture.

Due to the complexity of the proposal, all sizes are not included in the drawing on the planning sheet, however, holistically the candidate had sufficient detail across the three areas of the planning pro forma, to merit full marks in this section.

Measuring and marking out (9/9)

The candidate was awarded **9 marks** because they demonstrated a high level of skill and accuracy in measuring and marking. The joints in the frame were accurately marked using a sliding bevel, try square and marking gauge. The angled notches in the shelf used to house the frame also demonstrated a high level of skill in marking out. The holes were spaced according to the working drawing however the candidate had to change the length of the shelf and reverse the order of the holes as the initial planned sizes would mean the holes occupied too much of the shelf's space. Some skill was demonstrated in marking the fret lines and screw holes on the acrylic. There was sufficient evidence in the above to merit full marks.

The candidate also accurately marked a stopped housing inside the guitar head, this is used to house the acrylic strip.

No marks were awarded for marking the shape of the shelf or the guitar head as these were marked freehand and from a template.

Using hand and machine tools (18/18)

The candidate was awarded **18 marks** because the candidate demonstrated a high level of skill using a wide range of hand and machine tools. The candidate

used a bevel edged chisel and tenon saw to skilfully remove the waste material from the joints on the frame and shelf. A smoothing plane was used skilfully to taper the sides of the frame. A coping saw and drum sander was used to create the curve on the top of the frame and on the shelf. The band facer was used to curve the over ends of the frame. The pillar drill was used skilfully with a machine vice, twist bit and forstner bit, to drill the range of holes in wood and acrylic.

Due to the complexity of the proposal, there was sufficient evidence in the frame and shelf components to merit full marks.

The candidate also formed the acrylic strip and cut an accurate stopped housing in the guitar head. The fret lines on the acrylic strip are not well done, however these do not take away from the high level of skill demonstrated in other areas.

The candidate was struggling for time. The following work was carried out by the technician/teacher, and recorded on the candidate's mark sheet.

- Guitar head cut on band saw.
- Large hole cut out and sanded as no hole saw of that diameter was available.
- Holes drilled in guitar head for rivets.
- Made former for acrylic strip.

The candidate was not allocated any marks for these, however it allowed them to take home a completed solution.

Assembling components (5/5)

The candidate was awarded **5 marks** because they demonstrated a high level of skill in assembling the shelf and frame components. The assembly required to be completed in stages. Clamps, try square and the bench vice were used to ensure the frame and shelf was aligned correctly. There was sufficient evidence in this alone to merit full marks.

Limited skill was demonstrated to assemble the other components which required screwing the acrylic strip on and push fitting the rivets into the guitar head for aesthetics.

Finishing (9/9)

The candidate was awarded **9 marks** because there was evidence of a high level of skill in preparing surfaces and applying a finish throughout the model. There was good evidence of preparation to remove evidence of marking, cutting, shaping and gluing on the wooden frame, shelf and guitar head. The candidate demonstrated a high level of skill applying a wax finish. This was sufficient for the candidate to merit full marks. There was also evidence of good skill in the finish of the edges of the acrylic strip.

Evaluating (4/4)

The candidate was awarded **4 marks** because they carried out effective evaluation of the proposal. The candidate used a range of appropriate evaluation techniques to evaluate the solution against the specification. They gathered opinion from the target market on specific aspects relating to the appearance of the product. The questions asked were valid. The candidate also carried out a

test and user trip to evaluate their proposal’s success in holding and accessing the items it was designed to store. The results were based on findings and not personal opinion.

Candidate C

Analysing a brief (0/8)

Carrying out research
The candidate was awarded **0 marks** because none of the information on the research sheets can generate specification points.

Incorporating research findings into a specification
The candidate was awarded **0 marks** because all of the points are generic, have been guessed or are simply not valid.

Generating ideas (2/9)

The candidate demonstrated limited skill in generating ideas and was awarded **2 marks**. All ideas are very similar but have differences in shelf configurations and shapes. Note that no marks are awarded for evaluation matrix.

Developing ideas (5/20)

Exploring ideas towards a proposal
The candidate was awarded **1 mark** because there is limited evidence of exploring ideas. Although aesthetics, safety, joints and function are all mentioned material is mainly superficial and, in some cases archived material and does nothing to develop the idea.

Refining ideas towards a proposal
The candidate demonstrated limited refinement of their idea towards a proposal and was awarded **2 marks.** The marks are awarded for the refinement carried out using the models to work out positions of shelves.

Applying knowledge and understanding of design
The candidate was awarded **1 mark** because there is limited evidence of application of design knowledge. Although there is mention of design issues, it is generally superficial or generic and is not awarded marks above the bottom band at this level.

Applying knowledge and understanding of materials and manufacture
The candidate was awarded **1 mark** because there is limited evidence of **application** of knowledge of materials and manufacture. There is consideration of joints, but other information is superficial or generic and is not awarded marks at this level.

Using models (2/6)

Applying modelling techniques
The candidate was awarded **2 marks** for the limited use of models to calculate spaces and sizes for shelves. The models of initial ideas do not add any clarity to the existing sketches and do not attract marks at this level.

Using graphics (2/6)

Applying graphic techniques
The candidate was awarded **2 marks** because they made limited use of graphics to explore and refine the design proposal. There was also limited use of graphics to communicate with the detail being limited for this level. The use of graphics was very repetitive.

Planning for manufacture (5/6)

Producing a plan for manufacture
The candidate was awarded **5 marks** because the information on the planning sheet provides detail of sizes, parts, materials, processes and assembly, equipment and a logical and detailed sequence for manufacture. There are a few pieces of information (joint detail and positions of shelves) missing but evidence presented is enough to justify marks in top band at this level.

Measuring and marking out (2/9)

The candidate was awarded **2 marks** because level of skill demonstrated is limited. The material was supplied cut to length and the guitar shape marked out using a template which had been sketched. The shelves were jointed using dowels and the positions were marked accurately.

Using hand and machine tools (6/18)

The candidate was awarded **6 marks** because a fair level of skill was demonstrated in the use of hand and machine tools. The guitar shape was cut accurately using a fret saw and holes for dowel joints were accurately drilled. Additional marks cannot be awarded due to the simplicity of the proposal at this level.

Assembling components (2/5)

Preparing for assembly and assembling the prototype
The candidate was awarded **2 marks** because of the assembly of the dowel joint. However, the simplicity of the proposal only allows limited evidence of accurate and sound assembly to be demonstrated.

Finishing (2/9)

Preparing surfaces, application techniques, and final finishing
The candidate was awarded **2 marks** because there is limited evidence of skill when preparing for, and applying, a finish. Although two different finishes have been applied there are many surfaces which are rough, there is evidence of glue not being removed and stain marks on the backboard.

Evaluating (0/4)

Evaluating the design proposal
The candidate was awarded **0 marks** because the evidence presented does not demonstrate any evaluation skill required at this level.

Candidate D

Analysing a brief (6/8)

Carrying out research
The candidate was awarded **4 marks** because the research was adequate. The candidate has researched some critical sizes, made observations about the colour scheme of the room and carried out a user trial to identify problems with cables. However, the sizes of the headphones are limited to 2D and the observation of the room is rather generic. The information on existing products is archived or based on personal opinion and will not help generate a specification.

Incorporating research findings into a specification
The candidate was awarded **2 marks** because points were drawn from brief and some research. Many of the points were not drawn from research.

Generating ideas (6/9)

The candidate was awarded **6 marks** because they demonstrated effective skills in generating ideas. The candidate has produced several ideas which do not address the brief and are not shelves. These ideas did not attract marks as they were not aimed at the brief.

Developing ideas (11/20)

Exploring ideas towards a proposal
The candidate was awarded **4 marks** because exploration was adequate. There is some effective exploration during the initial stages however the design quickly develops into the final proposal. Most of the exploration is limited to stability, small alterations to improve holding the headphones more securely and basic methods for storing the cables. There is also some consideration of how to demonstrate practical skills during the exploration, eg changing the dowels to aluminium and introducing turning.

Refining ideas towards a proposal
The candidate was awarded **3 marks** because refinement was adequate. They make adequate decisions on sizes, materials and methods of manufacture. The candidate used modelling to aid the refinement.

Applying knowledge and understanding of design
The candidate was awarded **2 marks** because knowledge and understanding of design was adequately applied during the development of their proposal. Lack of exploration and refinement made it difficult generate enough evidence to gain marks in the top band. Basic aspects of function stability and ease of use were considered during the exploration of the proposal.

Applying knowledge and understanding of materials and manufacture
The candidate was awarded **2 marks** because knowledge and understanding of materials and manufacture was adequately applied during the development of their proposal. Although much of the information is limited to labelling materials or tools used, there is knowledge of acrylic, allowing one piece manufacture and use of the strip heater and the threading of aluminium.

Using models (6/6)

Applying modelling techniques
The candidate was awarded **6 marks** because they used models effectively to communicate ideas, explore and refine the proposal. Some of the models of the initial ideas provide additional information to the 2D sketches. Modelling was used during the exploration to visualise ideas and consider issues relating to stability. Modelling was applied effectively to refine sizes and provide feedback on ease of use (highlighting the need for a hole for the wires).

Using graphics (5/6)

Applying graphic techniques
The candidate was awarded **5 marks** because they used graphics effectively to explore and refine the design proposal. Although the graphics were limited to 2D the candidate still communicated detail, at appropriate stages, to develop their proposal. Some of the 2D graphics made it difficult to understand the development.

Planning for manufacture (0/6)

Producing a plan for manufacture
The candidate was awarded **0 marks** because the pro forma had been altered.

Measuring and marking out (7/9)

The candidate was awarded **7 marks** because they demonstrated a good level of skill in measuring and marking out. The candidate made and used a template to accurately mark out the curves on the body of their proposal. The position of the holes for the dowels and the cable tidy were accurately marked out. All the materials were cut to sizes and supplied to the candidate.

Using hand and machine tools (18/18)

The candidate was awarded **18 marks** because they demonstrated a good level of skill in the use of a range of hand and machine tools to accurately remove and form materials. A smoothing plane was used to create the chamfer on the base and the pillar drill was used to drill the blind holes for the dowels. The MDF sides were cut to shape using a scroll saw and the edges rounded with a file. The acrylic was also shaped using a scroll saw and file before being using the strip

heater to bend to a right angle. The aluminum parts were cut to length with a hacksaw before being faced off and step turned accurately on the centre lathe.

Assembling components (3/5)

Preparing for assembly and assembling the prototype
The candidate was awarded **3 marks** because there is good evidence of accurate and sound assembly. Clamps were used to hold the MDF and acrylic together when being glued. The upright was dowelled onto the base at a right angle. The relative simplicity of the proposal prevented full marks being awarded in this section.

Finishing (9/9)

Preparing surfaces, application techniques, and final finishing
The candidate was awarded **9 marks** because there was strong evidence of appropriate surface preparation and a high level of skill demonstrated in application techniques resulting in a very good final finish. The candidate has achieved a good finish on the acrylic. The surfaces of the wooden base have been well prepared with no visible pencil marks and the finish has been carefully applied with no runs or brush marks. The paint finish on the MDF is also run free and smooth. Varnish was applied to the wooden spheres and the aluminum was polished to create a good finish on the cable holders.

Evaluating (4/4)

Evaluating the design proposal
The candidate was awarded **4 marks** because there is an effective evaluation of the proposal. The candidate carried out a range of activities to evaluate their proposal. Their use of questions, tests and a user trip provided a detailed evaluation. Each of the questions and tests were appropriate and produced valid information.

Candidate E

Analysing a brief (2/8)

Carrying out research
The candidate was awarded **2 marks** because they carried out limited research using a limited range of techniques. The candidate made a range of measurements of the item to be held by the shelf. Limited issues were researched.

Incorporating research findings into a specification
The candidate was awarded **0 marks** because their specification does not include any relevant information from either the specification or the brief. The candidate's specification points have not been generated a result of any of the evidenced research.

Generating ideas (3/9)

The candidate was awarded **3 marks** because they demonstrated limited skill in generating ideas. Whilst the candidate generated an adequate range, ideas show few differences between them and are repetitive. Some of the ideas were not shelves/ did not address the brief and therefore were not awarded any marks. Annotations have been used to some effect to communicate further information to the sketches.

Developing ideas (8/20)

Exploring ideas towards a proposal
The candidate was awarded **2 marks** because their exploration towards a proposal was limited. Much of the exploration is focussed on making superficial changes to the aesthetics of the design. The candidate has given some consideration to the strength of the solution but limited alternatives have been offered. The proposal has limited evolution from the initial idea.

Refining ideas towards a proposal
The candidate was awarded **3 marks** because they adequately refined their idea towards a proposal. Modelling activity allowed the candidate to refine the final sizes and function of the solution. There was adequate detail to permit manufacture of the product.

Applying knowledge and understanding of design
The candidate was awarded **1 mark** because they applied limited knowledge and understanding of design to explore and refine the proposal. The candidate made limited use of the specification to evolve or evaluate the developing solution. The candidate considered the aesthetics of the solution although limited this to the shape.

Applying knowledge and understanding of materials and manufacture
The candidate was awarded **2 marks** because they applied adequate knowledge of materials and assembly to refine the proposal. The comments were relevant and clarified the proposal.

Using models (3/6)

The candidate was awarded **3 marks** because they used models adequately to refine the proposal. Modelling was used to check the sizes, to test the function of the guitar holder and evaluate the proportions for the shelf section.

Using graphics (3/6)

The candidate was awarded **3 marks** because they used graphics adequately to explore and refine the design proposal. The range of graphic types used is very limited and therefore often inappropriate to their purpose. The graphics clearly communicate throughout the folio but do little to develop the proposal. Graphics are repetitive, however they are used to communicate some additional detail as the design is refined.

Planning for manufacture (5/6)

The candidate was awarded **5 marks** because the information on the planning sheet provides detail of sizes, one of the parts, materials, processes and assembly, equipment and a logical and detailed sequence for manufacture. Although sizes have not been included for the shelf part of the solution or the two timber supports the evidence presented is enough to justify marks in top band at this level.

Measuring and marking out (4/9)

The candidate was awarded **4 marks** because they demonstrated a good level of skill and accuracy in measuring and marking out. The acrylic was marked with pen, try square and a pair of compasses. The shelf part was supplied cut to length and then marked out with a try square and marking gauge. The two wooden supports were marked out once the acrylic had been formed with the plastic being used to mark the correct angles. All processes were carried out with a high level of accuracy.

Using hand and machine tools (7/18)

The candidate was awarded **7 marks** because they demonstrated a fair level of skill using a fairly wide range of hand and machine tools.

A scroll saw was used to accurately remove material from the acrylic. The candidate then filed the curved edges to achieve the marked out shape. The candidate also used the strip heater and a former to bend the acrylic once finishing was complete.

The candidate used tenon and coping saws to remove the waste from the shelf part. This has been done less skilfully than the cutting and shaping of the acrylic.

The candidate used the scroll saw to roughly cut the timber supports. The bandfacer was then used to achieve the marked out shape.

The simplicity of the proposal restricted the marks which could be awarded.

Assembling components (2/5)

The candidate was awarded **2 marks** because there was limited evidence of skill in assembling the holder, shelf and support components. The assembly required to be completed in stages. The shelf and holder parts were glued together using contact adhesive prepared by the candidate. The supports were assembled using the hot glue gun.

The simplicity of the proposal restricted the marks which could be awarded.

Finishing (2/9)

The candidate was awarded **2 marks** because there was limited evidence of skill in preparing surfaces and applying a finish. There is adequate evidence of preparation to remove the majority of evidence of marking out, cutting and shaping on all material. The candidate did not apply any finish to the timber parts.

There was limited evidence of finishing in the finish of the edges of the acrylic part. The candidate has not removed many of the marks left by the saw or file. No finish has been applied here either.

Evaluating (1/4)

The candidate was awarded **1 mark** because their evaluation of the proposal is limited. The bulk of the evaluation is based upon the candidate's personal opinion. The candidate has tested the strength of the solution by testing it with the guitar in it. There are no other recognisable evaluation techniques used.

Candidate F

Analysing a brief (5/8)

Carrying out research
The candidate was awarded **3 marks** because the research carried out was adequate. This research included physically measuring a CD case, internet research to determine the dimensions of a standard DVD case and identifying the style of the room.

Incorporating research findings into a specification
The candidate was awarded **2 marks** because they had incorporated the research information from the brief into the specification. The details from the research had also been incorporated although some aspects are personal opinion (must hold 10 CDs) and are not based on valid research information.

Generating ideas (4/9)

The candidate was awarded **4 marks** because they produced an adequate range of ideas. The ideas produced demonstrated some creativity/diversity and were generally aimed at the specification. The candidate used an idea generation technique to generate some ideas.

Developing ideas (5/20)

Exploring ideas towards a proposal
The candidate was awarded **1 mark** because the exploration undertaken was limited to shape and colour changes. There was limited evolution from the initial idea. The information provided on anthropometrics, joints and materials is generic and was not used to develop the proposal.

Refining ideas towards a proposal
The candidate was awarded **2 marks** because although the refined idea included details such as dimensions, possible materials and assembly methods this was limited due lack of development. The candidate considered the minimum spacing and length of shelf required based on the space occupied by the CDs.

Applying knowledge and understanding of design
The candidate was awarded **1 mark** because they had demonstrated limited application of design knowledge and understanding. There was some limited understanding of the functional requirements of the product on page 4.

Applying knowledge and understanding of materials and manufacture
The candidate was awarded **1 mark** because they had considered appropriate materials for the product.

Using models (0/6)

Applying modelling techniques
The candidate was awarded **0 marks** because there was no evidence of modelling.

Using graphics (3/6)

Applying graphic techniques
The candidate was awarded **3 marks** because although appropriate graphics had been used to communicate ideas, the lack of exploration meant there was little to communicate.

Planning for manufacture (5/6)

Producing a plan for manufacture
The candidate was awarded **5 marks** because the information on the planning sheet provides detail of sizes, parts, materials, processes and assembly, equipment and a logical and detailed sequence for manufacture. Although some of the information on the sequence of operations and cutting list is not clear and lacks detail, the evidence presented is enough to justify marks in top band at this level.

Measuring and marking out (9/9)

The candidate was awarded **9 marks** because they demonstrated a high level of skill and accuracy in measuring and marking out. The joints in the uprights and shelves were accurately marked using a steel rule, try square and marking gauge. The holes used for the dowel joints were also marked accurately according to the working drawing. Skill was demonstrated in marking the fillet lines on the shelves and the profile on the acrylic back using a try square, steel rule and compasses.

There was sufficient evidence in the above to merit full marks.

Using hand and machine tools (18/18)

The candidate was awarded **18 marks** because they demonstrated a high level of skill using a wide range of hand and machine tools. The candidate used a bevel edged chisel and tenon saw to skilfully remove the waste material from the joints on the frame and shelf. A coping saw and hand file was used to create the curve on the top of the acrylic back. The band facer was used to curve the ends of the shelves. The pillar drill was used skilfully with a machine vice and twist bit to drill the range of holes for the dowel joints.

Assembling components (5/5)

Preparing for assembly and assembling the prototype
The candidate was awarded **5 marks** because they demonstrated a high level of skill in assembling the shelf components. The assembly required to be completed in stages. Sash cramps and a try square were used to ensure the frame was flat, square and aligned correctly. The shelves were G-cramped in position and checked with a try square to ensure they were sitting perpendicular to the frame. Some skill was demonstrated when the acrylic back was glued and G-cramped onto the frame.

Finishing (8/9)

Preparing surfaces, application techniques, and final finishing
The candidate was awarded **8 marks** because there was evidence of a high level of skill in preparing most surfaces and applying a finish throughout the model.

There was good evidence of preparation to remove evidence of marking, cutting, shaping and gluing on the wooden frame and shelves. The candidate demonstrated a high level of skill applying varnish and wax finish. There was also evidence of good skill in the finishing of the edges of the acrylic back.

Evaluating (3/4)

Evaluating the design proposal
The candidate was awarded **3 marks** because they carried out adequate evaluation of the proposal. The candidate used an appropriate evaluation technique to evaluate the model/proposal against the specification. They gathered opinion from the target market on aspects relating to the appearance and function of the product. The questions asked were generally valid.

Candidate G

Analysing a brief (8/8)

Carrying out research
The candidate was awarded **5 marks** because they conducted valid and effective research using a range of methods. The candidate measured the item to be stored and used a questionnaire to identify how many items it should store, the style that would be preferred by the target market, where it should be stored and how much it should be manufactured for. No marks are awarded for the candidate's planning of their research.

Incorporating research findings into a specification
The candidate was awarded **3 marks** because they produced a detailed specification. The candidate included the specifics given in the brief and added several other specification points drawn from their research such as aesthetics, items to be held and their sizes.

Generating ideas (9/9)

The candidate was awarded **9 marks** because they demonstrated effective skill in generating ideas. The candidate generated a wide range of creative and diverse ideas. All ideas were clearly aimed at the specification and show clear differences between them.

Developing ideas (19/20)

Exploring ideas towards a proposal
The candidate was awarded **6 marks** because they effectively explored their idea towards a proposal. The candidate clearly considered alternatives for the proportions, storage, materials and themed aesthetics of the solution. Evolution from the initial idea is a little limited but the candidate has clearly considered many alternatives and adapted the design as appropriate.

Refining ideas towards a proposal
The candidate was awarded **6 marks** because they effectively refined their idea towards a proposal. Modelling activity allowed the candidate to refine the materials, assembly, angles and sizes of the final solution. Details of the formers required have been refined. There was sufficient detail to permit manufacture of the product.

Applying knowledge and understanding of design
The candidate was awarded **3 marks** because they applied knowledge of function and aesthetics to explore and refine the proposal. Different approaches to the function have been considered. The candidate could have better applied their knowledge and understanding of aesthetics, beyond shape changing and made better use of the specification to score marks in the top band.

Applying knowledge and understanding of materials and manufacture

The candidate was awarded **4 marks** because they applied knowledge of materials, processes and assembly to explore and refine the proposal. The

comments were relevant and used to advance the proposal. The candidate demonstrated effective knowledge in their decisions to ensure the materials, sizes, assembly and processes had been decided upon prior to the planning for manufacture.

Using models (3/6)

The candidate was awarded **3 marks** because they used one model, for different purposes, to explore and refine the proposal. The candidate used the model initially to work out the best sizes for the circle parts by modelling around the product it would be storing. The candidate formed some plastic rod to test the sizes for the holder. The same model was then used to test the angles and work out the best sizes for the bit of plywood that would connect the three circle parts.

It should be noted that much of the information gained from the modelling was unclear in the folio or had already been worked out in graphics and therefore did not attract marks.

Using graphics (6/6)

The candidate was awarded **6 marks** because they used graphics effectively to explore and refine the design proposal. Recognised graphic types were used and were appropriate to their purpose. The graphics clearly communicate throughout the folio. Graphics are used to communicate an increased level of detail as the design is refined towards the proposal.

Planning for manufacture (6/6)

The candidate was awarded **6 marks** because the information on the planning sheet provides clear detail of sizes, parts, materials, processes and assembly, equipment and a logical and detailed sequence for manufacture.

Measuring and marking out (7/9)

The candidate was awarded **7 marks** because they demonstrated a high level of skill and accuracy in measuring and marking. The candidate used a rule, compass, try square and marking gauge to accurately mark the circle and the centre points to be drilled on the circular parts. The triangular back has been accurately marked using a set square to ensure the correct angles. The candidate marked out the formers used for the formed plastic parts. The plastic rod was measured and marked to the correct length by the candidate.

Greater complexity would be required to score nearer the top of the band.

Using hand and machine tools (14/18)

The candidate was awarded **14 marks** because the candidate demonstrated a good level of skill using a wide range of hand and machine tools. All parts have been manufactured with a very high level of accuracy.

The candidate used a tenon saw to roughly cut the MDF circles then the bandfacer to skilfully shape these to a highly accurate circular shape. The triangular back was roughly cut with a scroll saw and then accurately shaped with

the bandfacer. The candidate independently set the depth stop on the pillar drill to drill the blind holes in the circular parts. The formers for the plastic components were cut by the teacher but accurately shaped by the candidate. These were used to achieve the correct form for the plastic rod which had previously been in the oven.

A high level of skill has been demonstrated by the candidate in achieving the accuracy to allow all parts to be soundly fitted together. A more complex component or element within the model would have likely provided the evidence required to achieve marks in the top band.

Assembling components (3/5)

The candidate was awarded **3 marks** because they demonstrated a good level of skill in assembling the various components.

The assembly required to be completed in stages. Clamps and the bench vice were used to ensure the circular parts and triangular back were held and aligned correctly. Each circular part had to be carefully aligned to ensure the holes sat horizontally allowing the stored items to be positioned vertically.

Some further skill was demonstrated to assemble the plastic parts which required epoxy to be prepared and inserted into the holes.

Finishing (4/9)

The candidate was awarded **4 marks** because there was good evidence of appropriate surface preparation and a good level of skill demonstrated in applying the paint finish. There was good evidence of preparation to remove evidence of marking, cutting, shaping and gluing on the wooden parts. The simplicity of the component parts prevents the finishing achieving marks in the top band.

Evaluating (4/4)

The candidate was awarded **4 marks** because they carried out effective evaluation of the proposal. The candidate used a range of appropriate evaluation techniques to evaluate the solution against the specification including testing, gathering opinions and comparing against the specification. They asked the target market about particular aspects relating to the appearance and performance of the product. The questions asked were valid. The candidate also carried out a test and user trip to evaluate how well the shelf performed its function and how well it performed after repeated use. The results were based on findings and not personal opinion.

Candidate evidence

Candidate evidence to accompany this pack can be found on the SQA secure site, access is available via your SQA Coordinator.

N5Design&ManufactureEvidence_ABCDEFG_2017.pdf