

Stage 2 Design and Technology

Material Products (Furniture)

Assessment Type 2: Product

Product Record

Year 12

Furniture



Intro:

My Year 12 final furniture Project starting idea was a simple chest with a set of draws at the bottom. After completing a lot of research I had a rough idea of what it would look like. It would be a simple wooden chest with a flat top and a set of draws at the bottom, the chest would consist of a Blackwood frame and a lighter wood for the panels, draws and the top (pine and celery top pine). I then decided that this project would be too easy and could be completed in a very short time so I chose to make the draws swing out from a pivot. To do this with the draws I would have to use a set of pin hinges that I would make myself.

Planning
Analysis of information to develop appropriate solutions to an identified design brief.
(P1)

Design:

Before I started any work I designed all the sizes to make the project fit a specific space. I then had the issue of the jointing and hinging to sort out. I decided that the best way to complete my chest would be to make a solid Blackwood frame then fill in the gaps with solid pine and celery top pine. I decided to use basic mortise and tennon jointing for the frame as it would be strong convenient and attractive. I then had to join pieces of wood together to create the panels. I used lightening joints for the panels and biscuit jointing for the top. I used lightening jointing for the panels because it would be strong and a quick process. I also used mitre joints with feather joints for the frame around the top.

The draws were the hardest part to design as they could not be square or else they would not open properly. I had to design a shape so it would open without hitting the other draw. I made the size of the draws the exact size of a piece of celery top pine that I found because of the patterns on the wood. The draws would have to have supports both under and above to ensure it would not move once in place. As they swung open I could not use railings so I used biscuit joints to fasten them in on the Blackwood frame.

Producing
Thoughtful development of solutions to technical problems that may arise during product or system realisation.
(Pr3)

Process:

1. The first part of the process after designing my project would be to find and purchase wood. I decided to use Blackwood and celery top that was already available in the schools store room because it would be convenient and I would not have to pay a delivery cost. But I had to order in pine for the panels which were easy as there was an order being placed already.
2. Once I had received/found my wood I had to cut them to size by firstly buzzing one side flat and then using the table saw (teacher did this). Once the thicknesses were all approximate size I put all my wood through on the thicknesser to get them to the exact thickness. I then marked out the length of all the pieces I needed and cut them to length with the drop saw.

Producing
Accomplished use of resources, equipment, and materials to create a product or system safely and accurately.
(Pr2)

- After cutting all my wood to size I put aside everything except the Blackwood which would be used for the frame which is what I made first. I then had to cut all the tennons on all the rails. I decided to do this by making a jig so I could cut them all with the router quickly instead of doing it individually by hand. I made the jig by marking out exactly



where the pieces of wood had to go on MDF board and used screws to secure them in place. I then set the depth of the router and cut one side of the tennons. After cutting one side I had to adjust the jig size then cut the other sides.

Evidence of use of learned skills, and selection of components.

Producing
Sophisticated application of appropriate skills, processes, procedures, and techniques to create a product or system to a precise or polished standard and specification. **(Pr1)**

Accomplished use of resources, equipment, and materials to create a product or system safely and accurately. **(Pr2)**

- After cutting the tennons I had to mark out and cut the mortises on the legs for the rails. This was a simple task as no jig was needed. Once this was completed I put it all together to ensure the sizes were right and the joints fitted.



Modification of ideas and testing of construction processes.

Planning
Purposeful testing and refined modification and validation of ideas or procedures. **(Pl3)**

- Before I started on the panels I had to cut out the trenches which would support them. I did this by using the router on the legs and the table saw on the rails. For the legs I used the router because I would have to stop the trench at the point for the draws. I used the router up most of the length of the legs with a 4 mm cutting bit to fit the panels.
- The rail trenches were much easier as all I had to do was set up the table saw to the right height and cut into them the whole length. Once all the trenches were cut I cleaned out the joints to get rid of any excess shavings.

7. Once the frame was completed I then went about making the panels. Because I had already cut the wood to the right length all I had to do was lightening joint them and glue them together. Because the wood was bowing slightly I had a bit of trouble on the router cutting the lightening joints so I had to cut through them a couple of times.



8. Once the panels were glued I put together a quick jig which consisted of a large flat piece of MDF and a stopper across the end so I could cut the whole panels through the thicknesser. I had to make the jig because I would be cutting across the grain and it would tear the end off if I did not.
9. When the panels were the right thickness I then routed all the edges similar to the panels on a door so the edges would fit in my trenches. This was a dangerous process as the cutter was barely in the router so the teacher had to do this after school when there was no one else in the room.



10. The next step was to make my draws which were a bit more complicated. I designed a shape to fit that would pivot from point without hitting the other draw. I had to cut

Evidence of modification of processes due to material problems and machining techniques.

Producing
Thoughtful development of solutions to technical problems that may arise during product or system realisation.
(Pr3)

the front piece of celery top in two as there were two draws then cut all the sides to the right length.

11. The wood I used for the sides already had a trench cut for the bottom of the draw but I had to cut the trench for the plywood bottom in the celery topfront (same method as rails) and on one side the trench had to be cut out to slide in the bottom.
12. Once all the wood was the right length I had to cut the barefaced joints for the draw and create supports for the inside of the draw corners.



13. Once all the joints were done for the draws I did a quick dry fit then glued them both together with web clamps.

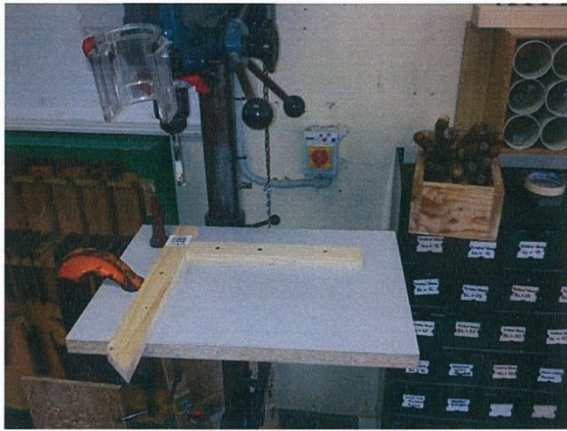


14. The next step was to make the hinges for my project. I did this by finding some pipe and solid wire that would fit snug inside the pipe.

15. I knurled the pipe so it would fit and grip into the wood to support the pin. The wire had to be knurled half way as only half needed to grip into the wood and the other half needed to float on a ball bearing. After the knurling I cut the lengths to size and all the edges were faces and filed to smooth edges.



16. To fit the hinges in the draw and frame I had to drill holes the right size and in exactly the right place. I did this by making a small jig to keep the wood in the right place that would sit on the drill press.



17. After I drilled the holes I then squished the hinges into the holes with a clamp (as hitting with hammer could damage it) and no glue was needed because of a tight fit.
18. The last step to complete the box part of my project would be to biscuit join the supports for the draws to the front and the back of the frame. This was a quick and easy process as all the wood was the right size; all I had to do was take apart the frame and biscuit the rails and the wood that would be the supports.

19. To ensure it all fitted I did a dry fit of the front with the sides.



20. Once I was happy with how it all fitted I then sanded all the wood as it would be too hard to do after it was assembled.

21. I glued the box together by firstly gluing the front together and the back together(separately) and once they had dried I glued them together with the sides and supports to complete my box.(web and quick action clamps)



Evidence of testing of product outcome, and adjustment to processes to achieve outcome.

Planning
Purposeful testing and refined modification and validation of ideas or procedures.
(PI3)

22. The last part before spraying my project was to make the top. The wood was already cut to size so I biscuit joined the celery top pine together and while it was drying I cut the framing Blackwood's 45 degree joints to size.

23. Once it was cut to size I then biscuit joined the frame to the celery top pine and glued them together.

24. Once dried I cut two slits in each corner for the feather joints. This is where slits are cut into the corners and the gap is filled up with wood and glue to give it stability. And then the excess is cut off.



25. After that was completed I had to make another jig to put through the thicknesser just like the panels so it didn't tear off the end. I then thickened the top so it was all the same size then sanded it smooth with an electric sander.



26. The edges were quite sharp so I decided to rout a 45 degree edge which was very simple as I used a router with a cutting bit with a bearing on it(no jig needed)

27. The last part before spraying my project with a finish was to put the butt hinge I purchased onto the top and the box and the handles for the draws. This was very simple as all I had to do was mark out the size and place and cut the gap out with a chisel and drill a hole in the draws for the handles.



28. To spray my project I covered up all the hinges and handles. I then sprayed one coating with a lacquer then lightly sanded it back before spraying again. I completed this four times to give it a solid coating.

Conclusion:

My final product of mu chest with swing draws turned out well. The draws swing out without hitting anything, my box is square, the top sits with the right amount of overhang on each side and overall the project is high quality made from high quality woods that will last a long time. If I had to make the project again I would not change anything at all as it turned out exactly as I imagined.



Evidence of some evaluation of product outcome to meet design brief.

Evaluation
Description of product progress, with elements of basic testing against design brief requirements. **(E1)**

Clear images provided of processes and completed product to support assessment of the Assessment Design Criterion: Producing.

Producing
Sophisticated application of appropriate skills, processes, procedures, and techniques to create a product or system to a precise or polished standard and specification. **(Pr1)**

Accomplished use of resources, equipment, and materials to create a product or system safely and accurately. **(Pr2)**

Additional Comment:

This example is illustrative of an A- grade. High performance was demonstrated in the specific features: Pr1, Pr2 and PI3.

Performance Standards for Stage 2 Design and Technology

| | Investigating | Planning | Producing | Evaluating |
|----------|---|---|--|--|
| A | <p>Clear, comprehensive, and well-considered identification of a need, problem, or challenge.</p> <p>Thorough and insightful creation and validation of initial design brief based on needs analysis and task identification.</p> <p>Purposeful investigation and critical analysis of the characteristics of a broad variety of existing products, processes, systems, and/or production techniques.</p> <p>In-depth investigation into product material options and focused and thorough critical analysis for product use.</p> <p>Focused and perceptive investigation into the impact of products or systems on individuals, society, and/or the environment.</p> | <p>In-depth analysis of information to develop imaginative, innovative, and enterprising solutions to an identified design brief.</p> <p>Accomplished communication of a variety of refined product design ideas, consistently using relevant technical language.</p> <p>Purposeful testing and refined modification and validation of ideas or procedures.</p> | <p>Sophisticated application of appropriate skills, processes, procedures, and techniques to create a product or system to a precise or polished standard and specification.</p> <p>Accomplished use of resources, equipment, and materials to create a product or system safely and accurately.</p> <p>Accomplished and resourceful development of solutions to technical problems that may arise during product or system realisation.</p> | <p>Insightful and well-considered evaluation of product success against design brief requirements.</p> <p>Insightful and detailed evaluation of the effectiveness of the product or system realisation process.</p> <p>Refined and well-considered reflection on materials, ideas, and procedures, with sophisticated recommendations.</p> <p>Resourceful and well-informed analysis of the impact of the product or system on individuals, society, and/or the environment.</p> |
| B | <p>Well-considered identification of a need, problem, or challenge.</p> <p>Well-considered creation and validation of an initial design brief based on needs analysis and task identification.</p> <p>Thoughtful investigation and analysis of the characteristics of a variety of existing products, processes, systems, and/or production techniques.</p> <p>Detailed investigation into product material options and thorough analysis for product use.</p> <p>Some depth of investigation into the impact of products or systems on individuals, society, and/or the environment.</p> | <p>Thoughtful analysis of information to develop enterprising solutions to an identified design brief.</p> <p>Capable communication of different quality product design ideas using relevant technical language.</p> <p>Thoughtful testing, modification, and validation of ideas or procedures.</p> | <p>Capable application of appropriate skills, processes, procedures, and techniques to create a product or system to a mostly precise or polished standard and specification.</p> <p>Capable use of resources, equipment, and materials to create a product or system safely and mostly accurately.</p> <p>Thoughtful development of solutions to technical problems that may arise during product or system realisation.</p> | <p>Well-considered evaluation of product success against design brief requirements.</p> <p>Well-considered and detailed evaluation of the effectiveness of the product or system realisation process.</p> <p>Well-considered reflection on materials, ideas, and procedures, with thoughtful recommendations.</p> <p>Well-informed analysis of the impact of the product or system on individuals, society, and/or the environment.</p> |
| C | <p>Considered identification of a need, problem, or challenge.</p> <p>Considered creation and validation of an initial design brief based on needs analysis and task identification.</p> <p>Competent investigation of the characteristics of some existing products, processes, systems, and/or production techniques.</p> <p>Competent investigation into product material options and analysis for product use.</p> <p>Generally thoughtful investigation into the impact of products or systems on individuals, society, and/or the environment.</p> | <p>Analysis of information to develop appropriate solutions to an identified design brief.</p> <p>Competent communication of product design ideas using appropriate technical language.</p> <p>Competent testing, modification, and validation of ideas or procedures.</p> | <p>Competent application of skills, processes, procedures, and techniques to create a product or system to an appropriate standard and specification.</p> <p>Competent use of resources, equipment, and materials to create a product or system safely and generally accurately.</p> <p>Development of appropriate solutions to technical problems that may arise during product or system realisation.</p> | <p>Considered evaluation of product success against design brief requirements.</p> <p>Considered evaluation of the effectiveness of the product or system realisation process.</p> <p>Considered reflection on materials, ideas, and procedures, with appropriate recommendations.</p> <p>Informed analysis of the impact of the product or system on individuals, society, and/or the environment.</p> |
| D | <p>Identification of a basic need, problem, or challenge.</p> <p>Creation of a basic initial design brief with some consideration of a needs analysis.</p> <p>Identification of the characteristics of some existing products, processes, systems, or production techniques.</p> <p>Some basic description of material options.</p> <p>Some description of the impact of products or systems on individuals, society, or the environment.</p> | <p>Some identification of information to attempt basic solutions to an identified design brief.</p> <p>Basic communication of some product design ideas with some use of appropriate technical language.</p> <p>Partial testing and some modification of ideas or procedures.</p> | <p>Partial application of skills, processes, procedures, and techniques to make one or more articles to a limited standard and specification.</p> <p>Some use of basic resources, equipment, or materials to create a product or system, with some consideration of safety aspects.</p> <p>Partial development of some basic solutions to technical problems that may arise during product or system realisation.</p> | <p>Description of product progress, with elements of basic testing against design brief requirements.</p> <p>Some description of the effectiveness of the product or system realisation process.</p> <p>Superficial reflection on or description of materials, ideas, or procedures, with basic recommendations.</p> <p>Some consideration of the impact of the product on individuals, society, or the environment.</p> |

| | Investigating | Planning | Producing | Evaluating |
|----------|---|--|---|--|
| E | <p>Limited identification of a need, problem, or challenge.</p> <p>Creation of a very basic initial design brief, with support.</p> <p>Statement of one or more characteristics of an existing product, process, system, or production technique.</p> <p>Limited description of one or more product material options.</p> <p>Identification of one impact of a product or system on individuals, society, or the environment.</p> | <p>Attempted identification of some information to develop limited solutions to an identified design brief.</p> <p>Limited communication of one or more product design ideas.</p> <p>Some attempt at testing and limited modification of an idea or procedure.</p> | <p>Attempted application of one or more skills, to follow an appropriate process, procedure, or technique.</p> <p>Attempted use of resources, equipment, or materials, with emerging awareness of safety issues.</p> <p>Some attempted description of problems that may arise during product or system realisation.</p> | <p>Identification of some product progress, with limited testing.</p> <p>Identification of some aspects of the effectiveness of the product or system realisation process.</p> <p>Identification rather than description of materials, ideas, or procedures, with one or more recommendations.</p> <p>Emerging recognition of one or more of the impacts of the product on individuals, society, or the environment.</p> |