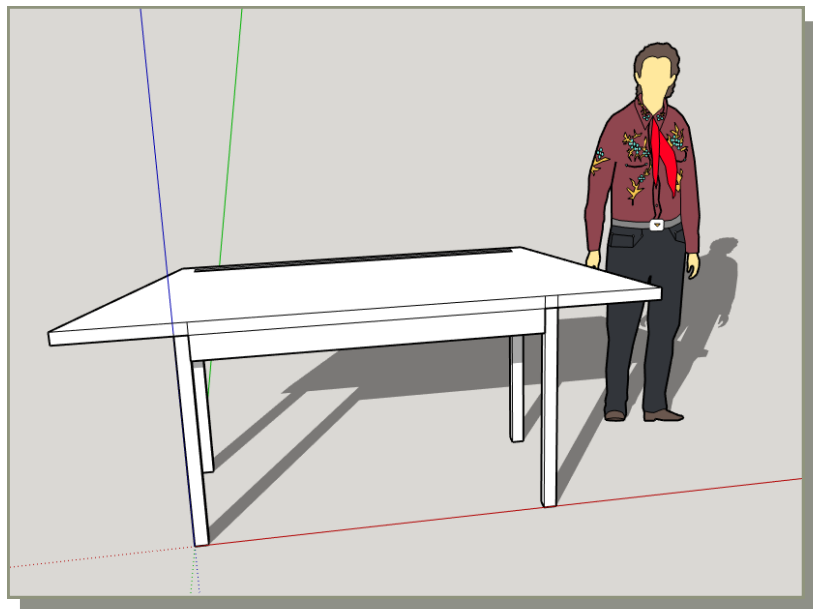


Core Maths Project

Table Design

This project is aimed towards prospective Y12 students at UTC South Durham who aim to study for the Core Mathematics qualification.



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Project Brief

I want to build a table that will fit snugly into my bay window area. Having as much woodwork/ design experience as my hamster, I am putting the project to yourselves as a project in readiness for working life at the UTC.

This is not a made-up problem, I want to design, and build a perfect piece of furniture suiting my own needs. At the time of writing, I only have a rough idea how much I want to spend (£200) and a vague idea of measurements.

The project I am handing to you is to design a table that suits my specifications. The design needs to be thorough and costing needs to be justified.

Yours in thanks,
David Myers



Learning outcomes

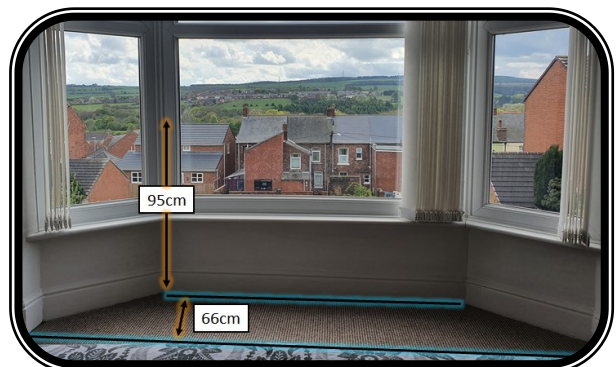
- Acquiring and implementing general skills in design of a bespoke project,
- Acquiring some familiarity with design-based software such as Solidworks and Sketchup.
- Application of GCSE Maths skills to an applied project.
- Developing a heuristic understanding of the applications of mathematics to solve practical problems.

The problem.

The bay window area forms a symmetrical trapezium with the shorter length 141cm and larger length 224cm. There is a perpendicular length measuring 66cm between these two and this is where I would like the table to be placed. Furthermore, I would like the height of the table to be roughly 95cm to block out the view of the houses opposite, as shown, but retain the beautiful view of the moor.



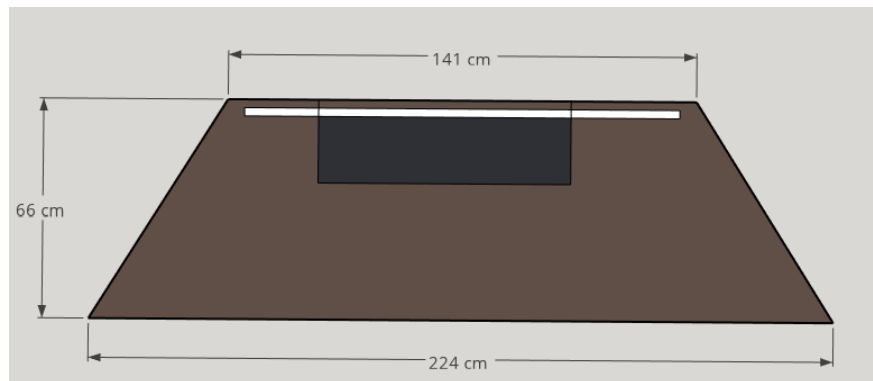
In addition to this, I intend to build the table from scratch, meaning that I will also cut the wood myself. Precision instructions are required from you to fulfil the design that I decide suits me best. Finally, I require a thorough costing of the wood, paint and other materials used in the construction of the table. Plans and elevations of your designs would be incredibly useful in your final presentations.



Design ideas

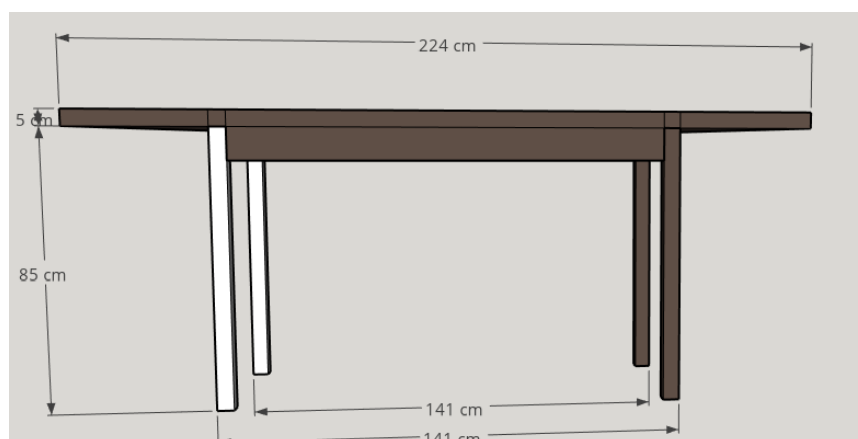
Plans and elevations.

Given here is a **plan view**, or a view of the table from the top. Ignore the darker rectangle for now, this is used in **extension 1, page 14**.



With this, you will be able to demonstrate where to cut the wood that forms the top surface. A basic use of angles will help but **using Trigonometry will be even more helpful**.

Don't forget to include suggested angles of cut in your design. The front elevation below is basic, at best! If your design includes shelves, or something new, don't forget to include its dimensions (thickness of material included). A complete set of plan, front and side views with angles gives a clear picture to the designer.



Plan

Front

Side

Plan

Front

Side

Costings

Designs are great things, but not much use if they cannot be put to production. Can you buy the material you propose to use? Does the material exist as you would like it or does the design need some editing?

The links given here include some materials that could be used in the design, what would you choose?

[Square edge oak](#) for the top. A few pieces would need [gluing](#) together. How many and how much in total? Oak is a strong piece of wood which would last but is it the most practical/ worth the cost?

[Timber](#) can be bought with almost any pre-specified dimension but again, is it the most practical?

Other materials to consider may be [wood varnish](#), [felt pads](#) to protect the carpet. A full req-list can be found in **extension 1** for guidance.

Requirements & costs

	Name	Retailer	Cost (per unit)	Units	Subtotal
Item e.g.	Gorilla wood glue	B&Q (diy.com)	£7.50	2	£15.00
Item 1					
Item 2					
Item 3					
Item 4					
Item 5					
Item 6					
Item 7					
Item 8					
Item 9					
Item 10					
Item 11					
Item 12					
Item 13					
Item 14					
Item 15					
				Total	

Requirements & costs

	Name	Retailer	Cost (per unit)	Units	Subtotal
Item e.g.	Gorilla wood glue	B&Q (diy.com)	£7.50	2	£15.00
Item 1					
Item 2					
Item 3					
Item 4					
Item 5					
Item 6					
Item 7					
Item 8					
Item 9					
Item 10					
Item 11					
Item 12					
Item 13					
Item 14					
Item 15					
				Total	

Extension 1—TV Stand

I admit, I got very excitable when I saw this [clip](#), I decided my table would need a motorised monitor lift! In the section, **plans and elevations**, a darker rectangle accounts for the area where I want my motorised lift to be. A minimum 75cmx25xm rectangle is needed to safely accommodate the television. My req-list for the costing of materials is included overleaf.

But how does this affect *your design*? Are there any major changes to the structure that need to be considered?

If you were to add one, or two, of your own must-haves for the table, can you integrate those into your design?



Requirements & costs - Motorised lift

	Name	Retailer	Cost (per unit)	Units	Subtotal
Item e.g.	Gorilla wood glue	B&Q (diy.com)	£7.50	2	
Item 1	Motor	https://www.ebay.co.uk	£2.32	1	£2.32
Item 3	Right angled brackets	https://www.amazon.co.uk	£3.75	1	£3.75
Item 4	Pulley (for motor) + 2 smoothed idlers	https://www.ebay.co.uk	£2.89	1	£2.89
Item 6	Pulleys for threaded bar	https://www.ebay.co.uk	£3.39	1	£3.39
Item 7	Timing belt	https://www.ebay.co.uk	£5.75	1	£5.75
Item 8	Threaded bar	https://www.ebay.co.uk	£8.41	2	£16.82
Item 9	Locking nuts M?				£0.00
Item 10	Captive T nuts	https://www.screwfix.co.uk	£1.89	1	£1.89
Item 11	Switch	https://www.ebay.co.uk	£1.49	1	£1.49
Item 12	Thread lock	https://www.diy.com/diy	£4.20	1	£4.20
Item 13	Flange screws	https://www.screwfix.co.uk	£2.62	1	£2.62
Item 15	Fishing line	https://www.amazon.co.uk	£3.99	1	£3.99
Item 16	Right-angle aluminium bars	https://www.metals4u.co.uk	£3.82	4	£15.28
	Bearings	https://www.ebay.co.uk	£1.99	1	£1.99
Item 17	Wood		£32.91	1	£32.91
Item 18	Misc		£5.00	1	£5.00
				Total	£104.29

Notes

Links & Resources

It is helpful to have a list of links, tables and figures in a project. Many of the following have been referenced earlier, but are left here for your convenience.

Introduction video

- <https://web.microsoftstream.com/video/201b7a3a-d01d-4a0c-b1dc-97b34b9af9af>

Software for design (pencil and paper is fine)

- <https://edu.sketchup.com/>
- <https://www.solidworks.com/>

Tutorials

- Using Sketch up: <https://www.youtube.com/watch?v=JC8sYjN1vtY>
- Motorised TV Stand: <https://www.youtube.com/watch?v=kaJVWoKj2a4>

Shopping sites

- <https://www.diy.com>
- <https://www.screwfix.com/>

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