Thomas Mills
High School & Sixth Form

CURRICULUM OVERVIEW: Design and Technology – Resistant Materials

"*The best way to predict the future is to design it*" - Buckminster Fuller

At Thomas Mills High School and Sixth Form we teach the Edexcel GCSE Design and Technology course, including the Timbers specialism. The course is structured to develop pupils' creativity, problem-solving, and technical knowledge. The key aims of the course are:

1. Creative Problem Solving - Pupils learn how to come up with ideas and design solutions to real-world problems, thinking about what people need and want.
2. Practical Skills - They get hands-on experience using tools and machines (like saws, drills, and even laser cutters or 3D printers) to build their designs.
3. Understanding Materials - They explore the properties of different types of wood and other materials—learning which are best for different jobs and why.
4. Thinking About the Bigger Picture - Pupils consider how their designs affect the environment, society, and people's lives. They learn to make responsible and sustainable choices.
5. Using Technology - They use computer-aided design (CAD) software to bring their ideas to life digitally before making them physically.
6. Evaluating and Improving - They test their ideas, get feedback, and learn how to improve their designs—just like real designers and engineers do.

The course is assessed as 50% written exam paper (1hr 45mins) where pupils are tested on their knowledge of materials, design, and making. The other 50% comprises of their Project which is a design and make task based on a real challenge set by the exam board.

Our aim for Y9 is to build on the practical work skills that have been introduced from KS3 Resistant Materials, this will be achieved through mini projects throughout the year. The mini projects also focus developing pupils sketching (2D and 3D), modelling and evaluating skills. We also teach the 'Timbers' specialism area of the course so that pupils understand the materials they will be using and use this knowledge in their design work.

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Year 9

Term	Topic	Knowledge and Skills	Useful Links
1	**Design and make** Tote Box Project **Theory** Unit 7 Timbers	**Knowledge:** During Year 9 we focus on the 'Timbers' specialism part of the specification as this will allow pupils to understand the key materials they will be using. We start by building on KS3 knowledge and developing learning about natural and manufactured timbers including hardwoods and softwoods. We also study the ecological and social impact of the timber trade and how we can make it sustainable. Students will develop their designing skills both on paper with different presentation skills and on computers using 3D CAD packages. We will practice and develop their manufacturing skills with exploring different jointing methods and then students will design and make a wooden tote box. Once manufactured and tested students will develop their evaluation skills. **Skills:** During this term pupils will start to develop the following skills: **Working with materials** – understanding the working properties and limitations of different materials **Joining materials** – to be able to create a range of basic wood joints – dowelled butt joint, lap joint and finger joint. **Sketching** – To be able to sketch in isometric and two-point perspective **CAD** – To start to develop CAD skills and be able to use *Sketchup for Web* to be able to draw a modern style house. **Evaluate** – To be able to reflect on your tote box design and draw out the positive points and be able to suggest some improvements.	Exam board and course information https://qualifications.pearson.com/en/qualifications/edexcel-gcses/design-and-technology-9-1-from-2017.html Seneca https://senecalearning.com/en-GB/ 2 point perspective https://www.youtube.com/watch?v=M6MOIP_mLsc Sketchup for web https://www.sketchup.com/en/products/sketchup-for-web?srsltid=AfmBOopbNhEARPmhm9vhTuepl-wMG1QTqJZ0G4uhPYbSYtIR4VwFbYLw How to evaluate https://technologystudent.com/despro_flsh/evalprod1.html#google_vignette

Assessments		There are four core assessments this term. One is an online 'Timbers' specialism assessed through the Seneca learning platform. The second is the research, design and development and evaluation of their tote box, this will be a mixture of hand sketches and computer-based work. The third assessment is of the practical task, a pine tote box. The final assessment is an end of term written assessment covering the learning of the term. **Autumn 1:** Project paperwork – Tote box project research, design, development and evaluation **Autumn 2:** Practical work – Pine tote box **Autumn 3:** 3D CAD – Modern house design using SketchUp for Web **Autumn 4:** Written assessment – end of term test – timbers pt 1	
2	**Design and make** LED Lamp project **Theory** Unit 1 Metals and Electronics Unit 7 Timbers	**Knowledge:** Durning this term we focus on a mini project based around the design and manufacture of an LED Lamp. Pupils will focus on creating ideas, design development and modelling of design ideas in card before manufacture in sheet aluminium. They will also learn how to solder and create a simple lighting circuit. We will continue with some of the specialist timbers knowledge but also focus on the metals and electronics areas from the core knowledge. Pupils will also research and present work on the past and present designers and companies we are required to study. **Skills:** This term focusing on the following skills: **Working with materials** – understanding the working properties of metals and electronics, pupils will be able to shape aluminium and be able to solder simple circuits on a PCB. **Sketching** – To be able to sketch freehand in isometric and add shading/rendering to design ideas, to be able to produce a working drawing of their design with dimensions. **Research** – To be able to find and present relevant information on past and present designers and companies.	Exam board and course information https://qualifications.pearson.com/en/qualifications/edexcel-gcses/design-and-technology-9-1-from-2017.html Seneca https://senecalearning.com/en-GB/ Technology student Metals and electronics https://technologystudent.com/designpro/metals1.htm https://technologystudent.com/pcb/solder1.htm

		Evaluate – To be able to reflect on your LED lamp design and draw out the positive points and be able to suggest some improvements.	
Assessments		There are four core assessments this term. One is an online core knowledge metals and electronics assessed through the Seneca learning platform. The second is the design ideas and development of their LED Lamp (paperwork). The third assessment is of the practical task, LED Lamp (practical work). The final assessment is a research task on the work of past and present designers and companies. **Spring 1:** Seneca Knowledge assessment – Metals and Electronics **Spring 2:** Design portfolio – Design and development of LED lamp **Spring 3:** Practical work – Manufacture of LED lamp **Spring 4:** Research presentation – The work of past and present designers and companies	
3	**Design and make** Footstall project **Theory** Unit 7 Timbers	**Knowledge:** This term we complete the theory on "timbers" focusing on the following topics: Forces and stresses Stock forms Scales of production Tools and processes Surface treatments and finishes Pupils will produce their most demanding product to date, a pine footstall using mortise and tenon joints. We will also continue to develop both sketching and CAD presentation skills. **Skills:** **Manufacture** – Pupils will be able to use mortise machine, bobbin sander and biscuit cutter. **Final finish** – Pupils will apply knowledge of sanding and sealing timber to product a high-quality lasting finish to their footstool. **Working drawings** – Pupils will use working drawings with dimensions to mark out and produce their footstall.	Exam board and course information https://qualifications.pearson.com/en/qualifications/edexcel-gcses/design-and-technology-9-1-from-2017.html Seneca https://senecalearning.com/en-GB/ BBC Bitesize Edexcel - timbers https://www.bbc.co.uk/bitesize/guides/zhyny4j/revision/1 Technology Student https://www.technologystudent.com/

		Sketching presentation – Pupils will be able to render designs to represent different material types in both CAD and on paper.	
Assessment		There are four core assessments this term. One is a formal assessment of the theory covered this year and will uses exam style questions. The second assessment will be on the design pages of the footstool. The third assessment is the marking of the practical work for the footstool. The fourth assessment will be via Seneca and will focus on the 'Timbers' knowledge. **Summer 1:** Y9 Assessment – Formal assessment on theory and skills covered this year **Summer 2:** Sketching and drawing - Rendered 3D designs of footstool **Summer 3:** Practical work – Manufacture of footstool **Summer 4:** Online Timbers knowledge assessment – Seneca test on timbers.	