

Product Design

Department Overview:

Year 7			
Topic	Time Allocated	Skills	End Point
Investigate	7 hours	- Understand and analyse a design brief - Analyse previous products on strengths and development - Develop a detail task analysis from analysing a brief using ACCESSFMM	Critical understanding of constraints to write a specification using the ACCESSFMM framework
Design	6 hours	- Understand the design process from initial sketches, to developed ideas into a final concept. - Understand and demonstrate the technique of coloured pencil rendering to achieve different tones. - Apply annotations to concepts that are relevant to the design process in addition to linking to ACCESSFMM	4x initial concepts including rendering and annotations 2x developed concepts that show rendering and annotations 1 x final design concept which shows a clear plan in order to manufacture as well as detailed annotations and rendering. This should reflect their specification.
Manufacture	15 hours	- Understand and planning tolerances on timber using their measuring skills (metal rules for mm). - Show a secure understand of how to use hand tools. Demonstrate this safely and effectively by cutting their timber into their planned tolerances. - Following a manufacturing plan with the continuation of hand tools and the introduction of machines (belt sander, pillar drills (scroll saws if challenged)) - Continuation of following a manufacturing plan to complete a functional product.	Completed a functional product which matches their final design

Year 8			
Topic	Time Allocated	Skills	End Point
Investigate	7 hours	- Understand and analyse a design brief - Analyse previous products on strengths and development - Develop a detail task analysis from analysing a brief using ACCESSFMM	Critical understanding of constraints to write a specification using the ACCESSFMM framework
Design	6 hours	- Understand the design process from initial sketches to developed ideas into a final concept. - Understand and demonstrate the technique of coloured pencil rendering to achieve different tones. - Apply annotations to concepts that are relevant to the design process in addition to linking to ACCESSFMM	1x initial concept including rendering and annotations 2x handle concepts 1 x final design concept which has been drawn isometrically and shows a clear plan in order to manufacture as well as detailed annotations and rendering. This should reflect their specification.
Manufacture	15 hours	- Understand and planning tolerances on timber using their measuring skills (metal rules for mm). - Show a secure understand of how to use hand tools. Demonstrate this safely and effectively by cutting their timber into their planned tolerances. - Following a manufacturing plan with the continuation of hand tools and the introduction of machines (belt sander, pillar drills, scroll saws) - Continuation of following a manufacturing plan to complete a functional product.	Completed a functional product which matches their final design

Year 9			
Topic	Time Allocated	Skills	End Point
Investigate	4 hours	Understand and analyse a design brief	Critical understanding of constraints to write a

		- Analyse previous products on strengths and development - Develop a detail task analysis from analysing a brief using ACCESSFMM	specification using the ACCESSFMM framework
Design	4 hours	- Understand the design process from initial sketches to developed ideas into a final concept. - Understand and demonstrate the technique of coloured pencil rendering to achieve different tones. - Introduction to orthographic projection to plan out design ideas. - Apply annotations to concepts that are relevant to the design process in addition to linking to ACCESSFMM	1x initial concept including rendering and annotations 2x hand-drawn concepts 1 x final design concept which has been drawn isometrically and shows a clear plan to manufacture as well as detailed annotations and rendering. This should reflect their specification.
Manufacture	10 hours	- Understand and planning tolerances on timber using their measuring skills (metal rules for mm). - Show a secure understanding of how to use hand tools. Demonstrate this safely and effectively by cutting their timber into their planned tolerances. - Following a manufacturing plan with the continuation of hand tools and the introduction of machines (belt sander, pillar drills, scroll saws) - Continuation of following a manufacturing plan to complete a functional product.	Completed a functional product which matches their final design

Year 10			
Topic	Time Allocated	Skills	End Points
Theory units	2/5 lessons per fortnight September-May	Students develop analytical, problem-solving and evaluative skills, applying technical	By the end of Year 10, students will be able to:

		knowledge to justify design decisions and respond effectively to exam-style questions. - Analyse and evaluate existing products and design decisions - Apply technical knowledge of materials and processes - Solve problems and respond to design constraints - Make and justify informed decisions using key terminology - Understand materials, manufacturing, and sustainability - Evaluate and improve designs against a specification - Use subject-specific vocabulary in written responses - Demonstrate effective exam technique (e.g. extended answers)	- Apply their knowledge of materials, components, and processes to unfamiliar design contexts - Analyse and evaluate products effectively, using accurate technical vocabulary - Justify design decisions with clear reasoning linked to function, user needs, and sustainability - Demonstrate confident exam technique, including structured extended responses - Make clear links between theory knowledge and practical application within their NEA work
Passive Speaker Unit	Sept- Dec	Skills building project for year 10 students which would mimic the layout of the NEA but to a condensed version. Students will be introduced to several sections of the design process. Research & Investigation - Understanding user needs, existing products, and acoustics basics Design Development - Generating and modelling ideas (sketching, labelling, iterative design) Technical Knowledge - Applying knowledge of materials (e.g. timber, polymers) and sound amplification principles Making Skills - Safe and accurate use of tools and equipment	Students will independently design, make and evaluate a functioning passive speaker, applying technical knowledge, practical skills and the iterative design process. By the end of the project, students will be able to: - Independently apply the design process to produce a functioning passive speaker - Demonstrate accurate making skills, using tools and equipment safely and precisely - Apply technical knowledge of materials and sound amplification in a practical context - Communicate design ideas clearly, using annotated sketches and appropriate terminology

		- Measuring, cutting, shaping, and finishing Problem Solving - Adapting designs during manufacture to overcome practical issues Evaluation - Testing effectiveness (sound quality/volume) - Reviewing against specification and suggesting improvements Communication - Presenting ideas clearly using technical vocabulary and annotations	- Test and evaluate their product, explaining its effectiveness against a specification - Identify realistic improvements, showing understanding of design development
CAM Toy unit	Jan-May	This unit develops on from the passive speaker unit where students will be developing their skills further by designing and developing a CAM toy which reflects theory knowledge required in the exam. Research & Investigation - Exploring existing cam toys and understanding mechanical motion (rotary to reciprocating/oscillating) - Identifying user and design requirements Design Development - Generating ideas through sketching and annotation - Developing mechanisms (cam profiles, followers, linkages) Technical Knowledge - Understanding cams, followers, axles, and motion types - Selecting appropriate materials and components Making Skills - Accurate measuring, cutting, drilling, and assembling - Constructing a working cam mechanism safely	Students will design and make a functioning cam toy, applying knowledge of mechanisms, materials, and the iterative design process, and evaluate its effectiveness. Design and manufacture a working cam toy, demonstrating a clear understanding of mechanical movement (rotary to reciprocating/oscillating) Accurately construct a cam mechanism (cam, follower, axle) that functions reliably Apply technical knowledge of materials and components in a practical context Work safely and independently, using tools and equipment with increasing confidence Communicate design ideas clearly using annotated sketches and key terminology Test and evaluate the performance of their cam toy against a specification

		Problem Solving - Adjusting cam size/shape and alignment to improve movement - Fixing mechanical issues during build Testing & Evaluation - Testing movement and reliability of the mechanism - Evaluating against a design specification Communication - Using technical vocabulary and labelled diagrams to explain ideas	Identify improvements, showing understanding of how mechanisms could be refined
NEA	NEA Context released 1 st June June-July	The NEA is a substantial independent design project where students investigate, design, make and evaluate a response to a real-world context, applying their technical knowledge and practical skills. AO1 A: Identifying design possibilities: (10) -Contextual challenge -Challenge analysis (task analysis/mindmap) -Research tasks -Summary -Product analysis/evaluation -Client interview -Location visit - Research findings chart from prod analysis/client interview and location visit B: Producing a design brief and Specification (10) -Brief -Specification	Students will have completed AO1 of the NEA before the summer holidays

Year 11

Topic	Time Allocated	Skills	End Points
NEA Continuation	June Y10- May Y11 7th May 2027- Submission date	AO2: C: Generating design ideas (20) 5-7:hand drawn sketches D: Developing Design Idea (20) 8 Modelling Model development 9- Design Analysis Packaging? 10 -CAD Drawings -Isometric and orthographic CAD E: Realising Design Ideas (20) 11.Materials and cutting list . Materials Investigation 12.Manufacturing Diary 13. Finished product AO3: F: Analysing and Evaluating (20) 14.Product Evaluation against specification 15. Client and user interview 16.Testing and final improvements	Students will be working on the NEA unit until the internal school deadline (Easter time) 50% of final grade
Theory units	May- July	Students continue with theory units until their exam in July	Exam- 50% of final grade