



Curriculum Rationale:

As a department we are inspiring pupils to be creative, practical, and problem-solving individuals who can design and make products for real-life situations. It encourages students to use imagination alongside knowledge from subjects such as maths, science, engineering, and computing to create meaningful solutions. Through evaluating both modern and historical designs, pupils gain an understanding of the impact of technology on everyday life and society, while building confidence to take risks and become innovative and resourceful thinkers.

At its core, the curriculum is structured around an iterative design process of designing, making, and evaluating. Pupils learn to research user needs, generate and communicate ideas using a range of drawing and modelling techniques, and create functional products using appropriate materials, tools, and processes. They are also taught to test and refine their work, respond to feedback, and understand wider considerations such as sustainability, materials, and the responsibilities of designers, engineers, and technologists so that we ensure we deliver 'success for everyone'.

The subject content has been split into three sections as follows:

- Core technical principles
- Specialist technical principles
- Designing and making principles

We teach pupils for two periods a fortnight as a double lesson. We are on a project-based system, in which pupils keep their teacher and together they work around the projects. Which are six lessons long, 12hours of teaching time.



Year 7			
Term	Unit Title	Unit Purpose	Knowledge and Skills
Project 1	See Food Preparation and Nutrition LTP		
Project 2	BlockBot	<p>Within this unit students will be introduced to different materials and their properties. Health and Safety of the practical room. They will investigate the Design Process and iteration.</p> <p>It involves designing and building a small, quirky toy robot out of wooden blocks. The project will introduce pupils to cut with coping saws, tenon saws. The use of the pillar drill, file, sand and finishing. The project challenges pupils to mark and measure out accurately.</p>	<p><u>Substantive Knowledge (WHAT)</u></p> <p>Health and Safety</p> <ul style="list-style-type: none">• Understanding workshop rules and health & safety procedures• Safe use of tools, machinery and equipment• Risk assessment (identifying hazards and reducing risks)• Use of PPE (goggles, aprons, etc.) <p>Manufacturing & Processes</p> <ul style="list-style-type: none">• Cutting, shaping• Finishes and surface treatments• Tools, machinery and equipment• Health and safety rules <p>Materials & Properties</p> <ul style="list-style-type: none">• Physical Properties Absorbency / density / fusibility / conductivity• Working properties strength / hardness / toughness / malleability / ductility / elasticity• Identification of types• Classification <p>Timber</p>



			<ul style="list-style-type: none">• Soft / Hard / Manufacture Woods• Identification of types• Physical properties• Application <p>Metals,</p> <ul style="list-style-type: none">• Ferrous / non-ferrous / alloys metals• Identification of types• Physical properties• Application <p>Polymers,</p> <ul style="list-style-type: none">• Thermoplastics / thermosetting• Identification of types• Physical properties• Application <p>Material Properties</p> <ul style="list-style-type: none">• Physical Properties Absorbency / density / fusibility / conductivity• Working properties strength / hardness / toughness / malleability / ductility / elasticity• Identification of types• Classification <p>Designing Principles</p> <ul style="list-style-type: none">• Design briefs and specifications• ACCESS FMM• Initial Ideas• Evaluations <p><u>Disciplinary Knowledge (DO)</u></p> <p>Designing & Iteration</p> <ul style="list-style-type: none">• Design Briefs
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			<ul style="list-style-type: none">• Specifications• ACCESS FMM• Generate ideas using sketches,• CAD• Annotation• Develop and refine ideas• Evaluation <p>Technical Drawing</p> <ul style="list-style-type: none">• Rendering• Sketching• Oblique / Isometric• 1-point perspective <p>1. Working Safely</p> <ul style="list-style-type: none">• Understanding workshop rules and health & safety procedures• Safe use of tools, machinery and equipment• Risk assessment (identifying hazards and reducing risks)• Use of PPE (goggles, aprons, etc.) <p>2. Measuring, Marking Out & Accuracy</p> <ul style="list-style-type: none">• Accurate measuring using metal rule in mm.• Marking out materials using try squares, compasses, templates• Working to tolerances and improving precision.• Following dimensions from drawings.• Cutting materials to size <p>4. Using Hand Tools</p> <ul style="list-style-type: none">• Cutting – Coping saw, Tenon saw, Junior hacksaw• Shaping – files, sanding
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			<ul style="list-style-type: none">• Drilling - pillar drills <p>5. Using Machines & Equipment</p> <ul style="list-style-type: none">• Basic workshop machinery - pillar drill, sanding machines• CAD/CAM equipment - laser cutter or CNC cutters• Setting up and operating machines safely <p>8. Finishing Techniques</p> <ul style="list-style-type: none">• Surface finishing (wax)• Edge treatments and smoothing• Decorative finishes and aesthetics			
Tier 2 words			Tier 2 words			
Score Cut Measure Draw	Render Measure Design	Cost Customer Function	Hazard Design brief Specification Initial ideas	Evaluation Aesthetics Task Analysis Properties	Characteristics Ferrous Polymer Wood	
Project 3	Graphics	This project will give pupils an insight to technical drawings. Enable to read and understand communicate via drawings. AS well as building pupils confidence to communicate ideas clearly, accurately, and in a way that can be understood by others in design and manufacturing contexts. Students learn to produce precise drawings using standard conventions such as isometric and 1- & 2-point perspective, accurate measurements, and clear annotation.		<p><u>Substantive Knowledge (WHAT)</u></p> <p>Paper & boards</p> <ul style="list-style-type: none">• Identification of types• Classification• Physical properties• Application <p>Packaging Design</p> <ul style="list-style-type: none">• Purpose of packaging:<ul style="list-style-type: none">◦ Protection, containment, communication, and promotion• Net development and 3D forms		



		<p>This helps them develop spatial awareness, mathematical understanding, and attention to detail, while supporting the design process from initial ideas through to making. Ultimately, technical drawing ensures that designs can be reliably interpreted and produced, preparing students for further study and real-world applications in engineering, construction, and product design.</p> <p>Pupils will investigate packaging, and understand how products are protected, stored, and presented in the real world. Through this, students learn about branding, typography and consumer appeal.</p>	<ul style="list-style-type: none">• Branding, colour theory, typography• Sizing and positioning <p><u>Disciplinary Knowledge (DO)</u></p> <p>Technical Drawing</p> <ul style="list-style-type: none">• Rendering• Sketching• Oblique• Isometric drawing• 1-point perspective• 2-point perspective• Exploded drawing <p>4. Using Hand Tools Cutting - craft knives</p> <p>6. Shaping and Forming</p> <ul style="list-style-type: none">• Cutting and shaping materials into components• Forming processes (bending plastic with heat, shaping metal)• Using jigs, formers, templates and nets. <p>The work of others</p>		
Tier 2 words			Tier 2 words		
Score Cut Measure Draw	Rendering Measure Design Shape	Sizing Texture Tone Colour	Graphics Oblique Isometric Template	Model Exploded Typography Properties	Annotation Initial ideas Development Evaluation



Curriculum LTP

Subject: Design and Technology

Woolwich Polytechnic School for Girls



Year 8			
Term	Unit Title	Unit Purpose	Knowledge and Skills
Project 1	See Food LTP		
Project 2	Phone holder	<p>Pupils will build on their previous knowledge of safety and rules of practical rooms. To ensure they are following the routines of the practical room.</p> <p>Pupils will revisit their understanding of material properties and the different categories of materials, exploring how they behave and are used in design. They will build on this knowledge by investigating the lifecycle of materials, including where they come from, how they are processed, and their impact on the environment. Through this, students will develop an awareness of sustainability and consider how both users and manufacturers can make more environmentally responsible choices.</p> <p>They will be making a mobile phone holder to help pupils develop an understanding of designing for real-world needs while building practical making skills. Through this project, students learn how to work with materials, measure and mark accurately, and construct a stable, functional product that securely holds a device. It also introduces key design</p>	<p><u>Substantive Knowledge (WHAT)</u></p> <p>Materials & Properties</p> <p>Timber</p> <ul style="list-style-type: none">• Soft / Hard / Manufacture Woods• Identification of types• Classification• Physical properties• Application <p>Wood joints</p> <ul style="list-style-type: none">• Butt joint• Lap joint• Dowel joints <p>Metals,</p> <ul style="list-style-type: none">• Ferrous / non-ferrous / alloys metals• Identification of types• Classification• Physical properties• Application <p>Polymers,</p> <ul style="list-style-type: none">• Thermoplastics / thermosetting• Identification of types• Classification• Physical properties• Application



		<p>considerations such as ergonomics, user needs, and aesthetics, encouraging pupils to create a product that is both practical and visually appealing. The purpose of the unit is to guide students through the full design process—from researching and generating ideas to making and evaluating—while developing problem-solving skills, precision, and an awareness of how products are designed for everyday use.</p>	<p>Adhesives (PVA glue)</p> <p>Material Properties</p> <ul style="list-style-type: none">• Physical Properties Absorbency / density / fusibility / conductivity• Working properties strength / hardness / toughness / malleability / ductility / elasticity• Identification of types• Classification <p>Designing Principles</p> <ul style="list-style-type: none">• Design briefs and specifications• ACCESS FMM• User needs and context• Ergonomics• Anthropometrics <p>Manufacturing & Processes</p> <ul style="list-style-type: none">• Cutting, shaping, forming and jointing• Finishes and surface treatments• Tools, machinery and equipment• Health and safety rules <p>Energy generation and storage</p> <ul style="list-style-type: none">• Fossil fuels – coal / gas / oil• Nuclear• Renewable – wind / solar / tidal / hydro-electrical / biomass• Storage systems and Batteries – kinetic / Alkaline / re-chargeable• Identify• Selection• Advantages and Disadvantages
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			<p>Sustainability & Impact</p> <ul style="list-style-type: none">• Environmental issues and sustainability• The 6 Rs of responsible design• Ethical and social impact of products <p>Manufacturing & Processes</p> <ul style="list-style-type: none">• Cutting, shaping• Finishes and surface treatments• Tools, machinery and equipment• Health and safety rules <p><u>Disciplinary Knowledge (DO)</u></p> <p>Designing & Iteration</p> <ul style="list-style-type: none">• Design Briefs• Specifications• ACCESS FMM• Generate ideas using sketches,• Annotation• Develop and refine ideas through testing and modelling• Evaluation <p>1. Working Safely</p> <ul style="list-style-type: none">• Understanding workshop rules and health & safety procedures• Safe use of tools, machinery and equipment• Risk assessment (identifying hazards and reducing risks)• Use of PPE (goggles, aprons, etc.) <p>3. Material Handling & Preparation</p> <ul style="list-style-type: none">• Identifying and selecting appropriate materials – Soft wood vs MDF• Cutting materials to size in relation to other objects
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			<ul style="list-style-type: none">4. Using Hand Tools<ul style="list-style-type: none">Cutting - Coping sawsShaping - files, sandingDrilling (hand drills, pillar drills)5. Using Machines & Equipment<ul style="list-style-type: none">Basic workshop machinery - pillar drill, ban facer sanding machinesSetting up and operating machines safely6. Shaping and Forming<ul style="list-style-type: none">Making and Using templates7. Joining Techniques<ul style="list-style-type: none">Adhesives – PVASimple joints - butt joints, lap joints, dowel joints8. Finishing Techniques<ul style="list-style-type: none">Surface finishing – WaxEdge treatments and smoothing9. Quality Control & Evaluation (During Making)<ul style="list-style-type: none">Identifying and correcting mistakesTesting functionality of productsComparing outcome to design specificationDesigning & Iteration<ul style="list-style-type: none">Design BriefsSpecificationsACCESS FMMGenerate ideas using sketches,AnnotationDevelopmentsModellingEvaluation
Tier 2 words			Tier 2 words



Cut Measure Identify	Phone Mark out		Properties Characteristic Polymer Wood Metal	Sustainability Environment Adhesive	Design Brief Specification Annotation Initial ideas Development Evaluation
Project 3	Canteen Chair	<p>This project introduces students to the core principles of design through a familiar, real-world context. By designing a chair for a school canteen, students develop user-centred and inclusive design thinking, considering a range of user needs. The focus is on building key skills such as responding to a design brief, generating ideas, and evaluating outcomes. Via problem-solving and critical thinking.</p> <p>Pupils will develop their focused designing by consider different users of the chair and different functions of the chair.</p>	<p><u>Substantive Knowledge (WHAT)</u></p> <p>Materials & Properties</p> <p>Timber</p> <ul style="list-style-type: none"> • Soft / Hard / Manufacture Woods • Identification of types • Classification • Physical properties • Application <p>Metals,</p> <ul style="list-style-type: none"> • Ferrous / non-ferrous / alloys metals • Identification of types • Classification • Physical properties • Application <p>Polymers,</p> <ul style="list-style-type: none"> • Thermoplastics / thermosetting • Identification of types • Classification • Physical properties • Application <p>Adhesives (PVA glue, solvent cement, glue guns)</p> <p>Textiles,</p> <ul style="list-style-type: none"> • Natural / Synthetic / blended / woven • Identification of types • Classification 		



			<ul style="list-style-type: none">• Physical properties• Application Material Properties <ul style="list-style-type: none">• Physical Properties Absorbency / density / fusibility / conductivity• Working properties strength / hardness / toughness / malleability / ductility / elasticity• Identification of types• Classification Designing Principles <ul style="list-style-type: none">• Design briefs and specifications• ACCESS FMM• User needs and context• Ergonomics• Anthropometrics New and emerging technologies <ul style="list-style-type: none">• People – Technology push / market pull / jobs vs technology• Culture Trends / faith / beliefs• Society - Disabled / Elderly / Religions• Environmental – continuous improvement / efficient working / pollution / global warming. The work of others
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			<ul style="list-style-type: none">• Kushedda Mensah• Yinka Ilori• Norman Foster• Zaha Hadid <p>Companies</p> <ul style="list-style-type: none">• Alessi <p><u>Disciplinary Knowledge (DO)</u></p> <p>Designing & Iteration</p> <ul style="list-style-type: none">• Design Briefs• Specifications• Generate ideas using sketches• Modelling• Product Analysis• Annotation• Develop and refine ideas through testing• Evaluation <p>Technical Drawing</p> <ul style="list-style-type: none">• Rendering• Sketching• Oblique• Isometric drawing <p>Testing, Analysis & Evaluation</p> <ul style="list-style-type: none">• Gather user feedback and test data• Primary• Analyse performance using evidence• Propose justified design improvements
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Tier 2 words			Tier 2 words		
Score Cut Measure Draw			Graphics Oblique Isometric Template	User Environment Sustainability	Annotation Design Brief Specification Research Product Analysis Market research Annotation Initial ideas Development Evaluation



Year 9			
Term	Unit Title	Unit Purpose	Knowledge and Skills
Project 1	See Food LTP		
Project 2	Box Project	<p>Pupils make a wooden box with a range of joints to develop their understanding of materials, construction techniques, and craftsmanship. This project allows students to explore how different joints—such as butt, lap and finger joints—affect the strength, accuracy, and appearance of a product. By working with timber, pupils gain practical skills in measuring, marking out, cutting, and assembling, while learning the importance of precision and quality control. It also helps them understand why particular joints are selected for specific purposes in real-world products.</p> <p>They will work from an orthographic drawing to support accurate manufacture, helping them interpret technical information and translate 2D designs into a three-dimensional product.</p> <p>In addition, pupils will be building on their material knowledge and investigating how materials are shaped and joined in industry.</p>	<p><u>Substantive Knowledge (WHAT)</u></p> <p>Materials & Properties</p> <p>Timber</p> <ul style="list-style-type: none">• Soft / Hard / Manufacture Woods• Identification of types• Classification• Physical properties• Application <p>Wood joints</p> <ul style="list-style-type: none">• Butt joint• Lap joint• Dowel joints <p>Metals,</p> <ul style="list-style-type: none">• Ferrous / non-ferrous / alloys metals• Identification of types• Classification• Physical properties• Application <p>Metal Joining Methods</p> <ul style="list-style-type: none">• Mechanical fixing (nuts, bolts, rivets)• Brazing/soldering (introductory awareness only)• Threading (basic knowledge) <p>Polymers,</p> <ul style="list-style-type: none">• Thermoplastics / thermosetting• Identification of types• Classification



			<ul style="list-style-type: none">• Physical properties• Application <p>Polymer Forming Processes</p> <ul style="list-style-type: none">• Line bending• Vacuum forming• Injection moulding• Extrusion moulding• Rotation moulding <p>Maths</p> <ul style="list-style-type: none">• Area of shapes – including triangles• Volume• Surface area• Converting fractions / decimals• percentages• calculating ratios, <p><u>Disciplinary Knowledge (DO)</u></p> <p>1. Working Safely</p> <ul style="list-style-type: none">• Understanding workshop rules and health & safety procedures• Safe use of tools, machinery and equipment• Risk assessment (identifying hazards and reducing risks)• Use of PPE (goggles, aprons, etc.) <p>2. Measuring, Marking Out & Accuracy</p> <ul style="list-style-type: none">• Accurate measuring using metal rule in mm.• Marking out materials using try square.• Working to tolerances and improving precision• Following dimensions from drawings <p>3. Material Handling & Preparation</p>
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			<ul style="list-style-type: none"> Cutting materials to size <p>4. Using Hand Tools</p> <ul style="list-style-type: none"> Cutting – Coping saws & tenon saw, Shaping – files, sanding <p>7. Joining Techniques</p> <ul style="list-style-type: none"> Adhesives – PVA glues Simple joints – Finger joint, lap joints and dove tail <p>8. Finishing Techniques</p> <ul style="list-style-type: none"> Surface finishing - Wax Edge treatments and smoothing Decorative finishes and aesthetics <p>9. Quality Control & Evaluation (During Making)</p> <ul style="list-style-type: none"> Checking accuracy during manufacture Identifying and correcting mistakes Comparing outcome to design specification Manufacture accurately and safely <p>Apply tolerances and quality checks</p>		
Tier 2 words			Tier 2 words		
Measure Cut Finish			Joints Mitre Finger Dove tail Lap Joint	Design movements Adhesive Polymer Ferrous Forming	Design brief Specification Initial ideas Evaluation
Project 3	Quick Tasks	With in this project pupils will complete mini challenges, some of which will be team competitions. Marble race Automated - Cams	<p><u>Substantive Knowledge (WHAT)</u></p> <p>Mechanisms, Electronics & Systems</p> <ul style="list-style-type: none"> Gears, pulleys, cams and linkages 		



	<p>Car race Levers Hydraulics</p> <p>Pupils gain a wide range of knowledge and skills through completing these mini projects, as each one introduces key mechanical and engineering principles in a practical, engaging way. In the marble race and car race projects, students explore motion, forces, and energy transfer, learning how factors such as slope, friction, and aerodynamics affect speed and performance. They develop problem-solving and testing skills by refining their designs to improve efficiency, while also gaining experience in measuring, constructing, and evaluating outcomes.</p> <p>Through the cams, levers, and hydraulics projects, pupils build a deeper understanding of how mechanisms are used to create and control movement in real-world products. They learn how cams convert rotary motion into linear motion, how levers provide mechanical advantage, and how hydraulic systems use fluid pressure to</p>	<ul style="list-style-type: none">• Linear and rotary motion• Electronic components and simple circuits <p>Systems and approach to design - Electronics</p> <ul style="list-style-type: none">• Input• Processes• Outputs <p><u>Disciplinary Knowledge (DO)</u></p> <p>Material Selection & Justification</p> <ul style="list-style-type: none">• Select materials based on properties and performance <p>Designing & Iteration</p> <ul style="list-style-type: none">• Design Briefs• Specifications• ACCESS FMM• Generate ideas using sketches,• Modelling• Annotation• Develop and refine ideas through testing• Evaluation <p>2. Measuring, Marking Out & Accuracy</p> <ul style="list-style-type: none">• Measuring using rulers• Following dimensions from drawings <p>9. Quality Control & Evaluation (During Making)</p> <ul style="list-style-type: none">• Checking accuracy during manufacture• Identifying and correcting mistakes• Testing functionality of products• Comparing outcome to design specification
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		transmit force. These activities strengthen their technical knowledge while developing hands-on making skills and precision. Collectively, these projects support pupils in understanding systems and mechanisms, encourage iterative design thinking, and help them apply theoretical knowledge to practical, functional solutions.	<ul style="list-style-type: none"> • Manufacture accurately and safely • Apply tolerances and quality checks • Test products against specifications <p>10. Following Production Plans</p> <ul style="list-style-type: none"> • Interpreting step-by-step manufacturing processes • Time management during practical work • Working independently and in teams 		
Tier 2 words			Tier 2 words		
Cut Score Measure	Friction Momentum Angle Force Gravity	Linear Rotary Reciprocating Oscillating	Mechanism Followers Linear Automata Lever Gear Pulley	Model Test Quality Control Systems Pear cam Eccentric cam Snail cam	Initial ideas Development Annotation Research Evaluation