Brook Sixth Form & Academy Engineering Curriculum Programme Year 10

September 2024 – July 2025

Week Plan **(4 Periods per Week; 1 Double, 2 Singles)**	**Theme / topic / unit & link to specification** *(where appropriate)*	**Whole school priority** *(E.g. reading, literacy, passion for subject)*	**Skills being developed** *(E.g. reading, writing, measuring and marking out, drawing)*	**Knowledge being introduced, developed and / or consolidated** **Learning Objective/s**	**Understanding**		**Implementation** *(Includes explanation of why you are teaching the way you are)*	**Differentiation** (e.g. through curriculum intent)	**Aspects of the wider curriculum**		**Personal Development**
					Application of skills	**Application of knowledge**			**Arts, music, culture, RS history, geography, MFL**	**Cultural Capital** [1]	
Autumn Term											
Health & Safety											
Week 1	Health & Safety	Safe guarding	Awareness & causes	Laws, risks, equipment **LO/s: Students thinking safety**	Identifying hazards	Using PPE, accessories	Joint theory & practise is best	Group & 1-1 support	Historical reasons behind H&S		H&S 'savvy'
Design Principles & Product Analysis											
Week 2	Brief Product Analysis DFMA	Reading Analysing	Analytical	Industrial applications **LO/s: Students writing briefs & analysing products**	Working to briefs	Planning for making	Reading drawings	Teacher led examples	Cultural meeting other's needs		Working to set standards
Tools & Machinery to Make a Product (Carousel Teaching with Technician)											
Week 3	Identifying hazards risks linked to machinery & hand tools	Reading Writing	Risk Assessments	Identify risks **LO/s: Students producing risk assessments**	Milling risks dangers	In own work	Workshop & classroom	Individual & 1-1 support	Old & modern safety machining		Working safely
Week 4	Hand Tools Milling Equip	Reading Measuring Maths	Machine operation	Use of Mill Machines **LO/s: Students working & using tools & machines safely**	Setting up work	Accurate machining	Workshop essential	1-1 support	Imperial versus metric		Safe machining
Ford Partnership Work - Introduction to Ford Motor Company & Practice (In Green)											

[1] Cultural capital: "It is the essential knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement."

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Week 5	Industrial processes History of Ford & Dagenham	Reading Analysing	Mould & Batch making	Sandcasting base **LO/s: Students produce a sandcasting** **LO/s: Ford Motor Company & opportunities**	Aluminium casting	Moulding & Sand casting	Workshop essential	1-1 support	Sandcasting safety in other countries	Applying theory-make
Week 6	Casting & Milling	Reading Analysing	Using tools machines	Prepare base to machine **LO/s: Students prepare to cast for machining**	Milling principles	Safe working practises	Workshop essential	Individual & 1-1 support	N/A	Being safe & responsible
Week 7	Research & Modelling Ford Design Eng. Systems	Reading Measuring Maths	Planning	Models & patterns **LO/s: Students collecting & using data in modelling** **LO/s: Know Design Cycles 1-2**	MDF model making	Moulding for Sand casting	Workshop essential	Individual & 1-1 support	Cultural model making	Applying theory-make
Week 8	Workshop equipment	Reading Analysing	Using tools machines	Sprue & slag removal **LO/s: Correct safe use of hand tools**	Using hand tools	Safe working practises	Workshop essential	Individual & 1-1 support	N/A	Hand skills
October ½ Term										
Extending knowledge & application of the tools; materials & industrial processes to make a product – (Carousel teaching with Technician). Ford Partnership Work Continued.										
Week 9	Precision Measuring Ford Design Eng. Systems	Reading Measuring Maths	Machining Lathe mill.	Surface finish & fit **LO/s: Using precision tools** **LO/s: Know Design Cycles 3-4**	Machine to drawing size	Making to correct sizes	Machine shop essential	Individual & 1-1 support	N/A	Being safe & accountable
Week 10	Quality Control	Reading Measuring Maths	Checking & comparing	Quality control **LO/s: Importance of quality checks**	Precision tool use	Identify & resolve	Machine shop essential	Individual & 1-1 support	Imperial metric measuring	Checking & correcting
Week 11	Engineering Drawings Ford Component Case Study	Reading Measuring Maths	Measuring Marking out	Reading drawings **LO/s: Using measuring tools**	Marking out holes	Marked out to drawing	Workshop essential	Group & 1-1 support	N/A	Precision tool use

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				LO/s: Using systems to evaluate / decide						
Week 12	Manual Drilling & machining An Introduction to CNC	Reading Measuring Maths	Setting up for drilling Awareness of CNC capability	Clamping drilling **LO/s: Student able to clamp work & drill holes; Awareness of CNC machining**	drilling out 2 holes	Safe drilling practises	Workshop essential	Individual & 1-1 support	Old & modern equipment	Safe machine working
Week 13	Taps & Dies Gauges Ford EV Charge Handle Project	Reading Measuring	Threading int. holes	Taps & dies **LO/s: Student able to cut screw threads** **LO/s: To design a new Ford EV charger handle**	Tapping holes	Tapping principles	Workshop essential	Individual & 1-1 support	Hand versus machine techniques	Tap tool use
Quality Assurance & Quality Control										
Week 14	Standards Quality Ass.	Reading Measuring Maths	Checking work	Quality control **LO/s: Student able to check accuracy against drawings**	Checking size drawing	Using precision tool	Workshop essential	Individual & 1-1 support	European & USA drawing standards	Quality control
Xmas										
Spring Term										
Extending Knowledge & Application of the Tools; Materials & Industrial Processes to Make a Product – (Carousel Teaching with Technician). Ford Partnership Work Continued.										
Week 15	Lathes & machining	Reading Writing	Reading brief task	Lathe work **LO/s: Student able to set speed & cutting tool**	Lathe safety & use	Identify lathe parts	Workshop essential	Group & 1-1 support	Old & modern safety machining	Safe machine working
Week 16	Jigs & Templates	Reading Measuring	Cutting mild steel rod	Hand tool use **LO/s: Student able to use various jigs & templates to check accuracies**	Measuring & cutting	Bench / vice working	Workshop essential	Individual & 1-1 support	N/A	Safe hand tool working

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Week 17	Setting up lathes	Reading Measuring	Setting up a lathe	Turning **LO/s: Student able to safely operate a lathe**	Measuring & setting up	Precision tool use	Workshop essential	Individual & 1-1 support	N/A	Safe machine working
Week 18	Turning	Reading Measuring	Lathe turning	Methods of turning steel **LO/s: Student able to turn down a round post**	Safe lathe operation	Using cutting tools	Workshop essential	Individual & 1-1 support	N/A	Safe machine working
Week 19	Threading	Reading Measuring	Threading ext. holes	Taps & dies **LO/s: Student able to cut a thread**	Threading holes	Threading principles	Workshop essential	Individual & 1-1 support	N/A	Die tool use
Week 20	Assembling Checking Ford Robotics	Reading Measuring	Checking work	Quality control **LO/s: Student able to use precision tools** **LO/s: Student able to program a robot. Understands robots in industry**	Checking size drawing	Using precision tool	Workshop essential	Individual & 1-1 support	N/A	Quality control
Spring ½ Term										
Product Evaluation & Techniques										
Week 21	Finishing Aesthetics	Reading Measuring	Assembly work	Quality control **LO/s: Student able to check fit, finish to drawing**	Fit & finish	Quality control	Workshop essential	Individual & 1-1 support	N/A	Quality outcomes
Week 22	Evaluating products	Reading Writing	Report writing	Writing to mark criteria **LO/s: Student able to use evaluative techniques to write an evaluation**	Report writing	Report submission	Class & CAD room	Individual & 1-1 support	N/A	Submitting report / work
Computer Aided Design & Manufacturing Products										

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Week 23	CNC, CAD & CAM Ford EV Charge Handle Project	Reading Analysing	Analysing task / brief	CAD / CAM in industry **LO/s: Student able to understand terms** **LO/s: Student clear on the set task & expectations.**	Planning the desk tidy top	Designing the desk tidy top	To complete the mini project	Individual & 1-1 support	Cultural & functional designs	Creativity
Week 24	CAD Drawing	Reading Measuring	2D Design techniques	CAD / CAM in industry **LO/s: Student able to use 2D Design**	Designing desk tidy top	Correct fit to base	To cover the specification	Individual & 1-1 support	Cultural & functional designs	Creativity
Week 24	Testing Trialling	Reading Measuring	Card model test piece	Checking by templates **LO/s: Student produces own template**	CAD cut template	Working to drawings	To test sizes before making	Individual & 1-1 support	N/A	Double checking
Week 25	Laser Cutting	Reading Writing	CNC Laser operation	Advantage & limitations **LO/s: Student able to use Laser to cut template.**	Setting up using lasers	Able to safely operate	Identifying cutting limits	Group work	N/A	New technology
Easter										
Summer Term										
Extended Knowledge & Application of CAD/CAM & Production Methods										
Week 26	Production methods Ford Dunton Tech. Centre Visit	Reading Writing	CNC laser machine	Batch production **LO/s: Student able to use 'Nest' CAD/CAM work** **LO/s: Student will experience motor vehicle industrial practices**	CAD/CAM applications	Able to set up & make	Combine theory & practise	Individual & 1-1 support	N/A	Working on own safely
Week 27	Fusion 360 3D Printing	Reading Writing Maths	Research & reporting	Alternative CNC equip.	Finding other CNC's	Good report writing	Further CAM experience	Classwork	N/A	Researching & finding

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	Ford Electric Motor making	Science		**LO/s: Student able to use 3D CAD** **LO/s: Student understand electric motor concepts.**						
Week 28	CNC versus manual work	Reading Writing	Report writing	Writing to mark criteria **LO/s: Student understands advantages of new technology**	Report writing	Report submission	Class & CAD room	Individual & 1-1 support	N/A	Submitting report / work
Week 29	Quality Assurance	Reading Analysing	Analysing QA Systems	Quality in industry **LO/s: Student understands use of QA techniques**	Quality assurance	Identify QC methods	Unit requirement	Individual & 1-1 support	N/A	Own work improvement
Week 30	Mechanisms & Control Ford Reverse Engineering	Reading Writing Science Maths	Electro-mechanical Systems	Control type systems **LO/s: Student understands e-mech. concepts** **LO/s: student understands Industrial copying concepts**	Concepts	Electrical Pneumatic mechanical	AQA requirement	Group work	Developing a 'culture' of teamwork	Using kits to problem solve
Spring ½ Term										
Electronics & New Technologies										
Week 31	Electronics & Components	Reading Maths	Reading Checking	Components	Checking own work	Evidence of Q Control	Check own & others' work	Individual & group work	N/A	Self & work assessment
Week 32	Modern Materials & Technologies	Reading Writing	Research Reporting	Robots, AI, Nano & SMART Materials **LO/s: Student able to I.D. parts & explain what they do**	Research & find	Good report writing	Combine theory & practise	Classwork 1-1 support	N/A	Find & present Info.
Week 33	Sustainability Recycling	Reading Writing	Production methods	Lean manufacture **LO/s: Student understands**	Research & find	Suggested methods	Internet best method	Classwork 1-1 support	N/A	Need to reduce waste

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	Ford Management Review			**types & choice of processes LO/s: To case show work with Ford**						Public speaking
Week 34	Welding & Types	Reading Writing	Writing to AQA criteria	Report writing **LO/s: Student understands welding & brazing types**	Report submission	Class & CAD room	Individual & 1-1 support	Classwork 1-1 support	Submitting report / work	Writing to mark criteria
Week 35	AQA NEA Theme Topic	Reading Writing	Planning Organisation	Identify need Solutions **LO/s: Student analysing NEA task**	Identify techniques	Appropriate selection	NEA preparation	Class & group work	Cultural changes	Decision making
Week 36	NEA Context & Brief	Reading Writing	Problem solving	Engineered solutions **LO/s: Student researching round the task.**	Identify solutions	Design to solve issues	NEA coursework	Class & group work	Cultural changes	Self-analysis Investigation
Week 37	Project planning	Reading Writing	Research organising	Solving problems **LO/s: Student produces a project Gantt chart for the year**	Analysis Research	Designing solutions	Getting pupils thinking	Classwork 1-1 support	Historical, Cultural, Geographical, Arts	Organisation Investigation
Summer Holidays										