

KS5 A Level Product Design Curriculum Mapping

Year 12						Engineering Y12						
Term	Autumn (1)			Autumn (2)		Spring (1)			Spring (2)		Summer (1)	Summer (2)
Topic(s)/ Subjects(s)	Festival Table			Balance toy		Foldable light			Pewter product		Transforming shapes	NEA
Knowledge and skills (Content)												
Week 1	3.1.1: Materials and applications Classification of materials A-level additional content: Elastomers			3.2.1: Design methods and processes		3.2.8: Responsible design Environmental issues Conservation of energy and resources A-level additional content: how products are designed to conserve energy, materials and components the reuse of material off cuts, chemicals, heat and water.			3.1.5: The use of finishes. Polymer finishing A-level additional content: acrylic spray paints thermoplastic elastomer metal finishing sealants preservatives anodising plating coating cathodic protection wood finishing colour wash Danish oil.		3.1.12: Design communication	3.2.6: Selecting appropriate tools, equipment and processes Development of designs from prototype to mass produced product The effect on the manufacturing process that is brought about by the need for batch and mass manufacture The importance of health and safety in a commercial setting including workforce training and national safety standard
Week 2	3.1.1: Investigating and testing materials			3.2.2: Design theory Design influences Designers and their work		3.2.9: Design for manufacture Planning for accuracy and efficiency			3.1.6: Modern and industrial commercial practice Scales of production A-level additional content:		Internal exams or external as papers	3.2.8: Responsible design Conservation of energy and resources How products are designed to conserve

		<p>A-level additional content</p> <p>Design styles and movements</p>	<p>Quality control</p> <p>A-level additional content:</p> <p>accuracy in scale production</p> <p>quality assurance</p> <p>go/no-go gauges, laser scanning and measuring</p> <p>non-destructive testing.</p>	<p>unit production systems (UPS)</p> <p>quick response manufacturing (QRM)</p> <p>vertical in house production</p> <p>the use of computer system</p> <p>modular cell production</p> <p>flexible manufacturing systems</p> <p>sub assembly</p> <p>efficient use of materials</p>		<p>energy, materials and components</p> <p>The reuse of material offcuts, chemicals, heat and water</p>
Week 3	<p>3.1.2: Performance characteristics of materials</p> <p>Papers and boards</p> <p>A-level additional content:</p> <p>watercolour paper painting</p> <p>composites</p> <p>tungsten carbide</p> <p>concrete, including reinforced concrete</p> <p>fibre cement.</p>	<p>3.2.3: How technology and cultural changes can impact on the work of designers:</p> <p>Socio economic influences</p> <p>Major developments in technology</p> <p>Social, moral and ethical issues</p> <p>A-level additional content</p> <p>Product life cycle</p>	<p>3.1.3: Enhancement of materials</p> <p>Polymer enhancement</p> <p>Wood enhancement</p> <p>Metal enhancement</p>	<p>3.1.7: Digital design and manufacture</p> <p>A-level additional content:</p> <p>CAD in industrial applications</p> <p>virtual modelling</p> <p>rapid prototyping</p> <p>electronic data exchange</p> <p>production, planning and control networking (PPC).</p>	<p>3.2.3: Technology and cultural changes</p> <p>Product lifecycle</p>	<p>3.2.9: Design for manufacture and project management</p> <p>Planning for accuracy and efficiency</p> <p>Quality assurance</p> <p>Quality control</p> <p>Go/no-go gauges, laser or probe scanning and measuring</p> <p>Non-destructive testing such as x-rays and ultrasound</p>

Week 4	<p>3.1.2: Performance characteristics of materials</p> <p>Polymer based sheet and film</p> <p>Biodegradable Polymers</p> <p>A-level additional content:</p> <p>Polyhydroxyalkanoate (PHA)</p>	<p>3.2.4: Design processes</p> <p>A-level additional content:</p> <p>the use of the design process in the NEA</p> <p>prototype development</p> <p>iterative design process in industrial or commercial contexts.</p>	<p>3.1.4: Forming, redistribution and addition processes</p> <p>Paper and board forming processes</p> <p>Wood processes</p> <p>Introduce joining methods, adhesives and fixings along with the use of jigs and fixtures where appropriate</p> <p>A-level additional content</p> <p>Wood processes:</p> <p>coach bolts</p> <p>milling.</p>	<p>3.1.8: The requirements for product design and development</p> <p>Product development and improvement</p> <p>A-level additional content:</p> <p>fitness for purpose</p> <p>accuracy of production</p> <p>consideration of aesthetics, ergonomics and anthropometrics</p> <p>inclusive design</p>	<p>3.2.4: Design processes</p> <p>The use of a design process</p> <p>Design processes used in the NEA</p> <p>Prototype development</p>	
Week 5	<p>3.1.2: Performance characteristics of materials</p> <p>Woods</p> <p>Smart and modern materials</p> <p>A-level additional content:</p> <p>planed all round (PAR)</p> <p>timber mouldings</p> <p>steam bending</p> <p>machining qualities</p>	<p>3.2.5: Critical analysis and evaluation</p>	<p>3.1.4: Forming, redistribution and addition processes</p> <p>Polymer processes</p> <p>Introduce joining methods, adhesives and fixings along with the use of jigs and fixtures where appropriate</p> <p>A-level additional content:</p> <p>Calendering</p>	<p>Health and Safety</p>	<p>3.2.4: Design processes</p> <p>Iterative design in commercial contexts</p>	

	moisture resistance toxicity aeroply.					
Week 6	3.1.2: Performance characteristics of materials Metals A-level additional content: H beam I beam thermal conductivity electrical conductivity melting points cast iron gold titanium brass duralumin pewter.	3.2.6: Selecting appropriate tools, equipment and processes A-level additional content: how designs are developed from single prototype to mass-produced product how scales of production effect the manufacturing process health and safety in a commercial setting.	3.1.4: Forming, redistribution and addition processes Metal processes Introduce joining methods, adhesives and fixings along with the use of jigs and fixtures where appropriate A-level additional content: cupping deep drawing investment casting mig welding tig welding spot welding oxy- acetylene welding machine screws flame cutting plasma cutting laser cutting.	3.1.11: Design for manufacturing, maintenance, repair and disposal Manufacture Repair Disposal A-level additional content: reduction in the number of manufacturing processes maintenance ease of manufacture disassembly.	3.2.2: Design theory Design styles and movements	

Week 7	3.1.2: Performance characteristics of materials Polymers A-level additional content Melting points	3.2.7: Accuracy in design and manufacture	3.1.5: The use of finishes Paper and board finishing Paper and board printing processes	3.1.13: Enterprise and marketing in the development of products A-level additional content: global marketing costings and profit entrepreneurs.	3.2.2: Design theory Design styles and movements	
Assessment	Mini tests and online teams' tasks will be marked, and grades collated to show progression. Final making work to be marked by 2-3 staff members to give non bias results	Mini tests and online teams' tasks will be marked, and grades collated to show progression. Final making work to be marked by 2-3 staff members to give non bias results	Mini tests and online teams' tasks will be marked, and grades collated to show progression. Final making work to be marked by 2-3 staff members to give non bias results	Mini tests and online teams' tasks will be marked, and grades collated to show progression. Final making work to be marked by 2-3 staff members to give non bias results	Mini tests and online teams' tasks will be marked, and grades collated to show progression. Final making work to be marked by 2-3 staff members to give non bias results	Mini tests and online teams' tasks will be marked, and grades collated to show progression. Final making work to be marked by 2-3 staff members to give non bias results
Cross Curricular Links	Links with science and industry protocols.	Links with Art, Math's and IT.	Links with geography, Math's and IT	Links with Math's, English, science and geography.	Links with Science and Math's.	Links with Math's, English, science and geography.
SMSC, British Values, Cultural Capital	British standards/values taught through a design workshop environment. And theory based task to build a wider understanding of the world and how it works	British standards/values taught through a design workshop environment. And theory based task to build a wider understanding of the world and how it works	British standards/values taught through a design workshop environment. And theory based task to build a wider understanding of the world and how it works	British standards/values taught through a design workshop environment. And theory based task to build a wider understanding of the world and how it works	British standards/values taught through a design workshop environment. And theory based task to build a wider understanding of the	British standards/values taught through a design workshop environment. And theory based task to build a wider understanding of the

					world and how it works	world and how it works
CEIAG	Look into university routes and apprentices					
Learning outside the classroom	Students have several home works based on research and how companies operate safely.	Students have to research ideas and investigate the design brief.	Students research existing products. Students learn about industrial processes through product disassembly.	Students use all Resources available to them to revise, including teams.	Students use all Resources available to them to revise, including teams.	Students use all Resources available to them to revise, including teams.