

Curriculum Map Year 12 DESIGN AND TECHNOLOGY

Following AQA GCSE Design and Technology Specification (a full copy of the specification can be found [here](#))

Topic Name	Term	Skills developed with link to NC Subject content	Reflection on previous link in the curriculum	Progress to future link in the curriculum
Technical principles	Autumn HT1	<u>1.1 Materials and their applications</u> <ul style="list-style-type: none"> Physical and mechanical properties of materials Factors which effect choice of material (aesthetics/cost) Classifications of materials of testing material properties (in school and industry) Methods <u>1.2 Performance characteristics of materials</u> <ul style="list-style-type: none"> Papers and boards Polymer based sheet and film Woods <u>1.4 Forming, redistribution and addition processes</u> <ul style="list-style-type: none"> Wood processes (joints, knock-down fittings, laminating, steam bending, turning, milling and routing) 	Year 7 Year 10 and 11 Year 7 Year 10 and 11 Year 10	Y13 study
Designing and making principles	Autumn HT1	<u>2.1 Design methods and processes</u> <ul style="list-style-type: none"> How designs meet users needs, wants and values Collecting and using data to inform design Planning for and evaluation of manufacture <u>2.2 Design influences</u> <ul style="list-style-type: none"> Designers and their work (Phillipe Stark, James Dyson, Margaret Calvert, Dieter Rams, Charles and Ray Eames and Marianne Brandt) Design styles and movements (arts and crafts, Art Deco, Bauhaus and Memphis) 	Year 8 and 9 Year 10 and 11 Year 10 and 11 Year 8, 9, 10 and 11 Year 8, 9, 10 and 11	Y13 study
Technical principles	Autumn HT2	<u>1.2 Performance characteristics of materials</u> <ul style="list-style-type: none"> Metals Polymer including elastomers and biodegradable polymers Composite materials Smart materials Modern materials <u>1.3 Enhancement of materials</u> <ul style="list-style-type: none"> Enhancements made to polymers, wood and metal to improve their working properties <u>1.4 Forming, redistribution and addition processes</u> <ul style="list-style-type: none"> Paper and board processes - die and laser cutting, creasing and bending Polymer processes - vacuum forming, thermoforming, calendaring, line bending, laminating (layup), injection moulding, blow moulding, rotational moulding, extrusion, compression moulding Metal processes - forming - press forming, spinning, cupping, deep drawing, forging, drop forging, bending, rolling, casting processes: sand casting, die casting, investment casting, low temperature casting (pewter), fabrication - metal inert gas (MIG) welding, tungsten inert gas (TIG) welding, spot welding, oxy-acetylene welding, soldering (soft and hard), brazing, riveting, temporary joining methods and fasteners: self-tapping screws, machine screws, nuts and bolt, wasting – milling, turning, flame cutting, plasma cutting, laser cutting, punching/stamping. 	Year 7 Year 7 Year 7, 10 and 11 Year 7, 10 and 11 Year 7	Y13 study

Designing and making principles	<i>Autumn HT2</i>	<u>2.2 Design influences</u> <ul style="list-style-type: none"> • Design styles and movements (arts and crafts, Art Deco, Bauhaus and Memphis) <u>2.3 How technology and cultural changes can impact on the work of designers</u> <ul style="list-style-type: none"> • Post WWI development of Bauhaus and mass production techniques used in product design. • WW2 Utility Furniture through rationing • Major developments in technology (micro electronics, new materials, new methods of manufacture, advancements in CAD/CAM) 	Year 8, 9, 10 and 11	Y13 study
Technical principles	<i>Spring HT1</i>	<u>1.4 Forming, redistribution and addition processes</u> <ul style="list-style-type: none"> • The use of adhesives and fixings – PAV, contact adhesive UV hardening adhesives, solvent cements and epoxy resin. • Jigs and fixtures <u>1.5 The use of finishes</u> <ul style="list-style-type: none"> • Paper and board finishes and printing processes • Polymer finishes • Metal finishes • Wood finishes <u>1.6 Modern industrial and commercial practice</u> <ul style="list-style-type: none"> • Scales of production including one-off, bespoke, batch, mass/line, UPS, QRM and vertical in-house production • Efficient use of materials with advantages of bulk-buying, developing designs to reduce use of materials and changing manufacturing processes to increase accuracy and reduce waste • Use of computer systems to plan and control manufacture including JIT systems and production control • Sub-assembly as a separate line of manufacture for certain products <u>1.13 Enterprise and marketing in the development of products</u> <ul style="list-style-type: none"> • Importance of marketing and brand identity including customer identification, labelling, packaging, corporate identification and global marketing, product costing and profit and awareness of the role of entrepreneurs 	Year 10 and 11 Year 7	Y13 study
Designing and making principles	<i>Spring HT1</i>	<u>2.3 How technology and cultural changes can impact on the work of designers</u> <ul style="list-style-type: none"> • Social, moral and ethical issues including sustainability, cultural, gender religious beliefs. How design can support social problems including Fairtrade <u>2.3.4 Product life cycle</u> <ul style="list-style-type: none"> • How a product is introduced to a market through introduction, evolution, growth, maturity and decline. Then how products can be refined and re-developed to extend life cycle. <u>2.4 Design process</u> <ul style="list-style-type: none"> • Working towards NEA process. How projects are undertaken: <ul style="list-style-type: none"> ○ investigations and analysis ○ use of inspiration materials, eg mood boards ○ ideas generation ○ illustration ○ development of a design specification ○ modelling ○ planning ○ evaluating and testing 	Year 7, 8, 9, 10 and 11	Y13 study

		<ul style="list-style-type: none"> • Prototype development – recapping skills/purpose/materials in the development of 3D models • Iterative design process and collaborative working 		
Technical principles	Spring HT2	<p><u>1.7 Digital design and manufacture</u></p> <ul style="list-style-type: none"> • Computer aided design as an approach to designing, 2D and 3D software with advantages and disadvantages • Computer aided manufacture in the production of products (laser cutting, routing, milling, turning and plotter cutter) • Virtual modelling with use of simulation, CFD and FEA to test and develop prototypes • Rapid prototyping – 3D printing • EPOS systems • PPC networking <p><u>1.8 The requirements for product</u></p> <ul style="list-style-type: none"> • How products should meet specification and manufacture of products to meet specific criteria, fitness for purpose, accuracy of production and critical assessment. • Factors that effect the choice of materials and design of products including anthropometrics and ergonomics. • Inclusive design. <p><u>1.9 Health and safety</u></p> <ul style="list-style-type: none"> • Safe working practices in the workshop/workplace. HSWA (1974), COSHH and risk assessment. • Safety in products and service to customers including Consumer Rights Act (2015) and Sales of Goods Act (1979). British Standards Institute and Lion Mark. Customer advice (instructions/safety warning/aftercare advice) <p><u>1.10 Protecting designs and intellectual property</u></p> <ul style="list-style-type: none"> • Copyright, patents, registered design, trademark and logo • Open design 	<p>Year 9, 10 and 11</p> <p>Year 9, 10 and 11</p> <p>Year 8, 9, 10 and 11</p> <p>Year 9, 10 and 11</p> <p>Year 7</p> <p>Year 12 Spring HT1 (1.13)</p>	Y13 study
Designing and making principles	Spring HT2	<p><u>2.5 Critical analysis and evaluation</u></p> <ul style="list-style-type: none"> • Analysing products to identify further/future developments after testing/use. Relating this to testing in industry before products reach the market. The use of feedback for interested parties. <p><u>2.6 Selecting appropriate tools, equipment and processes</u></p> <ul style="list-style-type: none"> • Understanding of function/uses of tools and related H&S whilst manufacturing • How manufacture will develop from prototype to mass production <p><u>2.7 Accuracy in design and manufacture</u></p> <ul style="list-style-type: none"> • how testing can eliminate errors and use of measuring aids, eg templates, jigs and fixtures in ensuring consistency of accuracy and the reduction of possible human error. 	<p>Year 9, 10 and 11</p> <p>Year 7, 8, 9, 10 and 11</p> <p>Year 10 and 11</p>	Y13 study
Non Exam Assessment	Spring HT2	<p><u>NEA</u></p> <p>I. Identifying and investigating design possibilities</p> <ul style="list-style-type: none"> ▪ Identify potential areas for study ▪ Research techniques and investigations 	<p>Year 9, 10 and 11</p> <p>Year 10 and 11</p>	
Technical principles	Summer HT1	<p><u>1.11 Design for manufacturing, maintenance, repair and disposal</u></p> <ul style="list-style-type: none"> • Reduction of manufacturing processes and labelling of materials to improve recycling. Six Rs of sustainability and maintenance to reduce waste. • Ease of manufacture through developing design for reduction in use of materials, snap fittings, internal mouldings, premade components and use of self finishing or textured 	Year 10 and 11	Y13 study

		<p>materials/surfaces in processing to reduce additional processes.</p> <ul style="list-style-type: none"> • How products are designed to be disassembled <p><u>1.12 Feasibility studies</u></p> <ul style="list-style-type: none"> • Use of FS to assess the practicality for production of proposed designs 		
Designing and making principles	Summer HT1	<p><u>2.8 Responsible design</u></p> <ul style="list-style-type: none"> • Sustainability of materials and environmental impact of packaging. • Conservation of energy and resources. The impact of sourcing, transporting and manufacture of materials including water/air pollution, energy consumption and processing of waste 		Y13 study
Non Exam Assessment	Summer HT1	<p><u>NEA</u></p> <ol style="list-style-type: none"> 1. Identifying and investigating design possibilities <ul style="list-style-type: none"> ▪ <i>Research techniques and investigations</i> 	Year 9, 10 and 11	
Technical principles	Summer HT2	<p>Assessment and recap</p> <ul style="list-style-type: none"> • Range of assessment tools to work through sections of course <ul style="list-style-type: none"> ○ 1.1 – 1.6 materials and processes ○ 1.7 – 1.13 factors in design and manufacture of products 	Year 12 Autumn HT1 – Summer HT1	Y13 study
Designing and making principles	Summer HT2	<p><u>2.9 Design for manufacture and project management</u></p> <ul style="list-style-type: none"> • Quality assurance processes to reduce waste and increase accuracy. TQM, scrum, Six Sigma and critical path analysis • Quality control to monitor, check and test equipment and products through production including 'go-no go' gauges, laser and probe scanning and measuring, use of callipers and micrometres and non-destructive testing. 	Year 10 and 11	Y13 study
Non Exam Assessment	Summer HT2	<p><u>NEA</u></p> <ol style="list-style-type: none"> 1. Identifying and investigating design possibilities <ul style="list-style-type: none"> ▪ <i>Research techniques and investigations</i> ▪ Development of initial concepts/ideas 2. Producing a design brief and specification <ul style="list-style-type: none"> ▪ Clarify project and write clear brief and specification to lead project forward 	Year 9, 10 and 11 Year 10 and 11	