Scheme of work: A-level Product Design

This resource is a scheme of work for the A-level Product Design specification. It is not exhaustive or prescriptive; it is designed to suggest a method of delivery that you might find useful when planning your delivery of the specification.

The scheme of work assumes a two year course for the teaching of the A-level specification. Teaching and learning is based on four sessions per week. The three components that make up the A-level qualification, Paper 1, Paper 2 and the non-exam assessment (NEA), should be allocated appropriate teaching sessions to reflect their weighting allocations: 50% NEA, 50% written exams. This scheme of work is structured to enable teachers to focus on content that will prepare students for assessment at the end of year 2.

Several schools and colleges have indicated that they may start the AS course before deciding whether students complete the full A-level course. This scheme of work suggests covering the AS theoretical content in the first year and developing the addition A-level content and depth in year two. Schools and colleges who are only offering the full A-level may wish to alter this approach.

Suggested format – overview planner:

Timescale	Exams	NEA
Two hours per component, four sessions total per week.	• Paper 1 - 30% of A-level Technical principles (TP) – 2.5 hours 120 marks • Paper 2 – 20% of A-level Design and making principles (DMP) – 1.5 hours 80% marks • Combined written paper weighting – 50% of the A-level	• Assesses practical application of technical principles and designing and making principles. • Substantial design and make project. • Written or digital portfolio not exceeding 45 pages. • Candidate developed brief. • 50% of the A-level qualification.
Year 1		
Term 1.1		
Week 1	Materials and their applications (TP)	The planning and organisation of the NEA allocation will depend on the choices of each individual school or college. Option two – for schools and colleges following a two year linear A-level. Preparation for the NEA. A series of small, skills based projects that take place over terms one and two to provide students with the skills needed to complete the individual NEA. These projects should cover a range of materials and processes outlined in the specification along with elements of CAD and sketching. They could
Week 2	Testing materials (TP)	
Week 3	Performance characteristics of materials (TP): • papers and boards • composites.	
Week 4	Performance characteristics of materials (TP) • polymer based sheet and film • biodegradable polymers.	

Week 5	Performance characteristics of materials (TP): • woods • smart and modern materials.	also be used to deliver or reinforce elements of the theoretical knowledge that may be examined in Paper 1 and Paper 2. Option two – for schools and colleges looking to co-teach the AS qualification with the option to continue to the full A-level qualification. Preparation for the NEA. A series of small skills based projects (as above) before students beginning their NEA using the contexts released by AQA. A-level students could complete the AS NEA as a practice project to prepare for the A-level NEA. AS NEA projects cannot be 'developed' in order to be entered for the full A-level. **NEA Preparation** Investigate possible contexts that are suitable for the A-level NEA. Care should be taken to ensure that any chosen context, offers scope and complexity appropriate for the award of an A-level. Students are likely to need time to explore possible options before deciding on their final context.
Week 6	Performance characteristics of materials (TP) Metals	
Week 7	Performance characteristics of materials (TP) Polymers	
Term 1.2	**Half term**	
Week 8	Design methods and processes (DMP)	
Week 9	Design theory (DMP)	
Week 10	Technology and cultural changes (DMP)	
Week 11	Design processes (DMP)	
Week 12	Critical analysis and evaluation (DMP)	
Week 13	Selecting appropriate tools, equipment and processes (DMP)	
Week 14	Accuracy in design and manufacture (DMP)	
Term 2.1	**Christmas break**	
Week 15	Responsible design (DMP)	
Week 16	Design for manufacture (DMP)	

Week 17	Enhancement of materials (TP)	
Week 18	Forming, redistribution and addition processes (TP)	
Week 19	Forming, redistribution and addition processes (TP)	
Week 20	Forming, redistribution and addition processes (TP)	
Week 21	The use of finishes (TP)	
Term 2.2	**Half term**	
Week 22	The use of finishes (TP)	
Week 23	Modern and industrial commercial practice (TP)	
Week 24	Digital design and manufacture (TP)	
Week 25	Product design and development (TP)	
Week 26	Health and safety (TP)	
Week 27	Design for manufacturing, maintenance, repair and disposal (TP)	
Week 28	Enterprise and marketing in the development of products (TP)	
Term 3.1	**Easter break**	
Week 29	Design communication (TP)	Start of NEA portfolio AO1 Section A – Identifying and investigating design possibilities (20 marks) Rationale for chosen context clearly identified.
Week 30	Internal exams – AS external exams	
Week 31	Technology and cultural changes (A-level specific) (DMP)	

Week 32	Design processes – prototype development (A-level specific) (DMP)	Investigation including: disassembly, practical experimentation, visits, surveys and interviews, focus groups, primary and secondary research. Investigation material thoroughly analysed and initial concepts generated. AO1 Section B – Producing a design brief and specification (10 marks) Produce a clear and challenging design brief and fully detailed design specification reflecting thorough consideration of investigations undertaken.
Week 33	Design processes (A-level specific) (DMP) – iterative design in commercial contexts	
Term 3.2	**Half term**	
Week 34	Design theory (A-level specific) (DMP)	AO2 Section C – Development of design proposal(s) (25 marks) Generate design proposals that take full account of the design brief and specification. Design proposals should reflect on first concepts and may use a variety of media in the development of a prototype that can be manufactured by the student. Constant reference to the design brief and design specification should be evident. Modelling is a key element of this assessment criterion. Produce a comprehensive and fully detailed manufacturing specification.
Week 35	Design theory (A-level specific) (DMP)	
Week 36	Selecting appropriate tools, equipment and processes (A-level specific) (DMP)	
Week 37	Responsible design (A-level specific) (DMP)	
Week 38	Design for manufacture and project management (A-level specific) (DMP)	

Year 2		
Term 1.1		
Week 1	National and international standards in product design (A-level specific) (DMP)	A02 Section C – Continued
Week 2	Performance characteristics of materials (A-level specific) (TP)	
Week 3	Performance characteristics of materials (A-level specific) (TP)	
Week 4	Performance characteristics of materials (A-level specific) (TP)	
Week 5	Performance characteristics of materials (A-level specific) (TP):	
Week 6	Performance characteristics of materials (A-level specific) (TP)	
Week 7	Forming, redistribution and addition processes (A-level specific) (TP)	
Term 1.2	**Half term**	
Week 8	Forming, redistribution and addition processes (A-level specific) (TP)	A02 Section D – Development of design prototype(s) (25 marks) Manufacturing a prototype using all potential resources, tools machines and equipment to a high level. On-going development and directly related to the
Week 9	Forming, redistribution and addition processes (A-level specific) (TP)	
Week 10	The use of finishes (A-level specific) (TP)	
Week 11	The use of finishes (A-level specific) (TP)	

Week 12	Modern and industrial commercial practice (A-level specific) (TP)	design proposals. On-going testing and evaluation
Week 13	Modern and industrial commercial practice (A-level specific) (TP)	
Week 14	Digital design and manufacture (A-level specific) (TP)	
Term 2.1	**Christmas break**	
Week 15	Digital design and manufacture (A-level specific) (TP)	A02 Section D – Continued
Week 16	Digital design and manufacture (A-level specific) (TP)	
Week 17	The requirements for product design and development (TP)	
Week 18	Protecting designs and intellectual property (TP)	
Week 19	Design for manufacturing, maintenance, repair and disposal (TP)	
Week 20	Feasibility studies (TP)	
Week 21	Enterprise and marketing in the development of products (TP)	
Term 2.2	**Half term**	
Week 22	Modern manufacturing systems (TP)	A03 Section E – Analysing and evaluating (20 marks) On-going analysis and evaluation that informs the manufacture of the prototype. Testing and fitness for the needs of the client/user. Critical analysis of the final prototype. Modifications and improvements including consideration of levels of production.
Week 23	**Internal exams**	
Week 24	Detailed product study	
Week 25	Detailed product comparison	
Week 26	Detailed product analysis	

Week 27	Exam preparation – Exam technique	
Week 28	Exam preparation – (TP)	
Term 3.1	**Easter Break**	
Week 29	Exam preparation – (TP)	Internal moderation and submission of NEA centre marks to AQA.
Week 30	Exam preparation – (TP)	
Week 31	Exam preparation – (DMP)	
Week 32	Exam preparation – (DMP)	
Week 33	Exam preparation – (DMP)	
Term 3.2	**Half term**	
Week 34		
Week 35	External exams Paper 1 – Dates (TBC) Paper 2 – Dates (TBC	

The A-level course includes all of the specification content of the AS, but most areas include greater detail or depth if following the A-level course. There are also additional specification items in the A-level that are not included at AS. These are highlighted throughout the scheme of work in the first year, but revisited in the second year to allow for co-teachability where desired by schools and colleges. (Indicated by **A-level additional content**)

Example content

Year one

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 1	3.1.1: Materials and applications Classification of materials A-level additional content: Elastomers	Become familiar with a wide range of specific materials and their uses. Be able to identify the classification or group to which they belong.	Physical and working characteristics of materials: malleability/toughness/ hardness etc. Analysis of data from material testing. Calculation of quantities of materials sizes and costs.	**Starter** Explore existing knowledge of material classifications. Use the familiar materials from the GCSE specifications. Introduce the combining of core technical principles from GCSE at A-level. **Activities** • Investigate classifications of materials – Using a collection of product images; match the product to the correct material. • Using the correct product and material, categorise further into the appropriate classification group. • Establish definitions of mechanical and physical properties. **Homework/independent study** Issue students with supplementary information on material properties and testing or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 2	3.1.1: Investigating and testing materials	Have knowledge of a range of comparative workshop tests.		**Starter** Recall activity using materials from week 1 – mini whiteboard Q and A. Using new images

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		Be able to suggest appropriate workshop tests.		identify material/classification and relevant property. **Activities** • Students can design and perform their own workshop tests on a range of materials. • Predict the results before testing and compare with the results of the samples tested. • Recalling definitions of mechanical and physical properties from week 1 and using the first-hand knowledge gained from testing, identify products that exemplify the property. • Videos of laboratory material testing are available online and can be used to compare the processes to the equivalent workshop tests. **Homework/independent study** Issue students with supplementary information on performance characteristics of materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 3	3.1.2: Performance characteristics of materials Papers and boards	Have knowledge of specific papers and boards along with their performance characteristics. Understand how they	Efficient use of materials in the construction of containers through 2D net design. Effective selection of materials to allow for	**Starter** Recall activity using materials from week 2 – introduce an exam style question covering material properties. Go through a model answer or mark scheme. Students should collate these across the year to assist their future revision.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	A-level additional content: • watercolour paper painting • composites • tungsten carbide • concrete, including reinforced concrete • fibre cement.	can be shaped and formed and how detail can be added through a range of printing techniques. Understand that materials can be combined to produce an enhanced material. Be able to explain and identify the suitability of composites for a given application.	recyclability, biodegradability and stability.	**Activities** • Investigate paper and board products and identify the material used by its appearance and suitability for use. • Disassemble a series of cardboard packages to identify the different nets used. Using a paper and board handling collection, get students to record individual materials and properties. • Explore Avento CFRP Helmets. Make notes on the stages of production. **Homework/independent study** Issue students with supplementary information on performance characteristics of materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 4	3.1.2: Performance characteristics of materials • Polymer based sheet and film • Biodegradable Polymers	Have knowledge of specific polymer based sheet and film along with their performance characteristics. Be able to justify their use in a range of different applications. Be able to explain and identify the suitability of biodegradable polymers		**Starter** Recall activity using materials from week 3 – mini whiteboard Q and A. Using product images identify the correct paper or board and composite used. **Activities** • Investigate a range of polymer-based sheets and explore their ability to be shaped, joined and finished. • Explore the rise of biodegradable packaging

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	A-level additional content: Polyhydroxyalkanoate (PHA)	for a given application. Understand how biodegradable polymers degrade.		and research both the positive and negative arguments. • Compare a biodegradable cup with a polymer equivalent – draw conclusions about the environmental impact. • Compare a water-soluble detergent sachet with a more traditional packaged version – draw conclusions about their benefits to the consumer. **Homework/independent study** Issue students with supplementary information on performance characteristics of materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 5	3.1.2: Performance characteristics of materials • Woods • Smart and modern materials A-level additional content: • planed all round (PAR) • timber mouldings • steam bending • machining qualities	Understand the term stock forms and be familiar with timber conversion. Have knowledge of timbers and their performance characteristics. Be able to explain and identify the suitability of a range of timbers for a given application.		**Starter** Recall activity using materials from week 4 – Introduce an exam style question covering biodegradable polymers. Go through a model answer or mark scheme. **Activities** • Visit a local timber merchant to see the range of stock sizes of timber available. • Using a hardwood/softwood and manufactured board, select three relevant products and illustrate the journey from source through to manufacturing.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	• moisture resistance • toxicity • aeroply.	Understand the term smart material and be able to explain their suitability for a given application. Be able to identify how the material responds to changes in external stimuli.		• Research the steam bending process used to produce components parts of a Windsor chair. This can be demonstrated in the workshop if a steam chamber is available. Can be linked to material testing to illustrate the change in material characteristics. • Using a flexible thermochromic thermometer, produce a themed product for a baby's nursery. • Complete a prepared worksheet as a revision aid – 'Smart Materials and their uses'. Categorise those that react to changes in light, temperature and pressure **Homework/independent study** Issue students with supplementary information on performance characteristics of materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 6	3.1.2: Performance characteristics of materials Metals A-level additional content: • H beam • I beam • thermal conductivity	Understand the range of stock forms of metal. Be able to describe the performance characteristics of metal. Be familiar with a range of specific metals from the classifications: • ferrous		**Starter** Recall activity using materials from week 5 – mini whiteboard Q and A. Using product images identify the correct 'smart' material for a given application. **Activities** • Using the classifications of ferrous metals and ferrous alloys, identify products in the department that are manufactured from

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	• electrical conductivity • melting points • cast iron • gold • titanium • brass • duralumin • pewter.	• non-ferrous • ferrous alloys • non-ferrous alloys.		each. Investigate the desirable properties required that make the material suitable. • Gain practical familiarity of the properties and aesthetics through a product handling collection of metals products. • Record images of the products and materials; Research the original source material, working properties and characteristics. Compile these in to a power point presentation. **Homework/independent study** Issue students with supplementary information on performance characteristics of materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 7	3.1.2: Performance characteristics of materials Polymers A-level additional content Melting points	Understand the range of stock forms of polymers. Be able to describe the performance characteristics of polymers. Be familiar with a range of specific polymers from the classifications: • thermoplastic • thermosets.		**Starter** Recall activity using materials from week 6 – introduce an exam style question covering the classification of metals. Go through a model answer or mark scheme. **Activities** • Introduce the SPI codes. • Using a product handling collection of polymer products identify the polymer used by the SPI resin identification codes. • Record images of the products and SPI

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				codes; identify the polymer its working properties and characteristics. Compile these in a power point presentation. **New topic preparation** In preparation for moving into Design and Making principles and to support the initial launch and delivery of the NEA, students should use the half term break to read around the subject and develop knowledge of product design in wider society. Websites such as yankodesign.com, dexeen.com/ or dexigner.com could provide insight.
Autumn half term				
Week 8	3.2.1: Design methods and processes	Gain an understanding of the iterative design process. Appreciate the role that user centred design fulfils and be familiar with methods of primary and secondary investigation.	Representation of data used to inform design decisions and evaluation of outcomes. The use of ergonomic and anthropometric data when designing for humans and specific applications.	**Starter** Review the investigation methods used while undertaking their GCSE. What worked well? What information truly influenced the design decisions that students made? **Activities** • Using the NEA context explore design methods that can be used in the NEA folio, discuss the merits of each. How can they be undertaken? • Establish a focus group and observe how potential users interact with a relevant product eg children interacting with a toy for

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				the first time. • Gather the anthropometric data of the class and determine the 5th/50th and 95th percentile of height etc. This can be done with height or width of hand etc. **Homework/independent study** Issue students with supplementary information on design styles or key design movements or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 9	3.2.2: Design theory • Design influences • Designers and their work A-level additional content Design styles and movements	Be aware of the key historical design styles, design movements and influential designers and the role they played in shaping product design and manufacture.		**Starter** Recall activity using materials from week 8 – mini whiteboard Q and A. Define ergonomics and anthropometrics and explain how designers make use of each. **Activities** • Using a range of iconic design products, identify the elements, materials or features that are synonymous with a range of design movements eg the sunburst element for Art Deco. • Create a timeline illustrating the major design movements of the 20th century. • In groups research the iconic pieces or products that are attributed to a particular designer. What makes them iconic? Display the images on a 'hot or not' board, students

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				should explain their arguments for or against. • Focusing on Dieter Rams' 10 principles for good design. Identify iconic products that meet some of the principles. • Compare the work of Dieter Rams and Jonathon Ives. Can they find any similarities? **Homework/independent study** Issue students with supplementary information on major developments in technology or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 10	3.2.3: How technology and cultural changes can impact on the work of designers: • Socio economic influences • Major developments in technology • Social, moral and ethical issues A-level additional content Product life cycle	Understand how socio economic influences have helped shape product design and manufacture. Be able to discuss how major developments in technology have shaped product design and manufacture. Be aware of social, moral and ethical responsibilities of a designer.	An awareness of scientific advancements/discoveries and their potential development.	**Starter** **Group discussion:** What has been the biggest factor or development in technology that has taken place in the last 20 years? **Activities** • Group work – Allocate a decade to members of the class. Research and produce a presentation to cover the major technological advancements that took place during that period. Link these to prominent designers or products. • Focus on a particular product and document its development over time eg the torch – covering batteries, bulbs, micro-electronics

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				etc. • Investigate how manufacturing methods and material development have influenced the production of a piece of sports equipment eg The tennis racket or the bicycle. • Define and illustrate the six Rs of sustainability. • Explore how sustainable materials are being used as replacements for more traditional materials eg bamboo and recycled rubber.
Week 11	3.2.4: Design processes A-level additional content: • the use of the design process in the NEA • prototype development • iterative design process in industrial or commercial contexts.	Be aware of and able to discuss and implement a range of design processes.		**Starter** In small groups individuals start to generate an idea for a given product. After a certain period of time the designs are passed around and further developed and finally annotated. This can continue until the design arrives back at the start. Variations include adding further specifications as the task takes place eg must be lightweight/used outdoors/methods of construction/materials etc. **Activities** • Using their current project, context or NEA if following the AS course, context, explore how a mood board can be used to help generate ideas for a particular target market. • Case study – Investigate how 'Under

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Armour' has used generative design in the development of their 3D printed trainer. **Link to NEA** Students should explore alternative methods of idea generation to further develop their NEA. Study the approaches used by the product designer productank.
Week 12	3.2.5: Critical analysis and evaluation	Be able to critically analyse and evaluate the work of others and the student's own project work. Understand how commercial products are tested and evaluated. Be aware of the role of third party feedback in the testing and evaluation process.		**Starter** Group discussion: Why is it important for designers and manufactures to test and evaluate their designs before being launched in the market place? **Activities** • Critically assess an existing product and suggest developments. Ideally this would be a hands on exercise, but online videos can help provide greater detail if needed. Use criteria such as safety, usability, manufacture. Produce a new product proposal eg Children's seating. • Case Study: Trunki – Product testing. See the extensive product testing that takes place before a product goes to market, also highlight how user feedback and focus groups have influenced design improvements. A supporting video resource

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				can be found on the STEM website. **Link to NEA** Students should evaluate their initial ideas against their initial design specification. Where possible incorporating third party feedback and the thoughts of their client or user group.
Week 13	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.	Be aware of, discuss and demonstrate good and safe working practice. Understand and be able to identify the correct tools and equipment for a specific task. Understand and be able to identify the most appropriate manufacturing process to realise their or others design proposals.		**Starter** Group discussion: Critical analysis - display an image of a product on the board and gain analysis from the group. If you also have the physical product, students can interact with it and then add to/adjust their initial comments. **Activities** • Using a range of workshop tools, establish the correct working practice and identify the range of materials with which they can be used. This can be done in a workshop environment or picture cards linking tools and materials could be used. • 'How it's made' Using either real products or a selection of initial ideas from the groups NEA. Discuss the most appropriate method of manufacture. • Compare a range of similar tools such as saws and identify which materials could be used with each and what specific

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				action could take place eg hacksaw/coping saw/tenon saw/jig saw/fret saw. What are the pros and cons of each? **Homework/independent study** Issue students with supplementary information on jigs, templates and fixtures or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 14	3.2.7: Accuracy in design and manufacture	Be aware of the importance of accuracy in manufacture. Understand how to eliminate errors. Understand how jigs, templates and fixtures can be used to increase accuracy and reduce human error.	Determining quantities of materials. Calculations of sides and angles of products. Use of geometry to create templates for designs.	**Starter** Recall activity using materials from week 13 – mini whiteboard Q and A. Using tool images, identify its correct use and identify the material that it is intended to be used with. **Activities** Group work – Using a small product such as key ring or coat hook. Produce a one off outcome and then design and manufacture a jig or fixture to improve accuracy. Compare the tolerances of the two outcomes. **Link to NEA** Students should explore the prototype from their NEA and identify any process or component whose accuracy may be improved by the use of a jig, template or fixture.
Christmas break				

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 15	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.	Be aware of the importance of environmental issues in design and manufacture. Understand the responsibilities in the use of sustainable materials and components. Be aware of the environmental impact of packaging. Be aware of methods to conserve energy resources and the concept of circular economy.		**Starter** Recall activity using materials from week 14 – mini whiteboard Q and A. What are the definitions of a **template**, **jig** and **fixture**? **Activities** • Analyse the packaging design of a mobile phone or small electronic device. Redesign and develop the packaging to reduce its environmental impact. • Take a product and undertake a study into its environmental impact from raw material extraction, manufacture and disposal. • Critically analyse how a product can be maintained to extend its durability. **Homework/independent study** Research the manufacture of the BMW Mini. Try to identify all of the quality control measures that take place throughout its manufacture. Issue students with supplementary information on quality control or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 16	3.2.9: Design for manufacture • Planning for accuracy and	Be aware of and be able to demonstrate how to plan for accuracy and efficiency.		**Starter** **Group discussion:** List the quality control measures that BMW mini or other car manufacturers use. Watch an MP4 clip and

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	efficiency • Quality control A-level additional content: • accuracy in scale production • quality assurance • go/no-go gauges, laser scanning and measuring • non-destructive testing.	Understand and be able to demonstrate quality control measures.		add/clarify any additional detail. Take note of the definitive list. **Activities** • Gather all the measuring devices that are commonly found in a school workshop. Arrange the devices by the level of accuracy that can be achieved when in use eg steel rule, vernier callipers, digital callipers. Demonstrate their correct use and function. • Using a range of measuring devices, analyse a building block from a child's modular kit. Identify the tolerance needed for the blocks to successfully connect. Use a 3D printer and the measurements gained to produce an accurate accessory that will connect to the kit. • The same exercise can be adjusted to cover CAD skills/orthographic drawing and dimensioning. **Homework/independent study** Issue students with supplementary information on enhancement of materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 17	3.1.3: Enhancement of materials • Polymer	Understand the range of enhancement methods used on materials.	Understand the appropriate use of materials, including polymers, composites, woods and based on their	**Starter** Recall activity using materials from week 16 – mini whiteboard Q and A. Using measuring tool

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	enhancement • Wood enhancement • Metal enhancement	Understand how additives can be used to enhance polymers in use and disposal. Understand how wood can be enhanced to improve strength and aesthetics. Understand how heat treatment can be used to enhance the properties of metals	physical properties.	images, identify their correct use. **Activities** • Walk around the school grounds and identify polymers that have degraded due to exposure to UV. Focus on outdoor seating, polymer rubbish bins etc. Notice the discolouration and brittleness. • Produce a document that provides both the positive and negative arguments for the use of bio batch additives in polymers. • Issue students with a range of 30x30 plywood samples. Apply available finishes to the test pieces and compare their method of application, aesthetics and durability. Photograph the results and annotate. • Practical demonstration or focused task. Using some small low carbon steel samples heat treat using the brazing hearth to harden. Compare hardness vs an untreated piece by cutting or filing. Temper a sample and note the tempering colours **Homework/independent study** Issue students with supplementary information on forming, redistribution and addition processes (papers and boards – wood processes) or refer

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				them to an AQA approved textbook – read and explore the content for the next lesson.
Week 18	3.1.4: Forming, redistribution and addition processes • Paper and board forming processes • Wood processes Introduce joining methods, adhesives and fixings along with the use of jigs and fixtures where appropriate A-level additional content Wood processes: • coach bolts • milling.	Understand the methods that can be used to shape paper and board. Understand the methods that can be used to join and fabricate wood and wooden products. Understand the methods used to shape wood into 3D products.	Dimensions and angles in the design of jigs fixtures and templates.	**Starter** Recall activity using materials from week 17– mini whiteboard Q and A. Connect the correct surface finish for timber with a given situation eg preservatives for timber fencing. **Activities** • Redesign the cardboard packaging for a small product of their choice. This can be combined with a small modelling task in Styrofoam. • Focus on developing a full size laser cut net eg a Christmas cracker or small gift box. • Introduce calculating area and material costing along with efficient use of material and tessellation. • Add graphics and labelling using markers or CAD • Create an embossing die using a 3D printer. • Product disassembly – explore the knock down fittings and materials used in a small piece of IKEA furniture. • Practical task – Manufacture a simple Styrofoam mould to produce a laminated

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				salad server **Homework/independent study** Issue students with supplementary information on forming, redistribution and addition processes (polymer processes) or refer them to an AQA approved textbook – read and explore the content for the next lesson. Visit the British Plastics Federation website Plastipedia and study the animations of the polymer manufacturing processes.
Week 19	3.1.4: Forming, redistribution and addition processes • Polymer processes • Introduce joining methods, adhesives and fixings along with the use of jigs and fixtures where appropriate A-level additional content: Calendering	Understand the methods that can be used to shape polymers into 3D products. Be able to identify and explain the forming methods used to produce a specific product. Understand how scales of production influence the choice of polymer process.		**Starter** Recall activity using materials from week 18, Students should provide commentary to the animations found on Plastipedia or equivalent source. **Activities** • Using a polymer product handling collection identify features that indicate the moulding process used eg ejector pin marks/mould lines, living hinges • Produce a small vacuum form moulding. Explore draft angles and understand the limitations of the process. • Practical demonstration – Using two halves of a vacuum form moulding and a quick setting liquid resin, demonstrate the concept

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				of rotational moulding. • Practical task – Using a low metal glue gun to simulate injection moulding. The mould can be manufactured from acrylic on a laser cutter or thin plywood sandwiched between two outers. **Homework/independent study** Issue students with supplementary information on forming, redistribution and addition processes (metal processes) or refer them to an AQA approved textbook – read and explore the content for the next lesson. Using online sources study the animations of the metal manufacturing processes.
Week 20	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	Understand the methods that can be used to shape metals into 3D products. Be aware of the permanent and temporary joining methods that can be for metal. Understand the wastage processes that can be used to shape metal.		**Starter** Recall activity using materials from week 19, Students should provide commentary to the animations found online. **Activities** • Using a metal product handling collection identify the most appropriate manufacturing process used. • Compare the processes spinning and press forming. Both can be used to produce similar outcomes, but why is one chosen of the other for certain applications?

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	• deep drawing • investment casting • mig welding • tig welding • spot welding • oxy- acetylene welding • machine screws • flame cutting • plasma cutting • laser cutting.			• Practical task - using a low temperature casting system. Design and manufacture a key ring or piece of jewellery from pewter. • Practical demonstration. Use a series of standard samples of aluminium to illustrate the range of mechanical fastenings available. **Homework/independent study** Issue students with supplementary information on the use of finishes, or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 21	3.1.5: The use of finishes • Paper and board finishing • Paper and board printing processes	Understand how papers and boards can be finished to improve their function, performance and aesthetic. Be aware of the printing processes that can be used and their suitability for specific products and scales of production.		**Starter** **Group discussion:** Explore the base knowledge around the topic of finishes for paper and board**.** Use a prepared slide of keywords for students to try and define or link. This will be particularly important for students that have not specialised in this area at GCSE. **Activities** • Using a paper and board handling collection, identify the use of techniques such as embossing and spot varnishing on gift cards packaging and promotional material. • Create a resource or powerpoint that illustrates the finishes, their function and the method of production or application.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				• Explore online to see practical examples of the printing processes. **Homework/independent study** Issue students with supplementary information on the use of finishes, or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Spring Half term				
Week 22	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.	Understand how polymers, metals and woods can be finished to improve their function, performance and aesthetic. Be aware that some polymers are self-finishing. Be aware that finishes on wood can be aesthetic and also help prevent decay.	Ensure products are designed to take account of potential corrosion due to environmental factors.	**Starter** **Group discussion:** Explore the base knowledge around the topic of finishes for polymers, metals and woods. Use a pre-prepared slide of keywords for students to try and define and connect the finish to the correct material. **Activities** • Walk around your school site and identify a range of finishes used in outdoor products. Photograph the object and research how the finish has been applied and explain how it protects the base material eg galvanised school fencing • Explore online sources to see practical examples of the powder coating process. • Practical demonstration – use a fluidising tank or powdered polythene to demonstrate

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				the process of dip coating. **Homework/independent study** Issue students with supplementary information on scales of production, or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 23	3.1.6: Modern and industrial commercial practice Scales of production A-level additional content: • unit production systems (UPS) • quick response manufacturing (QRM) • vertical in house production • the use of computer system • modular cell production • flexible manufacturing systems • sub assembly • efficient use of	Be aware of the different scales of production and be able to provide specific examples to illustrate each. Understand how computer systems are used in production/distribution and storage. Understand JIT and QRM.	Determining quantities of materials.	**Starter** **Group discussion:** Explore the base knowledge around the topic of scales of production**.** mini whiteboard Q and A. Define the terms one-off, bespoke, batch and mass/line production. Illustrate each with a range of appropriate examples. Complete a prepared worksheet with the comments from the class. **Activities** • Watch Life of a bolt – Red Bull racing. What are the pros and cons of this system against the company using a standard bought in component? • Watch How it's made – steel and aluminium • Case study – the manufacture of Morgan cars, BMW Mini, Tesla. Research the three manufactures and make note of the different scales of production? How much automation takes place? How do the manufacturing processes differ? • Research companies that make use of the

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	materials.			JIT production system. What flexibility does it offer the manufacturer? What are the risks? **Homework/independent study** Issue students with supplementary information on CAD and CAM, or refer them to an AQA approved textbook – read and explore the content for the next lesson. How has CAD changed the work of a product designer? What came before?
Week 24	3.1.7: Digital design and manufacture A-level additional content: • CAD in industrial applications • virtual modelling • rapid prototyping • electronic data exchange • production, planning and control networking (PPC).	Be aware of the role of CAD, its advantages and disadvantages. Understand how it can be used to develop and present work in 2D and 3D. Be aware of how virtual simulation can be used. Be aware of the role of CAM, its advantages and disadvantages.	Use of datum points and geometry when setting out design drawings. The use of tolerances in dimensioning. Calculating speeds and times for machining.	**Starter** **Group discussion:** Explore the base knowledge around the topic of CAD and CAM. mini whiteboard Q and A. Define the term CAD and CAM and generate an extensive list of the advantages and disadvantages of both. **Activities** • Using a 3D CAD package produce a visual representation of the candidate's final NEA piece. • Generate or create a dimensioned orthographic or assembly drawing of the Students NEA piece. • Practical task – Produce a small design manually and then again using CAM. Compare the two processes, considering speed, accuracy, quality etc.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Homework/independent study Issue students with supplementary information on inclusive design, or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 25	3.1.8: The requirements for product design and development Product development and improvement A-level additional content: • fitness for purpose • accuracy of production • consideration of aesthetics, ergonomics and anthropometrics • inclusive design.	Be able to critically analyse existing products and develop new design proposals. Understand how products need to meet specification criteria and be fit for purpose.		**Group discussion:** mini whiteboard Q and A. Using an object from one of the product handling collections, generate criteria that could have been used by the original design team. How well does the product perform? Could its performance or aesthetic be improved? **Activities** • Case study – evaluate the success of a design specification: the 2CV. Research the original design specification of the 2CV and see how well the first version met its requirements. • Group work – using an object in the classroom or a familiar product, critically analyse and suggest improvements. Compare the findings of the group. • Link the assessment of an existing product to the critical evaluation of the final NEA outcomes of the group. Use this third party feedback to suggest improvements to the NEA prototype. **Homework/independent study**

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Issue students with supplementary information on health and safety, or refer them to an AQA approved textbook – read and explore the content for the next lesson. Identify safety warnings and symbols that are found on domestic products.
Week 26	3.1.9: Health and safety	Be aware of safe working practices, the legislation and agencies responsible for health and safety. Be able to identify and take precautions to limit the potential hazards in a school workshop. Understand the legislation set out to protect consumers.	Understand why some materials, adhesives and finishes are hazards.	**Group discussion:** mini whiteboard Q and A. Using a pre prepared slide of symbols and health and safety markings, discuss as group what they represent and identify specific products where they may be found. Complete a prepared worksheet for future reference. **Activities** • Gather a range of products from the workshop that displays a COSHH hazard symbol. Use the Internet to research the accompanying data sheet. • Generate a risk assessment for one of the processes that they have used in the manufacture of their NEA eg use of a centre lathe or handheld router. **Homework/independent study** Issue students with supplementary information on manufacture, repair and disposal, or refer them to an AQA approved textbook – read and

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				explore the content for the next lesson.
Week 27	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.	Be aware of how the choice of material affects the use, care and disposal of products. Be aware of how products can be designed to be easy to disassemble and materials labelled to aid separation. Understand the six Rs of sustainability.		**Starter** Recall activity using materials from week 26 – mini whiteboard Q and A. Define COSHH, what legislation exists to protect consumers? **Activities** • Using a bicycle, identify the components that can be maintained and those that are disposed at the end of life. Identify how the designer has considered maintenance. What are the advantages and disadvantages to the user? • Research how bamboo and PLA have been used in products as more eco-friendly material alternative. • Dissemble a small product such as torch or small radio. How easy is it to disassemble? Has any thought been given to maintenance? Are there any mouldings or fixtures that have been used to reduce the amount of components or to aid assembly? **Homework/independent study** Issue students with supplementary information on enterprise and marketing in the development of products, or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 28	3.1.13: Enterprise and marketing in the development of products A-level additional content: • global marketing • costings and profit • entrepreneurs.	Be aware of the importance of marketing and brand identity.	Interpretation of market research data, calculating costs and profit.	**Starter** Recall activity using materials from week 26 – mini whiteboard Q and A. Define the six Rs of sustainability. **Activities** • Develop a new product concept that could be launched by an established brand. The product should display a clear brand identity and be instantly recognisable eg a new digital concept for Crayola. The next product in the household range from Joseph Joseph. • Explore recent degree show booklets from product design schools to gain inspiration. This could also provide valuable UCAS research.
Easter				
Week 29	3.1.12: Design communication	Be aware of a range of communication and presentation techniques used for conveying design proposals to clients.	Scaling drawings. Representation of data used to inform design decisions and evaluation of outcomes. Presentation of market data, user preferences and outcomes of market research.	**Starter** Recall activity using materials from week 26 – mini whiteboard Q and A. Define the six Rs of sustainability. **Activities** • Produce of series of promotion product boards using their NEA outcome to present to potential clients or users. Use a range of media to enhance the presentation.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				• Introduce the maths skills needed to interpret graphs tables and charts. **Revision preparation** Issue students with a checklist of the specification content for them to self-assess their knowledge. RAG rate the content, this can then be used to fine tune the remaining lessons in the build-up to the external exam.
Week 30	Internal exams or external as papers This week can be moved as necessary to accommodate individual school or college's requirements			
Week 31	3.2.3: Technology and cultural changes Product lifecycle	Understand how socio economic influences have helped shape product design and manufacture. Be able to discuss how major developments in technology have shaped product design and manufacture. Be aware of social, moral and ethical responsibilities of a designer. Be familiar with the concept of product	An awareness of scientific advancements/ discoveries and their potential development.	**Starter** Recap the material from the first year and develop depth. Using a prepared resource, highlight the major landmark events that helped shaped product design and manufacture. Highlight key dates, new materials and manufacturing processes. **Activities** • Develop greater depth of knowledge on developments in technology. Undertake a case study of an electrical product such as a personal stereo or camera, identifying the developments over time. • Using a selection of iconic product images from key movements. Identify common materials, manufacturing processes and finishes. What common features and styles

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		lifecycle. Understand how designers refine and re-develop products in the lifecycle of a specific product.		can be identified? Eg chairs • Focus on an area such as micro-electronics. Research and present their findings on how elements of product design and manufacture have changed as the technology has developed. eg – sketching to CAD/destructive testing to FEA. • Research the work of Trevor Bayliss. Explore how his clockwork radio was used in South Africa to help spread health information. Paying particular attention to how the specification for the radio was developed from a specific user group. • Using the phase, introduction, growth, maturity, decline, illustrate the product lifecycle of a product of their choice. **Homework/independent study** In preparation for covering prototype development. Students should produce a visual timeline of the development journey of a previous project.
Week 32	3.2.4: Design processes • The use of a design process • Design processes used in the NEA • Prototype	Be aware of and be able to discuss and implement a range of design processes. Be aware of the stages of the design process		**Starter** Recap the material from the first year and develop depth. **Group discussion:** Using their visual image boards students should discuss the development process of their chosen project. What decision did they take that influenced the outcome? How

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	development	used in the NEA. Be aware of and able to discuss and demonstrate the development of a prototype from a design proposal.		had the investigation that they had undertaken influence their final prototype? **Activities** • Link to A-level NEA – Explore strategies to determine the needs of the client, target market or user. • Undertake a meeting or consult user groups to identify key requirements needed to be able to generate a design specification. What does the prototype need to do, are there any specific performance requirements it must meet? • Research any standards or guidelines that the prototype must meet. British standards, safety standards etc. • In small groups undertake the De Bono thinking hats exercise. Each coloured hat analyses a design concept from a different viewpoint. How can the discussion help develop a product or idea. **Homework/independent study** In preparation for covering collaborative working. Students should individually generate a series of initial ideas for a simple design task such as measuring children or hanging clothes.
Week 33	3.2.4: Design processes	Be aware of and be able to discuss and		**Starter**

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	Iterative design in commercial contexts	implement a range of design processes. Understand how different design methodologies are used by designers in the corporate world including, collaborative working and the cyclic nature of commercial design and manufacture.		Recap the material from the first year and develop depth. **Group discussion:** What are the potential issues when designing in isolation? What opportunities may collaborative design offer a designer? **Activities** • Using the child measuring brief or clothes hanger, individuals should present their ideas. Record the variety of different approaches, materials, and designs created. Are there any common features across the group? • Building on the group exercise, explore the methodology of collaborative design. Generate a range of initial concepts for their NEA, present to the group and gain feedback and inspiration to further develop areas such as aesthetics, function and materials. **Homework/independent study** In preparation for covering **design theory**, allocate a different design movement to members of the group. Issue students with supplementary information on **design movements** or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Summer half term				
Week 34	3.2.2: Design theory Design styles and movements	Be aware of the key historical design styles, design movements and influential designers and the role they played in shaping product design and manufacture.		**Starter** Recap the material from the first year and develop depth. **Individual presentation:** Members of the group can begin the lesson with a short overview of their chosen design movement. Dates, key figures, styles etc. **Activities** • Develop greater depth of knowledge of key design styles or movements • Produce a display board that focuses on the iconic products produced, materials and manufacturing processes used, and key features that contribute to each style or movement. **Homework/independent study** Students will need to be taught how this information will be recalled and used in the written paper. Introduce a sample question for students to research in an open book exercise. Using an appropriate product example, explain how it conforms to the design theory of form follows function. In their answer, they should reference a specific design movement.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 35	3.2.2: Design theory Design styles and movements	Be aware of the key historical design styles, design movements and influential designers and the role they played in shaping product design and manufacture.		**Starter** **Worked question example:** Members of the group can begin the lesson contributing to create an essay plan or mind map around the material to answer the question. Mark scheme can be found in specimen paper 2 (Q3) **Activities** • Focusing on 'Dieter Rams' 10 principles for good design. Identify iconic products that meet some of the principles. • Compare the work of Dieter Rams and Jonathon Ives. Can they find any similarities? There are several resources that can be found online to help illustrate the work of Dieter Rams and Ives.
Week 36	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	Be aware of, discuss and demonstrate good and safe working practice. Understand and be able to identify the correct tools and equipment for a specific task. Understand and be able to identify the most appropriate manufacturing process		**Starter** Recap the material from the first year and develop depth. **Group discussion:** Critical analysis: Display an image of a product on the board and gain analysis from the group. If you also have the physical product, students can interact with it and then add to/adjust their initial comments. **Activities** • Research how companies use prototypes to

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	need for batch and mass manufacture • The importance of health and safety in a commercial setting including workforce training and national safety standard	to realise their or others' design proposals.		help the development of mass produced products. Compare the many iterations of Dyson's DC1® with a concept car such as a TVR®. • Watch a manufacturing video of a mass-produced product – How it's made. While watching, list the obvious differences between a commercial setting and your school workshop. How do health and safety practices differ? **Homework/independent study** Issue students with supplementary information on conservation of energy and resources or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 37	3.2.8: Responsible design • Conservation of energy and resources • How products are designed to conserve energy, materials and components • The reuse of material offcuts, chemicals, heat and	Be aware of the importance of environmental issues in design and manufacture. Understand the responsibilities in the use of sustainable materials and components. Be aware of the environmental impact of packaging.		**Starter** Recap the material from the first year and develop depth. **Group discussion:** What different ways can the group identify that manufacturing industries reuse material waste, heat and water. **Activities** • Explore the measures that Apple take to limit their environmental impact when designing and manufacturing their range of electrical

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	water	Be aware of methods to conserve energy resources and the concept of circular economy.		products and packaging. How do other large companies compare? • Using a small product such as calculator or bike light**,** identify how it has been designed to conserve energy, materials and components – Consider its manufacture and its power source. • Look at the structure of the smart car factory Smartville as a model for positive environmental considerations. **Homework/independent study** Issue students with supplementary information on quality control or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week 38	3.2.9: Design for manufacture and project management
	• Planning for accuracy and efficiency
	• Quality assurance
	• Quality control
	  • Go/no-go gauges, laser or probe scanning and measuring
	  • Non-destructive
		Be aware of and be able to demonstrate how to plan for accuracy and efficiency.
		Understand and be able to demonstrate quality control measures.
		Be able to clear define both quality control and quality assurance.
				Starter
				Recap the material from the first year and develop depth.
				Group discussion: What is quality control and What is quality assurance? What are their key functions and how do they differ?
				
				Activities
				• Research the quality assurance system introduce by Motorola in the 1980s. What are the five key stages and how does each help

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	testing such as x-rays and ultrasound			in reducing and minimising defects within a manufacturing process? • Introduce the concept of critical path analysis. Use a familiar process of action (such as making a cup of tea) to help students understand the concept before introducing more challenging processes. • Using a project with which they are familiar, product a critical path analysis diagram to identify the critical path. • Investigate the use of a Go no go gauge and identify why it is used in favour of other measuring devices with which they are familiar? Identify situations where non-destructive testing would be used.

Year two

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 1	3.2.10: National and international standards in product design • Agencies – BSI/ ISO • Legislation – • ROHS/WEEE • Eco labelling – mobius loop • EC energy label • FSC	Be aware of and able to discuss the importance of national and international standards in product design.		**Starter** Test existing knowledge and understanding – mini whiteboard Q and A. What national or international standards are the group familiar with? What do they do or why are they important to the consumer or manufacturer? **Activities** • Research how BSI standards are applied and tested before a product reached the market place. • Investigate the WEEE directive and explore the measures that companies such as Dyson go to meet the directive. • Explore a range of products in various materials and identify the markings that they carry to indicate the standards that they conform to. Look for Mobius loop markings on polymer products and EC marks or battery directive icons on electrical products. **Homework/independent study** Refer students to supplementary information on papers, boards and woods or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity

Week 2	3.1.2: Performance characteristics of materials
	• Papers and boards
	Water colour paper
	• Woods:
	  • planed all-round (PAR)
	  • steam bending
	  • machining qualities
	  • moisture resistance
	  • toxicity.
		Have knowledge of specific papers and boards along with their performance characteristics.
		Understand how they can be shaped and formed and how detail can be added through a range of printing techniques.
		Understand the term stock forms and be familiar with timber conversion.
		Have knowledge of timbers and their performance characteristics.
			Efficient use of materials in the construction of containers through 2D net design.
			Effective selection of materials to allow for recyclability, biodegradability and stability.
				Starter
				Recap the material from the first year and develop depth.
				Test existing knowledge and understanding – Mini whiteboard Q and A. How many papers and boards can the group remember from the year one course?
				
				Activities
				• Gather swatches of a range of papers and boards and identify the correct material. Investigate the range of products that they are used in and how they relate to their properties.
				• Research the COSHH guidelines on timbers and identify the measures taken in your workshop to reduce the potential hazards connected with toxicity. Are there any woods that are particularly hazardous to work with?
				• View the steam bending process used to produce components parts of a Windsor chair online. This can be demonstrated in the workshop if a steam chamber is available. Can be linked to material testing to illustrate the change in material characteristics.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Homework/independent study Refer students to supplementary information on metals or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week 3	3.1.2: Performance characteristics of materials
	• Metals:
	  • structural – H and I beam
	  • thermal conductivity
	  • electrical conductivity
	  • melting points
	  • cast iron
	  • gold
	  • titanium
	  • brass
	  • duralumin
	  • pewter.
	• Composites
				Starter
				Recap the material from the first year and develop depth.
				Individual activity – Introduce the group to a typical question style found in Paper 1 – technical principles.
				Give two physical and two mechanical properties of the metal used for a kitchen sink. In each case, state why the property is suitable for this product.
				Activities
				• Explore online videos view how Moots manufacture bicycles from titanium. Note its properties, how it is shaped, joined and finished. Compare the process to Charge Bikes' 3D printing titanium bike parts.
				• Identify structures or applications that use I bean or H beam structural steel. Research how they are manufactured.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Homework/independent study Refer students to supplementary information on Polymers or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 4	3.1.2: Performance characteristics of materials • Polymers • Melting points	Understand the range of stock forms of polymers. Be able to describe the performance characteristics of polymers. Be familiar with a range of specific polymers from the classifications: • thermoplastic • thermosets.		**Starter** Recap the material from the first year and develop depth. **Individual activity –** Introduce the group to a typical question style found in Paper 1 – technical principles. Give two physical and two mechanical properties of the metal used for a kitchen sink. In each case, state why the property is suitable for this product. **Activities** • In groups produce a visual resource that illustrates the properties and common products manufactured from each polymer listed in the specification. Include abbreviations and SPI codes. • Compare the properties and manufacturing process of a piece of child's crockery. One that is manufactured from HDPE the other MF. Justify the choice of material for each.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Homework/independent study Refer students to supplementary information on elastomers and biodegradable polymers or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 5	3.1.2: Performance characteristics of materials • Elastomers • Biodegradable Polymers	Elastomers Be able to explain the suitability of elastomers for given applications Understand their physical and mechanical properties Be able to explain and identify the suitability of biodegradable polymers for a given application. Understand how biodegradable polymers degrade.		**Starter** **Test existing knowledge and understanding** – mini whiteboard Q and A. What are elastomers? Where are they used and what are their desirable properties? **Activities** • TPE is used to aid the grip of many handheld products analyse the benefits TPE provides the user by comparing a range of contrasting products. Eg hand held drill, toothbrush etc. • Using 'SUGRU' model ergonomic improvements to an existing product. • Group exercise - Investigate biodegradable polymers in order to debate the motion: Biodegradable polymers - the future? • Create a resource to illustrate common products that are manufactured from Biodegradable polymers. **Homework/independent study** Refer students to supplementary information on composites and smart and modern materials or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 6	3.1.2: Performance characteristics of materials • Metals	Understand that materials can be combined to produce an enhanced material.		**Starter** Recap the material from the first year and develop depth. Recall activity – mini whiteboard Q and A. Using

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	• Composites • Smart and modern materials	Be able to explain and identify the suitability of composites for a given application. Understand the term smart material and be able to explain their suitability for a given application. Be able to identify how the material responds to changes in external stimuli.		product images identify the correct composite used. **Activities** • Practical task/demonstration. Experiment with concrete casting. Vacuum form a mould or use flexible plastic crockery etc. Source inspiration from Pinterest. Experiment with different mixtures and include reinforcing using low carbon steel wire. Undertake a comparative test with an unreinforced sample. • Practical task/demonstration: Use PMC to produce a small badge or trinket, manufacture the same design in pewter using a low melt casting module. Compare the two-process look at speed, accuracy, safety, durability and cost. **Homework/independent study** Refer students to supplementary information on polymer processing and metal processing or refer them to an AQA approved textbook – read and explore the content for the next lesson. Explore online to view animations of the relevant manufacturing processes.
Week 7	3.1.4 Forming, redistribution and addition processes	Understand the methods that can be used to shape polymers into 3D		**Starter** Recap the material from the first year and develop depth.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity

	• Polymer processes:
	  • calendering
	• Metal processes:
	  • cupping
	  • deep drawing
	  • investment casting.
		products.
		Be able to identify and explain the forming methods used to produce a specific product.
				Recall activity – mini whiteboard Q and A. Using product images identify the correct polymer and metal manufacturing process.
				Activities
				• Find a video online to view how the polymer process calendering takes place. Investigate the manufacture of polythene bags and see how calendaring forms part of the manufacturing process.
				• There are also manufacturing videos that cover cupping and deep drawing. Compare the process to spinning and identify the advantages and disadvantages of each?
				Homework/independent study
				Refer students to supplementary information on metal joining or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Autumn half term				
Week 8	3.1.4 Forming, redistribution and addition processes Metal processes: • MIG and TIG welding • spot welding	Understand the methods that can be used to shape metals into 3D products. Be aware of the permanent and temporary joining methods that can be for		**Starter** Recap the material from the first year and develop depth. Recall activity – mini whiteboard Q and A. Using a pre prepared series of slides link the suitability of all metal manufacturing processes to the different scales of production.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	• oxy acetylene welding • machine screws • flame cutting • plasma cutting • laser cutting.	metal. Understand the wastage processes that can be used to shape metal.		**Activities** • Using a range of metal test pieces explore joining processes. Gain experience of joining metals by addition and by fabrication. What are the advantages and disadvantages of each? • Create a resource with images of the addition joining methods for metal. Identify the strengths and weaknesses of each and illustrate applications where they would be used. **Homework/independent study** Refer students to supplementary information on wood processes or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 9	3.1.4: Forming, redistribution and addition processes • Wood processes • Coach bolts/milling	Understand the methods that can be used to shape paper and board. Understand the methods that can be used to join and fabricate wood and wooden products. Understand the methods used to shape wood into 3D products.	Dimensions and angles in the design of jigs fixtures and templates.	**Starter** Recap the material from the first year and develop depth. Recall activity – mini whiteboard Q and A. Using a pre prepared series of slides identify the wood joint or joining method. **Activities** • Practical task – Explore traditional wood joints. Focus on marking out, accuracy and manufacture. Compare a hand-produced joint to one produced using a jig such as a

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				router with a dovetail jig. • Disassemble a simple flat pack product. Identify the KD fittings used. Create a resource with images of the knock down fittings and identify other products where they can be found. **Homework/independent study** Refer students to supplementary information on polymer finishing or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 10	3.1.5: The use of finishes • Polymer finishing • Acrylic spray paints • Thermoplastic elastomer (TPE)	Understand how Polymers can be finished to improve their function, performance and aesthetic. Be aware that some polymers are self-finishing and others can be finished with acrylic paint or have a TPE over moulded on to the surface.	Ensure products are designed to take account of potential corrosion due to environmental factors.	**Starter** **Group discussion:** Explore the group's knowledge around the topic of polymer finishing **–** mini whiteboard Q and A. Why when some polymers are referred to as self-finishing do they need a supplementary spray finish applied? **Activities** • Identify products that have an over moulded element to them. How does the over moulding improve the performance of the product? • Explore online to view the process of over moulding in action. Compare the process where two moulds are used to the more efficient twin shot injection moulding process. **Homework/independent study**

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Refer students to supplementary information on metal finishing and wood finishing or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week 11	3.1.5: The use of finishes
	• Metal finishing
	  • sealants
	  • preservatives
	  • anodising
	  • plating
	  • coating
	  • cathodic protection.
	• Wood finishing
	  • colour wash
	  • Danish oil.
		Be aware of the ways that metals can be finished to enhance their appearance or prevent corrosion.
		Be aware that finishes on wood can be aesthetic and also help prevent decay
				Starter
				Recap the material from the first year and develop depth.
				Test existing knowledge and understanding mini whiteboard Q and A. Describe the process of galvanising. Why is it used?
				Activities
				• Explore online to see how the process of anodising is used to finish aluminium products. Eg motorbike components
				• Explore the process of tin-plating low carbon steel for use as food packaging. Compare a tin can with a laminated cardboard equivalent product. Comment on its environmental impact along with benefits to the consumer and manufacturer.
				• Using a range of timber samples prepare and apply a series of wood finishes including polyurethane varnish, stain, colour wash and Danish oil. Make note of application process, drying time and the aesthetic of the finish. Leave the test pieces outside and observe their resistance to weathering.
				Homework/independent study

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Refer students to supplementary information on scales of production or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 12	3.1.6: Modern and industrial commercial practice Scales of production: • unit production systems (UPS) • quick response manufacturing (QRM) • vertical in-house production.	Be aware of the different scales of production and be able to provide specific examples to illustrate each.	Determining quantities of materials.	**Starter** Recap the material from the first year and develop depth. Recall activity – mini whiteboard Q and A. Scales of production. Define the terms one-off, bespoke, batch and mass/line production. Illustrate each with a range of appropriate examples. **Activities** • Case study – The manufacture of Morgan cars, BMW Mini, Tesla. Research the three manufactures and make note of the different scales of production? How much automation takes place? How do the manufacturing processes differ? **Homework/independent study** Refer students to supplementary information on the use of computer systems or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 13	3.1.6: Modern and industrial commercial	Understand how computer systems are used in production/		**Starter** **Group discussion:** Explore the group's

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	practice The use of computer system: • modular production • cell production • flexible manufacturing systems (FMS).	distribution and storage.		knowledge around the topic of JIT manufacture. **Activities** • Observe how computer systems are being used in manufacture. Eg RFID technology in the manufacture of the BMW Mini. Explore online to see FMS (flexible manufacture systems) in action. • Explore online to investigate practical examples of companies benefitting from modular production/cell production and flexible manufacturing. Create a resource that explains the advantages and disadvantages of each. **Homework/independent study** Refer students to supplementary information on CAD and CAM or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 14	3.1.7: Digital design and manufacture • Computer aided design (CAD) • Computer aided manufacture (CAM)	Be aware of the role of CAD, its advantages and disadvantages and how it is used in industrial applications. Understand how it can be used to develop and present work in 2D and 3D.	Determining quantities of materials. Calculations of sides and angles of products. Use of geometry to create templates for designs.	**Starter** Recap the material from the first year and develop depth. **Group discussion –** Using specimen paper questions, continue to familiarise students with the style of question in Paper 1. Explain the benefits of using CAD modelling in the development of a remote control.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				Activities **Practical task** – Investigate tolerances and accuracy when using CAD and CAM. Route a simple cavity in a small block of timber, a basic shape or initial etc. Set the depth of the cavity to 3mm. Use a laser cutter to create the plug to fill the cavity. This could also be done using a thin sheet of timber and setting the offset of the tool to cut around the shape.
Christmas break				
Week 15	3.1.7: Digital design and manufacture • Virtual modelling • Rapid prototyping processes • How products are designed to conserve energy, materials and components The reuse of material offcuts, chemicals, heat and water.	• Virtual modelling • Rapid prototyping processes Be aware of the role of CAD, its advantages and disadvantages. Understand how it can be used to develop and present work in 2D and 3D. Be aware of how virtual modelling/testing is used in industry prior to production. Be aware of and be able to describe rapid prototyping processes	Interpretation of data from CFD and FEA testing	**Starter** Recap the material from the first year and develop depth. **Group discussion –** Using questions created by the teacher in the paper 1 style continue to familiarise students with the style of question in Paper 1. Explain the benefits to a manufacturer of using a virtual model to gain target market feedback in the development of a remote control? **Activities** • Link to NEA: Identify how rapid prototyping could be used to assist the development of their practical piece. Where possible model an element of their NEA in CAD and subsequently 3D. • Explore the benefits of simulation eg: print

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				preview for a 3D print or a tool path simulation on a CNC router. • Explore how companies are making use of CFD and FEA in the development of their cutting edge products. Eg – Formula One and aerospace design. **Homework/independent study** Refer students to supplementary information on EDI and PPC or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 16	3.1.7: Digital design and manufacture • Electronic data interchange • Production, planning and control network (PPC).	Be aware of and be able to describe the use of EPOS Be aware of and be able to describe the role of PCC systems in planning and control of all aspects of manufacturing.		**Starter** **Test existing knowledge and understanding** – mini whiteboard Q and A. What is understood by the term EPOS (electronic point of sale)? What information or data can it be used to track and monitor? **Activities** • Case study – BMW Mini. Investigate how mini make use of Master production software to manage customers customisation of their new car, through to JIT stock ordering and RFID tracking throughput the production line. **Homework/independent study** Refer students to supplementary information on EDI and PPC or refer them to an AQA approved textbook – read and explore the content for the

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
				next lesson.
Week 17	3.1.8: The requirements for product design and development • Product development and improvement • Fitness for purpose/accuracy of production • Aesthetics, ergonomics and anthropometrics when designing	Be able to critically analyse existing products and develop new design proposals. Understand how products need to meet specification criteria and be fit for purpose.		**Starter** **Test existing knowledge and understanding** – mini whiteboard Q and A. What is understood by the terms 'aesthetics', 'ergonomics' and 'anthropometrics'? **Activities** Using a series of products such as bottle openers, workshop hand tools etc, Critically analyse their design and suggest improvements. Use the focus areas of aesthetics, ergonomics and anthropometrics to help focus their analysis and guide their suggested improvements. **Homework/independent study** Refer students to supplementary information on protecting designs and intellectual property or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 18	3.1.10 – Protecting designs and intellectual property	Be aware of and able to explain the importance of: • copyright • design rights • patents • registered designs • trademarks		**Starter** **Test existing knowledge and understanding** – mini whiteboard Q and A. Who owns an idea? What is it important to protect designs? How can this be done? **Group challenge –** Using one of the many logo apps**.** How many logos can the group recognise. What factors make them instantly recognisable?

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		• logos.		**Activities** • Create a resource that provides information on the main types of intellectual property rights. Using an example product, illustrate how each can be applied. • Visit espacenet.com or the website of the intellectual property office and explore the database of existing patents. • Research the significant patent battles by companies such as Dyson, Apple and Trunki. How have the companies protected their designs? **Homework/independent study** Refer students to supplementary information on design for manufacturing, maintenance, repair and disposal or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 19	3.1.11 Design for manufacturing, maintenance, repair and disposal • Manufacture – reducing the number of processes • Repair – maintenance • Ease of	Be aware of how the choice of material affects the use, care and disposal of products. Be aware of how products can be designed to reduce the number of manufacturing processes and allow for		**Starter** **Test existing knowledge and understanding** – mini whiteboard Q and A. Why is maintenance important. What benefits does it offer the consumer and the manufacture? **Activities** • Disassemble a series of small (unwanted) electronic products such as torches or computer mice. Identify how they make use of standardised parts and integral fixings

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	manufacture – disassembly	maintenance.		such as screw posts. Are they designed to be disassembled for maintenance? • Many new products can be updated with firmware or software downloads. Identify a range of products that benefit from this maintenance facility. **Homework/independent study** Issue students with supplementary information on feasibility studies or refer them to an AQA approved textbook – read and explore the content for the next lesson.
Week 20	3.1.12 – Feasibility studies	Be aware of and able to explain the use of feasibility studies to assess the practicality for production.	Interpret statistical analysis to determine user needs and preferences. Use data related to human scale and proportion to determine product scale and dimensions.	**Starter** **Test existing knowledge and understanding** – mini whiteboard Q and A. Why is it important to consider the feasibility of a product before committing to manufacture. Can they identify areas that might be considered? **Activities** Research other companies where prototypes have been tested and the design improved before public launch. **Homework/independent study** Issue students with supplementary information on enterprise and marketing in the development of products or refer them to an AQA approved textbook – read and explore the content for the next lesson.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 21	3.1.13 – Enterprise and marketing in the development of products	Global marketing Be aware of the importance of marketing and brand identity.	Interpretation of market research data, calculating costs and profit.	**Starter** **Group discussion:** What is understood by the term 'global marketing'? **Activities** • Investigate how the advertising of a product has developed with the growth of social media such as Facebook, Twitter etc. How do pop up's and corporate advertising on their social media feeds seem to be tailored to their interests particularly? • Investigate the journey of entrepreneur Rob Law, designer of the Trunki. How did he get his product to become a leader in the global market? Compare his journey with that of James Dyson.1.1 **Homework/independent study** Issue students with supplementary information on modern manufacturing systems or refer them to an AQA approved textbook – read and explore the content for the next lesson
Spring half term				
Week 22	3.1.15 – Modern manufacturing systems	Understand how computer systems are used in modern manufacturing. Develop knowledge of		**Starter** **Group discussion:** Try to identify the extensive volume of areas where computers are used in modern manufacturing systems.

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		specific industrial examples and their use in the manufacture of given products.		**Activities** Explore how computers systems are used to plan and control manufacturing in a range of companies eg: Apple/Jaguar/Dyson/Lego/Ikea etc.
Week 23	**Internal mock exams** This week can be moved as necessary to accommodate individual school and college requirements Having completed the delivery of the theory material for Paper 1 and Paper 2. The focus of the course should now turn to preparation for the written exams. In this phase of the course students should be working on developing a detailed understanding of commercial products to enable them to illustrate and provide exemplification in the written papers			
Week 24	Detailed investigation into design styles, products, materials, manufacture and manufacturing systems.	**Product study** Issue the group with a range of iconic products from a series of key movements or designers. They should then undertake a detailed product study. Suggested areas of study are outlined below, but not all will be appropriate for all products. • Identification of the materials used • Sourcing of material and the associated environmental issues • How is the product manufactured – component parts and assembly • What finish is applied • Ergonomic considerations • Critical analysis of the product in use leading to suggesting improvements. • End of life Students could produce a key knowledge summary or one could be pre prepared so that the group have a comprehensive resource.		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
Week 25	Detailed investigation into design styles, products, materials, manufacture and manufacturing systems.	**Product comparison** Issue the group with common products that they can undertake comparison exercise with. • These could be similar products that are manufactured from different materials such as corrugated cardboard packaging and polypropylene packaging. • They could be similar products with a different intend use such as an office chair and a portable deck chair. • They could be a model or prototype. Areas of study could include: • Materials • Manufacturing process • Ergonomics • Suitability for the intended environment • Cost and economic issues • Function, aesthetics and performance Students should develop well-structured, coherent justifications and arguments, reinforcing their knowledge and understanding of material across the whole A-level specification.		
Week 26	Detailed investigation into design styles, products, materials, manufacture and manufacturing systems.	**Product analysis** Issue the group with an image or physical example of a single product, critically analyse and draw conclusions. Areas of study could include: • Aesthetics • Function • Use of materials • Finish		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		• Ergonomics • Ease of use • Suitability for end user • Social, moral and ethical considerations. Students could produce summary resource for each product, or one could be pre prepared so that the group have a comprehensive resource.		
Week 27	Exam preparation	**Exam technique** In preparation for the final build up to the written papers, it is important that students understand how to answer the questions along with having the knowledge and understanding needed to provide the correct answers. Suggested areas of study: • Understand and be able to correctly interpret the command words used in the written papers eg explain/justify/analyse etc. • Issue worked examples and mark schemes, go through how marks are awarded. • Highlight how the tariff for questions or marks available indicates the level of response needed. • Create a mindmap to help answer the extended writing questions. Explain the techniques PEEL (point evidence explain link) or PEAL (point evidence analyse link). • Illustrate – Investigate how diagrams can be used to help illustrate and support written answers. Students should feel confident that they understand the most appropriate method of presenting their answers when under exam conditions.		
Week 28	3.1.0 Exam preparation (TP)	• Focus on materials and their applications • Performance characteristics of materials • Enhancement of materials • Forming, redistribution and addition processes A suggested selection of activities to use. • Mindmap: paired work to create a mind-map in response to the main material classifications.		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		• Word cloud: present a range of key physical and mechanical properties on a word cloud format (approx. 10 terms) – students to define/draw the given terms. • PP quiz: Slides on a PowerPoint presentation, a question per slide. Questions relate to materials and products in which they are found. • True/false: Supply a list of statements in relation to material properties. • How it's made: Using the product handling collection students identify the material, manufacturing process. This can focus on a particular process or material group. • Exam questions: Give relevant questions from the sample question paper or AQA secure materials website. Students should attempt a range of question types: Multiple choice, short answer and extended responses. • Possible exam questions: Create possible exam questions that relate to the specification. This can be done by the teacher, or the students, working in pairs or small groups. • Model answer marking: Use past students' answers or examples from AQA training to help students gain a clear idea of how marks are awarded and the level of detail that is needed in their written response.		
Easter break				
Week 29	3.1.0 Exam preparation (TP)	• Focus here on the use of finishes • Modern industrial and commercial practice • Digital design and manufacture • Product design and development • Health and safety • Manufacture maintenance repair and disposal • Enterprise and marketing • Design communication A suggested selection of activities to use. • Mindmap: paired work to create a mind-map in response to CAD and CAM. Word cloud: present a range of key health and safety terms on a word cloud format (approx. 10 terms) – students to explain the given terms and illustrate where they may be found.		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		PP quiz: Slides on a PowerPoint presentation, a question per slide. Questions relate to products and their manufacture, maintenance, repair and disposal. • How it's made: Using the product handling collection students identify the material, manufacturing process and finish. This can focus on a particular process or material group • Exam questions: Give relevant questions from the sample question paper or AQA secure materials website. Students should attempt a range of question types: Multiple choice, short answer and extended responses. • Possible exam questions: Create possible exam questions that relate to the specification. This can be done by the teacher, or the students, working in pairs or small groups. • Model answer marking: Use past students' answers or examples from AQA training to help students gain a clear idea of how marks are awarded and the level of detail that is needed in their written response.		
Week 30	3.1.0 Exam preparation (TP)	• Focus here on protecting designs and intellectual property • Manufacture maintenance repair and disposal • Enterprise and marketing • Design communication • Modern manufacturing systems A suggested selection of activities to use. • Mindmap: paired work to create a mind-map in response to patents, trademarks, copyrights and registered designs. • PP quiz: Slides on a PowerPoint presentation, a question per slide. Questions relate to products and their manufacture, maintenance, repair and disposal. • Exam questions: Give relevant questions from the sample question paper or AQA secure materials website. Students should attempt a range of question types: Multiple choice, short answer and extended responses. • Possible exam questions: Create possible exam questions that relate to the specification. This can be done by the teacher, or the students, working in pairs or small groups. • Model answer marking: Use past students' answers or examples from AQA training to help students gain a clear idea of how marks are awarded and the level of detail that is needed in their written		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		response.		
Week 31	3.2.0 Exam preparation (DMP)	• Focus here on design methods and processes • Design theory • Technology and cultural change • Design processes A suggested selection of activities to use: • Redesign: Analyse images or products from the handling collection. How can they be improved? Group work or individual critical analysis and evaluation of existing products. • Exam questions: Give relevant questions from the sample question paper or AQA secure materials website. Students should attempt a range of question types: Multiple choice, short answer and extended responses. Possible exam questions: Create possible exam questions that relate to the specification. This can be done by the teacher, or the students, working in pairs or small groups. • Model answer marking: Use past students' answers or examples from AQA training to help students gain a clear idea of how marks are awarded and the level of detail that is needed in their written response.		
Week 32	3.2.0 Exam preparation (DMP)	• Focus here on critical analysis and evaluation • Design communication • Tools equipment and processes • Accuracy in design and manufacture A suggested selection of activities to use. • Product analysis: Analyse images or products from the handling collection. Discuss their environmental impact and how they could be developed to consider conservation of energy and resources. • Exam questions: Give relevant questions from the sample question paper or AQA secure materials website. Students should attempt a range of question types: Multiple choice, short answer and extended responses. • Possible exam questions: Create possible exam questions that relate to the specification. This can be		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
		done by you or the students, working in pairs or small groups. • Model answer marking: Use past students' answers or examples from AQA training to help students gain a clear idea of how marks are awarded and the level of detail that is needed in their written response.		
Week 33	3.2.0 Exam preparation (DMP)	• Focus here on responsible design • Design for manufacture and project management • National and international standards in product design A suggested selection of activities to use: • Product analysis: Analyse images or products from the handling collection. Discuss their environmental impact and how they could be developed to consider conservation of energy and resources. • Exam questions: Give relevant questions from the sample question paper or AQA secure materials website. Students should attempt a range of question types: Multiple choice, short answer and extended responses. Possible exam questions: Create possible exam questions that relate to the specification. This can be done by the teacher, or the students, working in pairs or small groups. • Model answer marking: Use past students' answers or examples from AQA training to help students gain a clear idea of how marks are awarded and the level of detail that is needed in their written response.		
Summer half term				
External exams				
Week 37	3.2.8: Responsible Design • Conservation of energy and resources • How products are	Be aware of the importance of environmental issues in design and manufacture. Understand the responsibilities in the use of sustainable materials and components. Be aware of the environmental impact of packaging. Be aware of methods to conserve energy resources and the concept of circular economy.		

Week	Specification content	Aims	Link to Maths and Science	Potential learning activity
	designed to conserve energy, materials and components • The reuse of material offcuts, chemicals, heat and water			