

Teacher Resource Bank

GCE Design and Technology: 3D Product Design
Schemes of Work



Introduction

The following scheme of work is intended to be a guide to centres who may wish to adapt it to suit their own needs. It is not intended to be prescriptive as different centres may well have devised their own projects, resources and teaching methods that are already successful.

The scheme outlines a 'portfolio' approach to AS coursework, consisting of four short design and make projects. This is intended to deliver a wide range of skills, a sharp focus on different assessment criteria and cover a number of materials and making processes which can support teaching for PROD1 and PROD3. The projects described are again, only intended as a guide and centres are strongly advised to develop their own to match their specific centre resources and learner needs.

The scheme assumes an average contact time of 4.5 hours per week. Most centres seem to have 3 – 4 sessions per week for GCE courses and so the scheme aims reflect this with two sessions split between theory input and project and one session where the main focus is project. The scheme deals with contact time. However, it is assumed that students will routinely be set homework to support both theory teaching and continuation of coursework in private study time.

AS Scheme of Work

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
Week 1	<p>Induction</p> <p>Outline of the course structure Explain key dates Set project sessions on timetable Outline coursework for the year</p> <p>30 min Taster product analysis session-introduction to Materials, Components and Applications.</p> <p>Homework- 250 words and sketches 'What do they consider to be an example of good design'</p> <p>Coursework</p> <p>Introduction to coursework Project 1- Bauhaus model chair Introduction to AQA assessment criteria & CRF Research into theme – moodboard</p>	<p>Induction</p> <p>Materials, Components and Applications-</p> <p>Introduction to polymers- HIPS and vacuum forming- drinks cups. Expanded polystyrene and packaging.</p> <p>Coursework</p> <p>Completion of moodboard</p> <p>Primary analysis of an existing product(s) To investigate materials, construction, finish</p>	<p>Induction</p> <p>Coursework</p> <p>Measuring and testing of functional chairs-analysis of ergonomics</p> <p>Measuring of model ergonomome (1/6th scale).</p>	<p>In the first few lessons it is important for the students to bond as a group, and familiarise themselves with the expectations of the course.</p> <p>Written work is set for homework to establish student's writing skills, level of prior knowledge.</p> <p>Materials and Components are often unfamiliar with many students. It is therefore very important that this is started as soon as possible.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 2</p>	<p>Materials, Components and Application:</p> <p>ABS & Injection moulding- mobile phone. Product Analysis- Introduction to ergonomics with hand-held products</p> <p>Coursework</p> <p>Introduction to workshop and basic forming of plastics- line bending and drape forming to make simple test pieces/rough model chairs.</p> <p>Start workshop driving licence.</p>	<p>Materials, Components and Application:</p> <p>PET & blow moulding- mineral water bottle Introduction to echo themes- 3Rs.</p> <p>Coursework</p> <p>Introduction to sheet metal bending & joining- spot welding/riveting. Test pieces for chair.</p>	<p>Coursework</p> <p>Sketching techniques: Isometric Perspective Thumbnail sketching Use of fine line pen, marker to enhance.</p> <p>Introduction to steel rod bending and brazing. Test piece for chair framework.</p>	<p>Students often draw with a ruler and spend too much time on the presentation of ideas. Many haven't done graphics work before and will need instruction on quick, 3D sketching methods.</p> <p>Students should be instructed in the safe operation of hand tools and permitted machines. A record of who has been trained should be kept.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
Week 3	<p>Materials, Components and Application:</p> <p>Polypropylene and rotational moulding- children’s play equipment e.g. slide</p> <p>Introduction to safety in products</p> <p>Introduction to AQA marks schemes for PROD1</p> <p>Coursework</p> <p>Introduction to steam bending aeroply to produce a seat test piece.</p> <p>Workshop driving licence: Drilling Scroll saw Sanding Steam bender Hot wire cutter Hot glue gun</p>	<p>Materials, Components and Application:</p> <p>LDPE and calendaring: plastic bags Vs Bio-batch/biodegradable</p> <p>Recycling & Adv/disadvantages with biodegradables</p> <p>Coursework</p> <p>Introduction to CAD- Techsoft 2D Design</p> <p>And/or Google SketchUp.</p>	<p>Coursework</p> <p>Styrofoam modelling of design ideas.</p> <p>Selection of idea.</p> <p>CAD drawing of idea in 2D and/or 3D</p>	<p>Modelling is quite difficult for some students but it is an important method of demonstrating their skill. They will also cover aspects useful for PROD1</p> <p>Techsoft 2D Design is an easy to use package ideal for creating 2D drawings which will ‘print’ to laser cutter or router.</p> <p>Google SketchUp is a free, downloadable 3D CAD package. Most students find it very easy to use.</p>

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<p>Week 4</p>	<p>Materials, Components and Application:</p> <p>Thermoset polymers e.g. UF and compression moulding-electrical fitting.</p> <p>Coursework</p> <p>Card modelling/Styrofoam modelling. Evaluation of models.</p>	<p>Materials, Components and Application:</p> <p>Use of biodegradable polymers- e.g. soluble starch based used in medicines.</p> <p>Coursework</p> <p>Development- refinement of design.</p> <p>CAD skills development.</p>	<p>Coursework</p> <p>Development of the final design. Consideration of alternative materials and construction.</p> <p>Justification of final choice of material/making method.</p>	<p>Development sections in coursework are often an area that students don't get to grips with. It is worth revisiting several times in 'portfolio' approach models to coursework so that sufficient evidence is generated.</p>

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<p>Week 5</p>	<p>Materials, Components and Application:</p> <p>Use of Fillers, Additives and Stabilisers in polymers- UPVC products.</p> <p>Finishes used on polymers e.g. chrome plating on electronic products</p> <p>Coursework</p> <p>CAD working drawings completed</p>	<p>Materials, Components and Application:</p> <p>Introduction to metals classification. Ferrous, non ferrous and alloys</p> <p>Use of tin plated mild steel tin cans.</p> <p>Coursework</p> <p>Complete step by step manufacturing plan. Introduce concept of quality control checking.</p>	<p>Coursework</p> <p>Start production of outcome. Modify design as needed.</p> <p>Photograph making stages</p>	<p>Metals are often a very unfamiliar material area for students. There is also much confusion between manufacturing processes for example injection moulding with polymers and die casting with metals. This is therefore a very important area to focus on.</p> <p>Students should aim to use a range of processes/materials in making their chairs where possible. This will help to demonstrate a range of skills.</p>

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<p>Week 6</p>	<p>Materials, Components and Application:</p> <p>Non Ferrous metals- copper- application water pipes.</p> <p>Non ferrous metal- aluminium- application die cast alloy wheels.</p> <p>Non ferrous metal- zinc- application finishing material for mild steel.</p> <p>Coursework</p> <p>Manufacture of chair model Amend design as necessary. Annotate plans to explain changes to manufacture. Photograph making stages.</p>	<p>Materials, Components and Application:</p> <p>Non Ferrous metals- silver- Joining processes- soldering. Application- jewellery</p> <p>Coursework</p> <p>Manufacture of chair model. Finishing processes.</p>	<p>Coursework</p> <p>Finishing chair model. Quality control- inspection for defects.</p> <p>Amend manufacturing plans as necessary</p> <p>Photograph finished outcome</p>	

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<p>Week 7</p>	<p>Materials, Components and Application:</p> <p>Mild steel- piercing, blanking, press forming and spot welding. Application-car body panels.</p> <p>Coursework</p> <p>Evaluation & testing with 1/6th scale ergonomics to test proportions & ergonomics.</p>	<p>Materials, Components and Application:</p> <p>Mild steel tube. Forming, and fabricating using MIG welding. Application-bike frame</p> <p>Coursework</p> <p>Peer marking exercise using AQA criteria.</p> <p>Completion of CRF to date.</p>	<p>Coursework</p> <p>1:1 assessment, feedback and target setting for improvement</p>	<p>Peer marking of coursework is an excellent way for students to learn from each other. It is an active learning technique which reinforces understanding of the assessment criteria.</p> <p>1:1 feedback and target setting – task specific targets to ensure completion of project. Teachers might find it helpful to devise a feedback sheet with the assessment criteria pre-printed. Others might find it helpful to use a ‘tick list’ of task to complete for each project they deliver.</p>

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<p>Week 8</p>	<p>Materials, Components and Application:</p> <p>Finishing processes to protect metals</p> <p>Finishing processes to enhance aesthetics in metals.</p> <p>Product- Hand tools (chrome plating).</p> <p>Coursework</p> <p>CATCH UP WEEK START PROJECT 2- JEWELLERY/MOBILE- ACCESSORY</p> <p>Collect Inspiration images</p>	<p>Materials, Components and Application:</p> <p>Timed questions:</p> <p>Section A style questions: Definitions of categories e.g. alloys, thermosets, thermoplastics.</p> <p>Section B style question</p> <p>Table of polymers, metals and applications 7x 4 marks</p> <p>Coursework</p> <p>Sketching techniques & experiments with different drawing materials- pastel chalks, charcoal, watercolour pencil, stick and ink- mixed papers.</p>	<p>Coursework</p> <p>Design sketches. Experiments with drawing techniques and media- e.g. markers, markers and colour pencil, tonal pencil rendering.</p>	<p>Timed questions are useful for students to get used to answering exam style questions under similar circumstances to the examination. Teachers can use exemplar questions from the Teacher Resource Bank or adapt past paper questions.</p> <p>It is very useful to share the mark schemes with students in peer marking exercises. They will learn how much they need to write to achieve 2, 4, 6 marks and so on. More importantly they will understand the need to make properties relevant to the products in the question</p>

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<p>Week 9</p>	<p>Materials, Components and Application:</p> <p>Composites e.g. Carbon Fibre Reinforced Plastic. Lay-up/autoclave techniques and applications e.g. racing bike frame/components 'Lotus Superbike'</p> <p>Coursework</p> <p>Investigation into suitable materials/techniques for jewellery making:</p> <p>Pewter, acrylic, laser ply, hardwood veneers, copper & brass wire, sheet.</p>	<p>Materials, Components and Application:</p> <p>Composites e.g. GRP, layup techniques, finishes. Application-boats. Health and safety with fibre based composites</p> <p>Coursework</p> <p>Practical test pieces with materials and techniques suitable for jewellery. For example:</p> <p>Laminating hardwood and sanding back. Twisting and plating wire. Engraving acrylics and laser ply.</p>	<p>Coursework</p> <p>Experiments with materials and techniques relevant to jewellery making- holographic card construction, coloured papers, foils and films, trapping found objects in cold cast resin, casting with pewter or precious metal clay (PMC).</p>	<p>Materials and processes will vary in centres. Jewellery can obviously utilise very small off-cuts or waste from other projects.</p> <p>Experiments can be used to supplement evidence for 'Making/Modelling' where they meet the criteria.</p>

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<p>Week 10</p>	<p>Materials, Components and Application:</p> <p>Composites- MDF and applications e.g. flat-pack furniture. Health and safety when using MDF</p> <p>Coursework</p> <p>Finalise construction methods for jewellery. If casting: 2D Design or ProDesktop drawings for the manufacture of moulds for pewter casting.</p>	<p>Materials, Components and Application:</p> <p>Knock down fittings and applications e.g. Flat-pack furniture.</p> <p>Coursework</p> <p>If casting: Completion of CAD Drawings. Start laser cutting or router moulds for casting. Alternatively hand-made clay or cuttlefish moulds if casting.</p>	<p>Coursework</p> <p>Continue making jewellery. Photograph to record making methods. Adjust making method as required plus record changes in design folder.</p>	

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<p>Week 11</p>	<p>Materials, Components and Application:</p> <p>Composites- plywood, laminating and forming. Applications e.g. bent wood furniture</p> <p>Coursework</p> <p>Completion of jewellery making. Appropriate finishing e.g. stains, polishes, etc.</p> <p>EXTENSION- Make a display stand for the item of jewellery</p>	<p>Materials, Components and Application:</p> <p>Finishes to enhance aesthetics of timber- stains, waxes, paints, laminates.</p> <p>Coursework</p> <p>Completion of jewellery making.</p> <p>EXTENSION- Design and make a gift box for the item of jewellery.</p>	<p>Coursework</p> <p>Completion of jewellery making.</p> <p>Photograph 'in situ'</p> <p>Evaluate- include comment from users.</p> <p>1:1 formative assessment. Target improvements to work or focus areas for skill development in next project.</p>	

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<p>Week 12</p>	<p>Materials, Components and Application:</p> <p>Composites- Concrete and casting. Applications including: paving, structural building components.</p> <p>Comparison of concrete with stone.</p> <p>Coursework</p> <p>Evaluation and testing of jewellery. Include display and packaging if made.</p>	<p>Materials, Components and Application:</p> <p>Composites- Laminated glass- Application- car windscreen. Safety in Product Design.</p> <p>Coursework</p> <p>Introduction to 3rd project- 'Designer Mirror'</p> <p>User-research e.g. potential location User tastes.</p>	<p>Coursework</p> <p>Completion of user research-questionnaire with design styles images.</p> <p>Sketching design ideas. Use of 3D CAD to model ideas.</p>	<p>Use of historical themes in coursework can be useful in introducing some of the A2 content for the synoptic exam paper.</p>

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<p>Week 13</p>	<p>Materials, Components and Application:</p> <p>Smart Materials- Shape memory alloys (SMA) e.g. Nitinol Applications- bone fixator, dental brace, blood vessel stent.</p> <p>Coursework</p> <p>Modelling ideas using 3D CAD. Full size modelling in card and foamboard. Evaluation of ideas.</p>	<p>Materials, Components and Application:</p> <p>Smart Materials- Thermochromic pigments. Application- children’s feeding products.</p> <p>Practice exam question. PROD1 section C- sketches to show how a product could be enhanced with the use of thermochromic pigment.</p> <p>Coursework</p> <p>Modelling ideas using 3D CAD. Full size modelling in card and foamboard.</p>	<p>Coursework</p> <p>Development drawing- exploration of alternative materials, construction methods, etc. Justification of final choice of material.</p>	

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<p>Week 14</p>	<p>Materials, Components and Application:</p> <p>Smart Materials- Phosphorescent pigments. Application- Disco jewellery.</p> <p>Coursework</p> <p>Workshop experiments with possible materials. Test joints. E.g. pipe bending mild steel tube & brazing.</p>	<p>Materials, Components and Application:</p> <p>Review of January PROD1 Paper and Mark scheme.</p> <p>Timed questions using January series paper.</p>	<p>Coursework</p> <p>Completion of workshop experiments.</p> <p>Manufacturing plan using flow chart to show QC checks.</p> <p>3D CAD- Artist impression e.g. ProDesktop image placed into digital photo</p>	<p>The January paper will be posted after the examination on e-AQA. Many centres would use this to set a mock exam paper.</p>

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<p>Week 15</p>	<p>Materials, Components and Application:</p> <p>Peer marking of January PROD1 papers- question by question.</p> <p>Coursework</p> <p>Complete 3D CAD artist impression Start manufacture of mirror.</p>	<p>Materials, Components and Application:</p> <p>Peer marking of January PROD 1 paper by question.</p> <p>Coursework</p> <p>Manufacture of mirror</p> <p>Photograph stages of manufacture. Amend manufacturing plan. Draw up/explain changes to making as necessary.</p>	<p>Coursework</p> <p>Manufacture of mirror</p> <p>Photograph stages of manufacture. Amend manufacturing plan. Draw up/explain changes to making as necessary</p>	

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<p>Week 16</p>	<p>Materials, Components and Application:</p> <p>Modern materials- Coated steels e.g. nickel plated steel. Application- components used in flat-pack furniture (brackets & fastenings).</p> <p>Use of 'product components' and standardisation of manufacture.</p> <p>Coursework</p> <p>Complete manufacture of mirror. Finish appropriately- e.g. for Art Deco spray for chrome effect. For Memphis- apply laminates or simulate using paint effects.</p>	<p>Materials, Components and Application:</p> <p>Modern materials e.g. Alu composite- Applications e.g. aircraft.</p> <p>Use of components e.g. Self-tapping screws, machine screws and benefits e.g. speed of assembly, ease of repair.</p> <p>Coursework</p> <p>Complete manufacture of mirror. Finish appropriately. COSHH implications of finishing materials.</p>	<p>Coursework</p> <p>Complete manufacture of the mirror. Retouch finishing if required.</p> <p>1:1 assessment and feedback. Identify unfinished work and target for improvement.</p>	<p>If CAD/CAM has been used to make the component parts, students might consider making some using hand techniques. For, example a base or surface decoration for the mirror, cut from different coloured hardwoods using a scroll saw or fret saw for a fine detail.</p> <p>Paper backed veneers, formed using a bag press or clamps could be used to make decorative details to the mirror.</p>

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<p>Week 17</p>	<p>Materials, Components and Application:</p> <p>Wood based modern materials e.g. flexi-ply and flexible MDF. Applications such as curved pint of sale display. Suitable adhesives such as PVA. Use of laminates onto surfaces. Suitable adhesive- contact.</p> <p>Aircraft grade plywood and suitable adhesives such as synthetics resin. Applications- bentwood CD rack.</p> <p>Coursework</p> <p>Introduction- To final project brief ‘personalised-Low voltage lighting’ (Design and make a surround or shade for standard low voltage desk lamp)</p> <p>Identification of a specific situation and problem</p>	<p>Materials, Components and Application:</p> <p>Timed question</p> <p>Matching adhesives, temporary and permanent joining methods to given applications</p> <p>COSHH implications of adhesives.</p> <p>Coursework</p> <p>Production of own problem and brief.</p> <p>Produce an initial specification. Insert details on CRF</p>	<p>Coursework</p> <p>Primary and secondary research into low voltage lighting components*</p>	<p>Low voltage lighting kits are available from most design and technology suppliers.</p> <p>*However to conclude the project in 3-4 weeks a standard low voltage lamp will be used and new ‘surround’ or ‘shade’and base will be designed for the lamp to simply fit into.</p> <p>240 V lights should be avoided due to the risk of electrocution.</p> <p>Typically, students will design some form of box/cubist type arrangement and personalise it with applied graphics.</p>

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<p>Week 18</p>	<p>Materials, Components and Application:</p> <p>Elastomers and their use in products to enhance aesthetics and ergonomics. Application- razor</p> <p>Product Analysis written in PROD1 section C style.</p> <p>project</p> <p>Primary research into situation and how it might influence the design- e.g. colour, existing furnishings, etc.</p> <p>Primary research into client requirements</p>	<p>Materials, Components and Application:</p> <p>Sustainability issues:</p> <p>Use of polymers in disposable products e.g. toiletries, syringe. Safety benefits Vs eco impact.</p> <p>Project</p> <p>Analysis of research. Creation of detailed specification.</p>	<p>Coursework</p> <p>Generate creative ideas through model making:</p> <p>Styrofoam blocks/random geometric shapes, MDF blocks and shapes. Photograph models. Sketch modifications over photographs and annotate.</p>	<p>It is perfectly acceptable to communicate ideas through modelling.</p> <p>Using random shapes can lead to unusual/less stereotypical ideas. This is a good way to stimulate creative designs.</p>

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<p>Week 19</p>	<p>Materials, Components and Application:</p> <p>Compliant Materials</p> <ul style="list-style-type: none"> - Use of carton board, laminated card, etc in packaging. - <p>Product Analysis question in style of PROD1 Section C. Discuss 3Rs and the design and manufacture of packaging.</p> <p>Coursework</p> <p>Produce 1-2 development pages finalising design from model.</p>	<p>Materials, Components and Application:</p> <p>Compliant Materials</p> <ul style="list-style-type: none"> - Use of polymer based sheet materials e.g. translucent polypropylene and point of sale displays. <p>Product Analysis question in style of PROD1 Section C.</p> <p>Introduce use of jigs and fixtures in creation of tabs & slots, KD fittings, etc.</p> <p>Coursework</p> <p>Produce an orthographic projection of the lamp surround. Include dimensions.</p>	<p>Coursework</p> <p>Use of 3D CAD software to produce exploded views of lamp surround and assembly detail.</p>	<p>Information drawings are examined in PROD3. Early introduction into the different types gives time for practice in the coursework.</p>

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<p>Week 20</p>	<p>Design and Market Influences</p> <p>Inclusive Design</p> <p>Product Analysis written in style of PROD1 section C.</p> <p>For example- Mobile telephone to be designed/modified to meet the needs of visually impaired.</p> <p>Coursework</p> <p>Design artwork/graphics to 'personalise' lamp surround to client requirements. Possible use of Photoshop, Corel Draw or similar graphics package.</p>	<p>Design and Market Influences</p> <p>Consumer safety</p> <p>Critical analysis of existing products in terms of safety e.g. hedge trimmer, lawn mower, kettle, child's toy, etc. Students sketch modifications to a product to improve safety</p> <p>Coursework</p> <p>Completion of graphics to be used on lamp surround. Cut out component parts of lamp base/surround from MDF or plywood.</p>	<p>Coursework</p> <p>Use of stencils for applied artwork to lamp.</p> <p>Use of CNC laser cutters, plotter cutters, etc to make applied vinyl graphics</p> <p>Production of transfer sheets for applied graphics.</p> <p>Alternative- sublimation printing.</p> <p>1:1 formative assessment of coursework.</p> <p>(Identify any gaps and target set for improvement).</p>	<p>A large number of students come into AS Product Design from a Graphics GCSE. It is therefore useful to maintain the interest of such students with the opportunities to develop graphics skills in AS coursework.</p> <p>Use of CNC laser cutters, plotter cutters, routers, etc is detailed on pg 8 of the specification. A coursework project using this technology obviously helps to reinforce theory.</p>

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<p>Week 21</p>	<p>Processes and Manufacture</p> <p>Quality control- Use of drilling jigs and templates</p> <p>Design and make a simple drilling jig for project construction</p> <p>Design and make stencils/templates for finishing details on project.</p> <p>Coursework</p> <p>Manufacture of lamp surround using MDF/plywood box construction. Manufacture of stencils etc for applied graphics</p>	<p>Process and Manufacture</p> <p>Use of mite saws and mitre blocks- Test joint for base or shade construction on lamp</p> <p>Coursework</p> <p>Manufacture of lamp surround using box construction methods.</p> <p>Use of fillers to blend in joints between boxes. COSHH with use of fillers.</p>	<p>Coursework</p> <p>Finishing of lamp surround/shade/base and application of graphics when ready.</p> <p>Photograph details of making. Explain any difficulties and modifications to design that result.</p> <p>Explain use of jigs and templates where relevant.</p>	

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<p>Week 22</p>	<p>Design and Market Influences</p> <p>Consumer Safety</p> <p>Safety in children’s products and simple tests that designers could carry out to ensure safety.</p> <p>Coursework Finish lamp surround. Prepare for evaluation and testing with client/user in situ</p>	<p>Design and Market Influences</p> <p>Consumer safety</p> <p>Safety in electrical products e.g. lawn mower, kettle, steam iron.</p> <p>Coursework Evaluation and testing: Comparison to initial specification. Possible improvements in light of client/user feedback.</p>	<p>Coursework</p> <p>1:1 formative assessment and feedback.</p> <p>Student catch up time for folder/outcome completion.</p> <p>Students update Candidate Record Form (CRF).</p>	

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<p>Week 23</p>	<p>Coursework</p> <p>Selection and organisation of work for portfolio submission to AQA.</p> <p>Update CRF</p>	<p>Coursework</p> <p>Selection and organisation of work for portfolio submission to AQA.</p> <p>Update CRF</p>	<p>Coursework</p> <p>Selection and organisation of work for portfolio submission to AQA.</p> <p>Update CRF</p>	<p>Where several projects have been used in coursework time needs to be spent organising the portfolio. Students should organise their portfolios under the headings of the assessment criteria printed on page 10 of the specification.</p> <p>This will make it much easier for the teacher to assess and for the moderator to identify marked work against each criteria. Some centres like to colour code pages against the criteria to aid marking.</p> <p>The CRF will need to be completed by the student, and <u>signed</u>.</p>

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<p>Week 24</p>	<p>Processes and Manufacture</p> <p>Use of CNC machining and rapid prototyping to make non functioning/block models.</p> <p>PROD1 Section B or C type question- students produce notes and diagrams to explain how a block model could be made and finished.</p> <p>Coursework</p> <p>Submit final portfolio for assessment and moderation.</p>	<p>Revision</p> <p>PROD1 SECTION A</p> <p>Timed questions worth 1-2 marks each covering classification of materials and components. E.g. definitions of terminology-alloys, thermosets, etc, examples of each type.</p> <p>20 minute timed exercise.</p> <p>Peer marking of answers</p>	<p>Revision</p> <p>PROD1 SECTION A</p> <p>'pub quiz teams'</p> <p>'hangman'</p>	<p>Most teachers would aim to have coursework completed by the end of the second term.</p> <p>This allows good time to cover any remaining theory content of the specification and to begin revision. During the revision period, it is advised that a combination of timed questions, peer marking and 'fun' activities are used to maintain student interest.</p> <p>Quiz teams brings in a competitive edge and can make revision lively.</p> <p>Simple games like 'hangman' are good for covering key terminology</p>

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Week 25	<p>Revision</p> <p>PROD1 Section A</p> <p>‘Sort the definition’</p> <p>Students are presented with envelopes of jumbled definitions to sort.</p> <p>‘Mastermind’</p> <p>Students given a week to prepare for specialist subject- e.g. alloys and die casting.</p> <p>Following week- ‘Mastermind’ 2 minutes on specialist subject followed by 2 mins of general knowledge e.g. Section A type questions.</p>	<p>Revision</p> <p>PROD1 Section B</p> <p>‘Post-It Note Processes’</p> <p>Flip chart posters of machines/processes.</p> <p>Students use Post-IT notes to label up process and describe stage by stage.</p> <p>Powerpoint- Product Analysis.</p> <p>Students prepare a Powerpoint presentation explaining the materials used and method of manufacture of products made from:</p> <p>Woods Metals Polymers Present to class.</p>	<p>Revision</p> <p>PROD1 Section C</p> <p>‘Product Improvement’</p> <p>Students are given a CAD drawing of a simple product.</p> <p>In groups develop notes and diagrams to discuss:</p> <p>Possible materials Method of modelling Method of making for production Improvements e.g. Safety, ergonomics, inclusive design</p>	<p>Key aspects to successful revision are fun and variety.</p> <p>The strategies outlined here are intended to be active to keep learners engaged and prevent boredom</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
Week 26	<p>Revision</p> <p>PROD1- Section A</p> <p>‘Guess who’</p> <p>Students given cards face down with material names, properties, process names, etc.</p> <p>Partner place card on their forehead and give their partner clues to the word without using the actual word.</p> <p>Timed 20 minutes exercise with PROD1 Section A questions. Followed by peer marking</p>	<p>Revision</p> <p>PROD1- Section B</p> <p>Materials and applications poster</p> <p>Students produce posters of product detailing specific product, material and reason for selection of material from 1 of 3 material areas- wood, metal, plastic.</p>	<p>Revision</p> <p>PROD1- Section C</p> <p>‘Beat the Boss’</p> <p>Students presented with a product improvement challenge.</p> <p>Teacher and support staff e.g. technician have same challenge.</p> <p>A ‘judge; selects winning design based upon most appropriate material, making method, ergonomics, sustainability and inclusiveness.</p>	<p>Morning of the exam:</p> <p>Breakfast meeting</p> <p>Some centres hold a breakfast meeting for students. This ensures that they arrive for the exam in good time; they have had something to eat and are hydrated.</p> <p>It is a good opportunity to some last minute revision and to settle nerves.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 27</p>	<p>Commence A2 Course</p> <p>Explanation of A2 structure Key dates & delivery plan</p> <p>Coursework</p> <p>Explain nature of coursework i.e. single project, client focus, etc. Demonstrate exemplar folders and outcomes for PROD 4 Design and Making Practice.</p>	<p>PROD3 Design and Manufacture</p> <p>Section A- Materials and components.</p> <p>Impact of new materials on products</p> <p>e.g. smart materials</p> <p>Students introduced to A2 style questions and work through a question in groups to produce mind map plan.</p> <p>Coursework</p> <p>Identification of suitable project/client.</p>	<p>Coursework</p> <p>Identification of suitable project/client.</p> <p>How to write a situation and brief statement.</p>	<p>It is very important to make an early start to the A2 course. At the end of Y12, students could focus on choosing an appropriate A2 project.</p> <p>It is also important to start the theory for the final exam and develop writing skills for the extended answers required at A2.</p> <p>Most students find it helpful to initially work through 'essay' style questions in groups. Students will need instruction on how to structure answers and how to link points they make to each other and to the question.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 28</p>	<p>PROD3: Design and Manufacture Section A: Materials and Components</p> <p>The impact of new materials on products.</p> <p>E.g. selection and application of polymers in automotive industry replacing metals.</p> <p>Students analyse a car- identify plastic parts previously made from metals. Discuss benefits/drawbacks of using polymers.</p> <p>Project</p> <p>Finalise project choice Write up problem and brief Produce an initial specification. Start Research Plan.</p>	<p>PROD3: Design and Manufacture Section A: Materials and Components</p> <p>The impact of new materials on products</p> <p>E.g. use of polymers in packaging Vs traditional alternatives.</p> <p>Students work in 2 groups- pro and against polymers in packaging. Present argument using visual aids e.g. poster & powerpoint.</p> <p>Project</p> <p>Complete first draft of Research Plan</p>	<p>Project</p> <p>Explain differences with CRF for A2.</p> <p>How to carry out research and summarise findings.</p> <p>Students complete initial secondary research- e.g. inspiration images for ideas.</p>	<p>At A2 students will need the differences between the CRF at AS and A2 explaining to them and the implications for the conduct of the project.</p> <p>One of the most significant being research does not need to be presented in the folder but summarised. Strategies for conducting research will need to be discussed, e.g. keeping a notebook for recording results of interviews with client/users.</p> <p>Images collected in research, either primary or secondary could be pasted on ideas sheets for inspiration</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 29</p>	<p>PROD3: Design and Manufacture Section A: Materials and Components</p> <p>Selection of materials and components for specific application- polymers</p> <p>Students work through a practice essay question discussing polymers they are familiar with for specific products- reasons for selection e.g. manufacture, energy conservation, function of the product, etc.</p> <p>Project</p> <p>Primary research- letters to contacts, drafting interview questions, etc. Secondary research- inspiration images, existing products. Patents and safety regs. Initial thumb-nail sketches of concept ideas 1:1 guidance</p>	<p>PROD3: Design and Manufacture Section A: materials and components</p> <p>Timed question On theme of previous lesson.</p> <p>45 mins to complete.</p> <p>Peer marking & discussion in second half of lesson.</p> <p>Project</p> <p>Initial thumb-nail sketching 1:1 guidance</p>	<p>Project</p> <p>Initial thumb-nail sketches of ideas.</p> <p>1:1 guidance. Advice on appropriate contacts for primary research.</p>	<p>In these early phases of the A2 project, it is important to push on with initial sketches of ideas rather than wasting time waiting for replies to emails, phone-calls and letters or surfing the internet for the purposes of research.</p> <p>The main focus of the project is designing and making, so students should spend their time in this area.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 30</p>	<p>PROD3: Design and Manufacture Section A: Materials and Components</p> <p>Application of materials and components to specific production processes- one off to mass production</p> <p>Industry visit day</p> <p>a.m.- local company specialising in one-off/small batch production.</p> <p>p.m.- large manufacturer specialising in volume production e.g. car manufacturer.</p>	<p>PROD3: Design and Manufacture Section A: Materials and Components</p> <p>Set vacation work- 1.000 word case study based on industry visit.</p> <p>Focus points:</p> <p>Materials and production methods chosen on basis of volume of production.</p>	<p>Project</p> <p>Set targets for vacation:</p> <p>No of sheets of initial concept ideas.</p> <p>Make a simple card model</p> <p>Conduct a site visit and interview if relevant.</p>	<p>A case study based on PROD3 will keep the learner's mind on theory work and will help to revise the topics covered in the last 2-3 weeks.</p> <p>Setting vacation work between Y12 and Y13 is meant to ensure the students have made the best possible start and maintain the momentum of the project.</p> <p>If the school operates an intranet system, it might be possible for students to upload work during the vacation for teachers to monitor and feedback.</p>

A2 Scheme of Work

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 1</p>	<p>Recap on requirements of A2 Explanation of PROD4 (including demo of exemplar work from coursework standardising CD) and PROD3.</p> <p>Q&A discussion on industry visits from summer term. Learners produce short powerpoint from essay work completed over summer break.</p> <p>Project</p> <p>Learners show what they have completed for initial design ideas so far.</p> <p>Informal 1:1s To review designs and target set.</p>	<p>PROD3: Design and Manufacture</p> <p>Section A: Materials and Components</p> <p>Processes and Manufacture: Learners present powerpoints in groups-focus one off production (item of hand-made furniture) and large batch production (IKEA furniture product).</p> <p>Project</p> <p>Basic card/Styrofoam modelling of ideas. Basic 3D CAD modelling of some ideas.</p> <p>Focus on communicating ideas through a variety of methods.</p>	<p>Project</p> <p>Update of research plan. Start final specification. Continuation of ideas generation using models/CAD and drawing techniques.</p>	<p>In the first week back after the summer break, learners need to be re-introduced to the A2 course.</p> <p>It is important to re cap on theory work introduced in the previous term, plus review coursework.</p> <p>Some learners may have changed their minds about their choice of project. This should not be a major problem but they will need advice on their new choice and appropriate action taken to catch up.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 2</p>	<p>PROD3: Design and Manufacture</p> <p>Section A: Materials and Components</p> <p>Introduction to A2 style essay question. -structuring an essay. -identifying key words in a question. -using guidance points in the question i.e. ‘you should make reference to...’ -mind-map planning -linking points to each other and to the question.</p> <p>Learners work in groups and split the question. Produce bullet points and arrange on flip charts. These will be used later to produce an essay answer for homework.</p> <p>Project Continuation of ideas. Refine design ideas. Produce some drawings with more detail. Critical annotation.</p>	<p>PROD3: Design and Manufacture</p> <p>Section A: Materials and Components</p> <p>In groups produce mind map plans for A2 essay question.</p> <p>Work together to arrange bullet points into a structure for answer- introduction, main body, conclusion.</p> <p>Project</p> <p>Continuation of design ideas. Completion of card, Styrofoam, wire, mdf, etc, models. Add critical & evaluative notes. Use images collected in research as starting points for ideas.</p>	<p>Project</p> <p>Continuation of design ideas</p> <p>Continuation of primary/secondary research.</p>	<p>It is important that learners are taught how to address longer answers such as essays. Often they will not have these skills on entry to the course.</p> <p>The main focus of the project is designing, making and modelling. Whilst the research phase is going on, design ideas generation can go on in parallel. This avoids wasting time while waiting to conduct interviews with clients or complete other research activities that can't be done in school time.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 3</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>The influence of composites on product design and manufacture.</p> <p>Learners investigate use of carbon fibre reinforced plastics in sports equipment- e.g. tennis racket. Compare against traditional alternatives.</p> <p>Project</p> <p>Continuation of design ideas. Continuation of research but do not present in folder- keep notes in a design diary to complete research plan</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Learners produce handout-comparison between the manufacture of a wooden tennis racket using lamination and forming Vs moulding using CFRP. Benefits to consumer.</p> <p>Homework- investigate CFRP used in 'blades' for amputee runners. Complete short powerpoint or Wiki</p> <p>Project</p> <p>Continuation of design ideas. Continuation of research but do not present in folder- keep notes in a design diary to complete research plan</p>	<p>Project</p> <p>Continuation of design ideas. Continuation of research.</p> <p>Complete research plan indicating the key information obtained and how useful it was.</p>	<p>For the A2 project it is not necessary to present research. Therefore rough notes can be simply kept in a journal or diary for the purposes of completing the research plan and formulating a specification.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 4</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Application of smart materials for specific applications and/or manufacturing situations</p> <p>e.g. shape memory alloys- muscle wires to control robot actuators- applied to bionic limbs.</p> <p>e.g. thermochromic labels to indicate temperature- applied in refrigeration/storage</p> <p>e.g. photochromic pigments applied to reactions lenses in spectacles, welding masks, etc.</p> <p>Learners produce posters for class display.</p> <p>Project</p> <p>Complete final specification</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Application of biodegradable polymers to specific applications/and or manufacturing situations</p> <p>e.g. medical sutchers</p> <p>e.g. soluable polymers used in tablets.</p> <p>e.g. starch based polymers used in packaging to minimise environmental impact.</p> <p>Learners Carry out internet searches to identify 3 different biodegradable polymers and applications, and write up findings in their own words.</p> <p>Project</p> <p>Continuation of design ideas. Include use of models.</p>	<p>Project</p> <p>Continue design ideas generation.</p> <p>Paste final specification into CRF.</p> <p>Update research plan with additional key points found from primary/secondary research.</p>	<p>Learners should keep an electronic copy of the CRF and update it as they complete relevant parts of the project.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 5</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Impact of new technologies e.g. nanotechnology- application- surface coatings of fabrics or metals with other materials such as Teflon for enhanced properties such as dirt repellent, non-stick, etc.</p> <p>e.g. nanotechnology- used to produce microscopic electronic components- application in air bag sensors. Future potential for biomedical applications- implanted machines to carry out repairs to internal organs, etc. Learners to produce a 'newsletter' on nanotechnology and applications.</p> <p>Project</p> <p>Complete design ideas-add critical notes.</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Impact of new technologies- nanotechnology- applications such as biomedical such as construction of 'smart' wound dressings made from alginate and silver to minimise infection.</p> <p>Polymers used in 'smart packaging' impregnated with preservatives.</p> <p>'Microban' coatings on kitchen products such as chopping boards.</p> <p>Completion of 'newsletter'. Photocopy for class.</p> <p>Project</p> <p>Selection of design idea. Justify choice- use client/user to aid selection.</p>	<p>Project</p> <p>Selection of idea to develop. Comparison of idea against specification Use of client/user opinion to inform selection.</p>	<p>Use of the client/user in evaluating design ideas should be encouraged. Learners should explain how they selected their chosen idea. There are many ways to do this- including some form of matrix- comparing design ideas against the specification.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 6</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Impact of microelectronics.</p> <ul style="list-style-type: none"> - miniaturisation- impact on consumer products e.g. increased portability and added value through additional features. - digitalisation - Facility to & transmit store data. - Ability to communicate to other products. <p>Impact on personal communications/entertainment.</p> <p>Learners work through A2 style exam question in groups.</p> <p>Project</p> <p>Artist impression of chosen idea- use CAD or marker rendered drawing. Write up reasons for selection.</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Impact of microelectronics</p> <ul style="list-style-type: none"> - developments in personal computers. Moore's theory re miniaturisation and expansion of computing power. - linked innovations in software e.g. internet. - Impact of MP3/MP4 on products. <p>Learners complete a product analysis using their own mobile phones or other digital products.</p> <p>Project</p> <p>Complete artist impression- CAD/marker. Write up reasons for selection.</p>	<p>Project</p> <p>Start development of chosen idea. Consider aesthetics, proportions/scale.</p>	

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 7</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Other factors influencing personal communication/entertainment devices:</p> <p>LCD/Colour LCD Developments in batteries Bluetooth/Infra-red.</p> <p>Learners are to compare and contrast an early mobile phone to a current model.</p> <p>Project</p> <p>Continue development of chosen idea- refine aesthetics, shape, proportion, etc.</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Impact of technological development on product lifecycles.</p> <p>e.g. rapid obsolescence of computers with advancements of microprocessors.</p> <p>e.g. technology push influencing demand for improved products- e.g. digital TV set top boxes with hard-drive to download and record programmes on demand.</p> <p>Learners to complete lifecycle diagrams for products they are familiar with e.g. tape cassette to CD to MP3</p> <p>Project</p> <p>Continue development of chosen idea- refine aesthetics, shape, proportion, etc.</p>	<p>Project</p> <p>Continue development of chosen idea- refine aesthetics, shape, proportion, etc.</p>	

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 8</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Developments in modern materials: Composites such as: Carbon fibre reinforced plastics used in motor racing vehicles engineering timbers such as Glulam- enhanced properties for construction industry. Kevlar composites used in body armour and safety equipment. Students to work through A2 essay style question. Produce plans as a group and complete for homework</p> <p>Project</p> <p>Continue development of design-explore alternative construction methods.</p>	<p>Section B: Design and Market Influences</p> <p>Major developments in technology.</p> <p>Developments in materials:</p> <p>Metals such as: PMC- used in jewellery making. Discuss advantages over traditional alternatives. Titanium – Application such as bone replacements. Benefits over other metals or polymers. Metal foams- Applications such as composites used in vehicle armour. Coated metals- e.g. PET coated aluminium in soft drinks cans.</p> <p>Learners to produce video pod-cast on use of low temperature casting alloy-jewellery making.</p>	<p>Project</p> <p>Develop product- explore alternative materials and construction methods.</p> <p>Make appointment with 'client' to review ideas and assist in design selection.</p>	<p>Learners should keep in regular contact with the 'client' for the project. It is very important to work with a client in the design selection phase and to build up to client involvement in the final evaluation and testing of the finished product.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 9</p>	<p>PROD3: Design and Manufacture</p> <p>Section A: Materials and Components</p> <p>Use of polymers to replace traditional materials e.g. glass in bottles, timber in windows.</p> <p>Students compare and contrast using photos of products made from polymers and traditional alternative.</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p> <p>Project</p> <p>Develop design- consider alternative materials and construction methods. Produce models and test pieces.</p>	<p>Section B: Design and Market Influences.</p> <p>Modelling:</p> <p>Use of mock ups and prototypes.</p> <p>Students discuss own use of models in designing their projects.</p> <p>Use internet to research how car designers use models to test wind resistance and for data capture used in tooling up.</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p> <p>Project</p> <p>Develop design- consider alternative materials and construction methods. Produce models and test pieces</p>	<p>Project</p> <p>Produce rough mock-ups in card. Possibly full size.</p> <p>Use wire frame./Styrofoam or MDF models.</p> <p>Photograph and evaluate.</p>	<p>At this point in Y13, students should be moving towards the final design for their project. When modelling, it is worth reflecting on the industrial use of models and mock ups for the exam.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
Week 10	<p>Section B: Design and Market Influences.</p> <p>Use of orthographic drawings, Section views, exploded diagrams to communicate construction details of the product.</p> <p>Discuss industrial contexts for the above with examples from specific industries. Students produce a wall display.</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p> <p>Project</p> <p>Produce working drawings of final design. Possible use of CAD.</p>	<p>Section B: Design and Market Influences.</p> <p>Use of ICT in design.</p> <p>Learners look at how CAD/CAM is used in the development of products e.g. CAD to Rapid Prototype Model for a specific product.</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p> <p>Project</p> <p>Use of working drawings of the final design. Use of CAD or traditional methods as available.</p>	<p>Project</p> <p>Use of working drawings of the final design. Use of CAD or traditional methods as available.</p> <p>Order materials required for production</p>	<p>Most centres are likely to use the January sitting of PROD1 as a retake opportunity for learner to improve on their UMS mark.</p> <p>Learners entering the January sitting will need to be prepared in good time. This will mean putting on additional revision sessions and setting work for other students not taking the exam to build in some lesson time to devote to revision.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 11</p>	<p>Section B: Design and Market Influences.</p> <p>Information drawing: Use of organisational drawings such as charts, tables, flow charts.</p> <p>Learners will prepare notes to make their own manufacturing plans for the project.</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p> <p>Project</p> <p>Planning for manufacture: Use of step by step table and flow chart.</p>	<p>Section B: Design and Market Influences.</p> <p>Quality assurance and quality control.</p> <p>Use of QC checks in the manufacturing process.</p> <p>Learners will apply theory to their own manufacturing plans for the project.</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p> <p>Project</p> <p>Planning for manufacture: Use of step by step table and flow chart.</p>	<p>Project</p> <p>Complete project plans. Produce cutting lists/material order lists.</p> <p>Update CRF</p> <p>Prepare learners for retake of PROD1 if required with revision lesson.</p>	

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 12</p>	<p>Section B: Design and Market Influences.</p> <p>Use of models, mock ups and prototypes to communicate designs. Learners look at the use of full size mock-ups in industry e.g. interior of aircraft cockpit- video/case study of Eurofighter ‘Typhoon’ jet and ergonomist development. Use of full size car interior mock up, etc.</p> <p>Project</p> <p>Finalise manufacturing plans. Produce full size mock-ups of designs e.g. chairs to test ergonomics with full size drawing of ergonomome.</p> <p>Prepare learners for PROD1 retake if required.</p>	<p>Section B: Design and Market Influences.</p> <p>Design Processes: Use of test pieces to test and evaluate making methods. Learners discuss use of test pieces to prove making processes. Industrial examples e.g. spot welds in car manufacture- tested for integrity.</p> <p>Project</p> <p>Complete full size mock-ups. Photo and evaluate. Amend design as necessary.</p>	<p>Project</p> <p>Produce test pieces to prove making methods selected for project.</p>	<p>Client could be used in testing the full size mock-up. This is especially useful when designing a product to ‘fit’ a specific person.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 13</p>	<p>Design and Market Influences Human Needs:</p> <p>‘User trips/Bodystorming’ Group uses ‘vision impairment’ glasses to simulate using products with impaired vision.</p> <p>Learners use ski gloves to handle products e.g. telephone. Evaluate ease of use.</p> <p>Project</p> <p>Start making of final outcome</p>	<p>Design and Market Influences Human Needs:</p> <p>‘User trips/Bodystorming’ Group paired up and critically analyses school building and its suitability for the disabled user.</p> <p>Project</p> <p>Start making of final outcome</p> <p>Produce jigs, fixtures, templates if required. Explain how these are part of QA/QC in the project.</p>	<p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied.</p>	<p>If learners design and make templates, jogs and fixtures, they should include the design sketches of these in their project.</p> <p>They could also make reference to the use of these in their folder to show how they are using QA/QC</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 14</p>	<p>Design and Market Influences: Human Needs</p> <p>‘User Trip/Bodystorming’ Learners analyse the ergonomic and anthropometric features of a car interior.</p> <p>Explain how interior is made to suit different sized users.</p> <p>Practice essay issued for homework: Critically analyse the ergonomic and anthropometric features of a product. Example products: scissors, hairdryer, razor.</p> <p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied.</p>	<p>Design and Market Influences: Safety</p> <p>Learners look at examples of risk assessments. Then produce a risk assessment for a manufacturing process used in their own project.</p> <p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied.</p>	<p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied.</p> <p>Return to manufacturing plan and ensure health and safety checks are included.</p>	

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 15</p>	<p>Design and Market Influences: Quality assurance and quality control</p> <p>Factory visit: Focus on identification of QA/QC. Modern quality systems such as Six Sigma, Total Quality Management, Kaizen, etc. Learners identify a manufacturing process observed on the visit and analyse the QC/QA processes. Write up a 2 side case study for homework</p> <p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied. Adapt design as required and annotate project & CRF.</p>	<p>Design and Market Influences; Quality assurance and quality control</p> <p>Practice essay question: Learners describe QA/QC systems applied to a specific product and manufacturing process.</p> <p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied. Adapt design as required and annotate project & CRF.</p>	<p>Project</p> <p>Continue making of outcome Take photos and add notes to project to show where QA has been applied. Adapt design as required and annotate project/CRF.</p> <p>REVIEW RANGE OF MAKING/MODELLING SKILLS USED SO FAR. CONSIDER MODIFICATIONS TO DESIGN OR OTHER ITEMS WHICH CAN BE MADE IF REQUIRED.</p>	<p>Learners need to demonstrate a wide range of making skills. If the final outcome does not give the opportunity to do so, other items might. For example through model making, the manufacture of test pieces, jigs and fixtures and items such as packaging or promotional stands as well as the final outcome.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 16</p>	<p>Design and Market Influences</p> <p>Sustainability and environmental concerns</p> <ul style="list-style-type: none"> - Groups discuss the key environmental problems - Investigate legislation aimed at encouraging sustainable design and manufacture. - Discussion about key concepts such as 3Rs, green approaches, eco design, sustainable design and sustainable innovation. <p>Produce posters with definitions.</p> <p>Project</p> <p>Continue manufacturing. Apply QA measures. Record making stages in folder-explaining changes as required.</p>	<p>Design and Market Influences</p> <p>Sustainability and environmental concerns</p> <p>‘Cradle to grave assessment’ of familiar products e.g. Food packaging, drinks can, mobile phone.</p> <p>Learners to suggest methods of minimising impact of their chosen products.</p> <p>Project</p> <p>Continue manufacturing. Apply QA measures. Record making stages in folder-explaining changes as required.</p>	<p>Project</p> <p>Continue manufacturing. Apply QA measures. Record making stages in folder-explaining changes as required.</p>	

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 17</p>	<p>Design and Market Influences</p> <p>Sustainability and environmental concerns</p> <p>Groups analyse environmental problems with cars. In groups produce 2 side handouts on one of the following: SMART Car Toyota Prius/Hybrid G-Whiz (electric cars)</p> <p>Critically analyse each- benefits and drawbacks of different solutions.</p> <p>Project</p> <p>Complete manufacture of outcome. Start finishing processes in good time.</p> <p>Make appointments with client for testing and evaluation.</p>	<p>Design and Market Influences</p> <p>Safety Legislation</p> <p>Discuss safety standards learners maybe familiar with e.g. Cars: NCAP e.g. Cycle helmet: BSI...</p> <p>Critically analyse two different products and explain what safety standards apply to them and how designers and manufacturers meet them</p> <p>e.g. children’s toys e.g. electric lawn mower</p> <p>Project</p> <p>Complete manufacture of outcome. Start finishing processes in good time.</p> <p>Make appointments with client for testing and evaluation.</p>	<p>Project</p> <p>Final assembly and finishing of products.</p> <p>Apply QA measures to check finish. Rectify if required.</p> <p>Opportunity to reinforce learning about Risk Assessments & COSHH</p>	<p>Generally, many learners find finishing a challenge-especially where paints are involved. Allow plenty of time for this. It is a good idea to test finishes and the skills of the user on scrap material. For many learners, it might be the first time they have used things like rollers, spray paints, or stains.</p>

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<p>Week 18</p>	<p>Section C: Processes and Manufacture.</p> <p>ICT applications</p> <p>Visiting speaker from local manufacturer: Explain use of CAD and modelling.</p> <p>(Demonstration of design portfolio with RPT models).</p> <p>Project</p> <p>Evaluation and Testing:</p> <p>Plan how the product will be tested and evaluated with client and users.</p> <p>Prepare evaluation criteria taken from the design specification, etc.</p>	<p>Section C: Processes and Manufacture.</p> <p>ICT applications</p> <p>Industry visit:</p> <p>Focus on use of PPC, CAA and CIM systems where relevant.</p> <p>Learners to produce short case study on how manufacturer uses some of the above.</p> <p>Project</p> <p>Evaluation and Testing:</p> <p>Invite client for evaluation and testing session. Organise public exhibition of products. Design questionnaire or similar to invite opinion from public on designs. Use spec criteria as a starting point.</p>	<p>Project</p> <p>Evaluation and Testing:</p> <p>Organise transport of products to 'site' and plan how it will be tested. Consider using video of user testing if using e-portfolio.</p> <p>Photograph product in situ.</p>	<p>Evaluation and testing is a very important process in design projects. Learner will need to plan ahead – finish the practical work in good time and make the necessary arrangements with clients, users, etc to have the product tested.</p> <p>Some time will need to be spent preparing objective questionnaires and testing procedures to get valuable feedback.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 19</p>	<p>Section C: Processes and Manufacture.</p> <p>Manufacturing systems</p> <p>Learners investigate the difference in materials and manufacturing methods used in craft production to those used in mass production.</p> <p>Group split into two- one considering one-off/craft, the other mass production. Groups to give a PowerPoint presentation with products to illustrate.</p> <p>Project</p> <p>Evaluation and Testing</p> <p>Write up of feedback from clients/users. Own comparison against specification.</p>	<p>Section C: Processes and Manufacture.</p> <p>Manufacturing systems</p> <p>Timed essay- 45 mins: Impact of different levels of production on choice of materials and making process.</p> <p>Project</p> <p>Own comparison against specification.</p> <p>Write up observations from field testing. Include photos.</p>	<p>Project</p> <p>Conclusions, Evaluations and Recommendations</p> <p>Learners complete the conclusion, evaluations and recommendations section of their folders. Focus on producing notes and drawings to explain changes that could be made to the product in the light of testing and user feedback.</p> <p>Opportunity to reinforce learning about Product development/improvement-examination of alternative designs, redesigning existing products.</p>	<p>Quite often, A2 exam questions ask the learner to discuss how they have applied course theory in their own projects.</p> <p>Comparing their designs against the specification is a good example. Learners might be asked to explain what a specification is and how they used it in their own project. Apart from informing ideas generation, it is used at the review of ideas and the final product. It can therefore also be used to suggest improvements to a prototype.</p>

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<p>Week 20</p>	<p>Section B: Design and Market Influences</p> <p>Copyright protection.</p> <p>Learners are to discuss examples of methods to protect designs: Patents Copyright Registered designs & trademarks.</p> <p>Look at famous case studies e.g. Dyson & Black and Decker.</p> <p>Project</p> <p>Prepare project folder for AQA submission</p>	<p>Section B: Design and Market Influences</p> <p>Copyright protection.</p> <p>Learners search Patent databases for Patents that relate to their project. Investigate how their design might infringe existing patents or whether their design meets criteria for the award of a Patent.</p> <p>Project</p> <p>Prepare project folder for AQA submission</p>	<p>Project</p> <p>Prepare project folder for AQA submission</p> <p>Ensure CRF is fully completed and signed.</p>	

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<p>Week 21</p>	<p>Design and Market Influences</p> <p>Product Development and Improvement plus the work of past and present designers.</p> <p>Learners produce 'Moodboard' style posters and explain the key style characteristics of major design movements such as Arts and Crafts, Modernist and Post- Modernist.</p> <p>Plan response to: Homework task: to consider how products designed by groups like the Bauhaus were an improvement on traditional products of the time.</p> <p>Explain how the ideas of Modernist designers have influenced what we would consider 'good design' today.</p> <p>Use exemplar products to illustrate.</p>	<p>Design and Market Influences</p> <p>Product Development and Improvement plus the work of past and present designers.</p> <p>Critical examination of design classics such as the Anglepoise compared against modern classics such as the Tizio and ARA lamp.</p> <p>Examine how post modernist ideas have influenced contemporary products such as those in the Alessi range e.g. Juicy Salif Lemon Squeezer.</p>	<p>Design and Market Influences</p> <p>Product Development and Improvement plus the work of past and present designers.</p> <p>Critical comparison between design classics such as the Barcelona chair and contemporary examples such as IKEA cantilever chair.</p> <p>Learners produce a two side handout. Best examples copied and distributed to the group.</p>	<p>Rather than teaching 'design history' in isolation, learners generally find it more relevant if they critically evaluate products. For example comparing the materials, method of manufacture, fitness for purpose, aesthetics and so on of a range of products designed in different periods.</p> <p>In doing so, learners will begin to realise how the theories and ideas of design movements and organisations has influenced the style of product produced.</p> <p>Where possible, teaching for this topic could be supported with visits to the Design Museum, the VA or even local museums to examine product collections.</p>

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Week 22	<p>Design and Market Influences</p> <p>Product Development and improvement: Human factors.</p> <p>Learners critically evaluate the ergonomic and anthropometric qualities of exemplar products from different design periods/styles and suggest improvements.</p> <p>e.g. Victorian scissors (over decorated, hardly functional), and modern- easy to use & focus on function.</p> <p>e.g. 1908 AEG electric kettle and 1995 Philips Alessi Line Kettle.</p> <p>Timed essay question: Compare and contrast the ergonomic and anthropometric features, materials and making processes of two different products: Anglepoise & ARA lamp.</p>	<p>Design and Market Influences</p> <p>Product Life Cycle</p> <p>Major Developments in Technology</p> <p>Learners analyse the life cycle of personal communication devices in terms of introduction, evolution, growth and maturity.</p> <p>Explain how changes in technology prevent decline of such products and replace outdated technologies.</p> <p>Create posters to show developments over last 10-15 years & diagram showing lifecycle 'curve'</p> <p>Task: Critically evaluate their own mobile phone/hand held game etc. Explain the technologies that enable the various functions</p>	<p>PROD3 Mock exam</p> <p>Learners spend lesson attempting a question(s) under timed/exam conditions.</p> <p>Remainder of lesson or follow up session to include a peer marking exercise.</p> <p>Mark scheme explained. Learner mark other's papers. Common errors discussed. Exemplar answers shared.</p>	<p>A few weeks prior to the exam, it is useful if lessons can be set aside to complete mock papers and allow for the group to work through. The answers.</p> <p>Gaps in knowledge/understanding can be identified for further revision.</p>

Week	Lesson 1 & 2	Lesson 3 & 4	Lesson 5 & 6	Notes
<p>Week 23</p>	<p>PROD3 Mock exam</p> <p>Learners complete mock paper/peer marking exercise.</p> <p>Prepare learners for PROD1 retake if required.</p>	<p>Revision quiz activities</p> <p>Learners complete revision quizzes using Nelson Thornes e-materials or quiz devised by teacher.</p> <p>Learners could design their own quiz to test other teams.</p> <p>Possible focus: Modern manufacturing systems-definitions of terminology</p> <p>e.g. FMS, JIT, Kanban, etc.</p> <p>PROD1 revision if required.</p>	<p>Post-It Note Revision Exercises</p> <p>e.g. Labelling of manufacturing process diagrams and step by step description.</p> <p>e.g. Key phrases/points in response to question. Organise on flip charts. E.g. suitability of a polymer for a given application.</p> <p>e.g. Ticket to ride- Learners put key phrases e.g. properties of a material, relevant to application before exit to lunch/break. Identify gaps in knowledge.</p> <p>PROD1 revision if required.</p>	<p>For some learners, it may be appropriate for them to resit PROD1 in the summer. Separate revision sessions are advised for these students to cover the mechanics of the exam. However, many of the questions have relevance to PROD3 so the rest of the group could be included.</p>

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<p>Week 24</p>	<p>Product Analysis Revision Exercises:</p> <p>Learners use Nelson Thornes e-materials or teacher devised product analysis exercises.</p> <p>Focus on selection of materials for specific products. Changes to the design to improve aspects such as safety and ergonomics.</p> <p>Product Analysis Revision Exercises:</p> <p>Learners use Nelson Thornes e-materials, past paper questions (modified) or teacher devised exercises.</p> <p>Focus on modifying an existing design to improve eco efficiency.</p>	<p>Product Analysis Revision Exercises:</p> <p>Changes and improvements to existing products. Focus on changes to make products suitable for other groups such as the young/old/disabled.</p> <p>Timed question:</p> <p>With reference to two different products, explain how they meet requirements of safety and eco efficiency.</p>	<p>Revision Breakfast/Lunch meeting.</p> <p>Learners meet 1 hour to 1.5hrs before the exam to ensure they arrive on time. Light refreshments provided to ensure they have eaten and are hydrated.</p> <p>Final reminders about the structure of the paper. Warnings about rubric infringements. Timings of each question, etc.</p> <p>Quick Q&A session to refresh memories about key concepts, terminology, etc.</p>	