# Switching from AQA GCSE (9-1) Design and Technology to OCR GCSE (9-1) Design and Technology

### Introduction

Are you currently teaching the AQA GCSE Design and Technology specification? Are you thinking of switching? We are here to help.

We will provide you with all the support you could need to switch from the AQA GCSE in Design and Technology to our OCR GCSE in Design and Technology, including:

* Mapping of AQA’s specification to OCR’s specification
* An overview of the differences in assessment
* Mapping of the AQA explicit Specification content to OCR’s open specification content

### Our offer

* Our GCSE (9-1) Design and Technology qualification has been created by our subject specialist team working with a number of stakeholders including: OCR Design, Technology and Engineering Consultative Forum, teachers, assessors, Higher Education Institutions, industry experts and subject associations. It has been created to be a qualification which engages students to achieve their full potential.
* Our GCSE team are passionate about design and technology education. With industry, teaching and assessment experience, they are fully committed to supporting centres’ delivery of our GCSE qualifications.
* We have produced a wide range of support materials, including a range of free resources available on our website, CPD opportunities and Design and Technology Subject Advisors
are available to support teachers directly. This support will continuously evolve to suit the requirements of teaching and learning through the lifetime of the specification, based on continued feedback from teachers.
* Within this document as well as mapping the specifications, we also provide comparison of the explicit content from AQA and non-explicit content of OCR; making it easier for you to see how our approach provides you with opportunity to explore and deliver the course in a flexible way suited to your centre. It also challenges students to demonstrate their understanding of different areas of study rather than remembering explicit content and examples.
* Join conversations on the OCR Design and Technology Facebook page and @OCR\_DesignTech on Twitter to discuss and share good practice.

### Key differences

|  |  |
| --- | --- |
| **OCR GCSE (9-1) Design and Technology** | **AQA GCSE (9-1) Design and Technology** |
| This qualification relates authentic real-world 21st century awareness of iterative design practices and strategies used by the creative, engineering and manufacturing industries, and shifts the focus of learning onto the process of designing rather than on the outcome. | The qualification continues to only challenge students to work creatively when designing and making, apply technical and practical expertise, with a teaching focus on the design process, material techniques and equipment, as was the expectation of the legacy qualification. |
| Specification content is not explicit, allowing centres to engage with teaching the course in a flexible way that works to their existing strengths and assesses students’ ability to apply understanding of their chosen areas of study. | The specification is explicit, stating explicit content that must be learnt by students, and on which examination questions will be based.  |
| The course offers the opportunity for students to select deeper learning in paper/board, timbers, metals, polymers and textiles, as well as Design Engineering as an alternative area of ‘In depth’ learning to the material areas. | The course offers legacy material areas that include paper/board, timbers, metals, polymers and textiles.  |
| The NEA requirement provides an approximate guide of 40 hours over 24 slides, but does not penalise students for excessive or briefer portfolios, so long as they are concise and relevant.  | The NEA explicitly requires students to produce 30-35 hours of work over 20 slides, and penalises students for producing above or below this. |
| The examination is split into 2 sections, with a maximum of two extended response questions. In depth questions offer accessibility to students no matter which material area(s) they have chosen. | The examination is split into 3 sections, with no limit to extended response questions. Where questions relate to the students’ choice of deeper learning there are elements that may not be covered by the material area they chose, requiring a second material area to be covered. |
| The examination will assess only the mathematical content from the specification. Science content is considered implicit. | The examination will assess both the mathematical and scientific content. (15 and 10% respectively) |
| The NEA is assessed over 3 AO’s, Explore, Create and Evaluate, split into 5 strands for assessment. | The NEA is assessed over 3 AO’s, Identify, Design and Make, and Analyse and Evaluate, but split into 6 strands A to F. |
| The language of assessment in the NEA is clear, requiring students work to either be; convincingly, adequately, or just meeting the statement.  | The language of assessment in the NEA is less clear, requiring students work to be either; fully meeting all statements, mostly meeting all statements, and just meeting some of the statements.  |

### Content mapping

The content within the OCR GCSE (9-1) in Design and Technology covers the key principles and concepts of design and technology and will be very familiar. We’ve laid it out in a logical progression to support teaching the GCSE in a linear way.

Important differences to the course content include

* The OCR course encourages learners to explore the world of design broadly without barriers, create unique solutions to real world problems that will be reinforced by the genuine insight of looking within the contextual challenge, and evaluating their solutions with the freedom of recognising that their design outcome is; one of many possible outcomes; or merely a point in the evolution of a better solution, that will make a difference to the lives of real users.
* By learning with an enquiry approach, learners on the OCR course will become more exploratory and inquisitive in their practice, just as it would be in industry, which will result in graduating students possessing the skills needed for the modern workplace or for further study of Design and Technology at A Level or other routes.
* By teaching learners to interpret and explain why designers have made certain decisions in the development of a solution, and by having an understanding of the complexity of the iterative design process, OCR students will be able to better react to their own challenges with innovation and creativity.
* Through the removal of legacy assessed tasks such as design specifications or heavily weighted manufacturing work, learners on the OCR course will be rewarded for focusing and communicating a genuine design journey that developed without limitations, rather than a closed process of research leading to a design brief and specification, before design ideas are developed into a final design, that is manufactured and tested/evaluated.
* The course content for OCR does not implicitly focus on designing and making as an area of learning, but encourages students to use an iterative approach to exploring a context, managing multiple problems, and solving them through a nonlinear fashion, unrestricted by material areas. Learners have the freedom to use as many or as few materials, processes and techniques that they deem to be required to achieve the appropriate design outcome.
* The OCR course has a unique reference and a requirement to the use of modern digital tools for design and manufacture, which by inclusion ensures that there is a match to how modern industry approaches design.
* Students studying the AQA course must learn and remember specific applications for each of the material areas, for core knowledge, many in traditional applications rather than modern applications, and for electronics it includes motor vehicles.
* The AQA course content requires students to know and be able to describe quality checking processes for all material areas, ranging from quality marks to UV exposure tests.
* AQA students will need to learn 16 different past and present designers, and 8 companies, which includes Primark.
* The topic of material management has been included in the AQA specification to relate specifically and only to marking out materials and minimising waste, an aspect of course content that could be absorbed into a material area or into mathematics.

Below is a table to show where AQA Design and Technology content is covered in the OCR GCSE Design and Technology specification.

| **AQA content in GCSE (9-1) Design and Technology** | **OCR content in GCSE (9-1) Design and Technology** | **Surplus Content In AQA GCSE (9-1) Design and Technology** |
| --- | --- | --- |
| 3.1.1 New and Emerging Technologies relating to industry, enterprise, sustainability, people, culture, society, environment, production techniques and systems. | 2.2 How do developments in Design and Technology influence design decisions and practice? 3.1 What are the impacts of new and emerging technologies when developing design solutions?7.6 How do new and emerging technologies have an impact on production techniques and systems? | Enterprise - virtual marketing, co-operativesPeople - technology push/market pullSociety - different religious groupProduction techniques and systems - flexible manufacturing systemsCritical evaluation - planned obsolescence |
| 3.1.2 Energy generation and storage including fossil fuels, nuclear power, renewable energy, and energy storage systems including batteries | 3.2 How do designers choose appropriate sources of energy to make products and power systems? | Kinetic pumped storage systemsAlkaline vs rechargeable batteries. |
| 3.1.3 Developments in new materials including modern materials, smart materials, composite materials and technical textiles. | 5.1 What are the main categories of materials available to designers when developing design solutions? | Smart materials - materials that significantly change by stimuli such as PH. How fibres can be spun to make enhanced fabrics e.g. conductive fabrics |
| 3.1.4 Systems approach to designing looking at inputs, processes and outputs. | 6.4 How do electronic systems provide functionality to products and processes? |  |
| 3.1.5 Mechanical devices looking at different types of movement and changing the magnitude and direction of force. | 6.3 How do we introduce controlled movement to products |  |
| 3.1.6.1 Material categories includingPapers and boardsNatural and manufactured timbersMetals and alloysPolymersTextiles | 5.1 What are the main categories of materials available to designers when developing design solutions?5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing? |  |
| 3.1.6.2 Material properties Understanding the working and physical properties of materials | 5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing? |  |
| 3.2.1 Selection of materials or components including functionality, aesthetics, environmental factors, availability, cost, social factors, cultural factors and ethical factors. | 5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing? |  |
| 3.2.2 Forces and Stresses focused on materials and objects that can be manipulated to resist and work with forces and stresses, and material that can be enhanced to resist and work with forces and stresses to improve functionality. | 6.1 What gives a product structural integrity? |  |
| 3.2.3 Ecological and social footprint of at least on material category or system, looking at ecological issues in design and manufacture, the six R's, and Social Issues in design and manufacture.3.2.4 Sources and origins of at least one material category, including life cycle assessment. | 3.3 What wider implications can have an influence on the processes of designing and making?5.3 Why is it important to understand the sources or origins of materials and/or system components? | The Six R’s - reduce, refuse, re-use, repair, recycle and rethink. Social issues in design and manufactureSafe working conditions; reducing oceanic/atmospheric pollution and reducing the detrimental (negative) impact on others. |
| 3.2.5 Using and working with materials for at least one material category, looking at properties, modifications of properties, shaping and forming using cutting, abrasion and addition. | 5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing?7.2 How can materials be manipulated and joined in different ways in a workshop environment when making final prototypes? | Properties of materials:Students must know and understand the physical and mechanical properties relevant to commercial products in their chosen area as follows. * Papers and boards (flyers/leaflets and card based food packaging).
* Timber based materials (traditional timber children’s toys and flat pack furniture).
* Metal based materials (cooking utensils and hand tools).
* Polymers (polymer seating and electrical fittings).
* Textile based materials (sportswear and furnishings).
* Electronic and mechanical systems (motor vehicles and domestic appliances).

Modifications of properties for specific purposes: * Additives to prevent moisture transfer (paper and boards).
* Seasoning to reduce moisture content of timbers (timber based materials).
* Annealing to soften material to improve malleability (metal based materials).
* Stabilisers to resist UV degradation (polymers).
* Flame retardants reduce combustion and fire hazards (textile based materials).
* Photosensitive PCB board in PCB manufacture and anodizing aluminium to improve surface hardness (electronic and mechanical systems).
 |
| 3.2.6 Stock forms, types and sizes of at least one material category. | 5.4 Why is it important to know the different available forms of specific materials and/or systems components?8.1 How can cost and availability of specific materials and/or system components affect their selection when designing? | Papers and boards:* sheet, roll and ply
* sold by size e.g. A3, thickness, weight and colour
* standard components e.g. fasteners, seals and bindings
* cartridge paper and corrugated card.

Timber based materials:* planks, boards and standard moldings
* sold by length, width, thickness and diameter
* standard components e.g. woodscrews, hinges, KD fittings.

Metal based materials:* sheet, rod, bar and tube
* sold by length, width, thickness and diameter
* standard components e.g. rivets, machine screws, nuts, and bolts.

Polymers:* sheet, rod, powder, granules, foam and films
* sold by length, width, gauge and diameter
* standard components e.g. screws, nuts and bolts, hinges.

Textile based materials:* yarns and fabrics
* sold by roll size, width, weight and ply
* standard components e.g. zips, press studs, Velcro.

Electrical and mechanical components:* sold by quantity, volt and current rating standard components e.g. E12 resistor series, dual in line IC packages (DIL), microcontrollers (PIC).
 |
| 3.2.7 Scales of production | 7.5 How do processes vary when manufacturing products to different scales of production? |  |
| 3.2.8 Specialist techniques and processes covering tools, equipment, processes, cutting and shaping to tolerance, commercial processes and quality control. | 7.2 Specialist techniques, hand tools and equipment to shape, fabricate, construct and assemble high quality prototypes. | Addition: BatikCommercial processes: Electrical and mechanical systems (pick and place assembly and flow soldering). Quality control: Papers and boards (registration marks).* Timber based materials (dimensional accuracy using go/no go fixture).
* Metal based materials (dimensional accuracy using a depth stop).
* Polymers (dimensional accuracy by selecting correct laser settings).
* Textile based materials (dimensional accuracy checking a repeating print against an original sample).
* Electrical and mechanical systems (UV exposure, developing and etching times in PCB manufacture).
 |
| 3.2.9 Surface treatments and finishes | 6. 2 Material finishing for function, durability and aesthetics6.2 How can materials and products be finished for different purposes? | Papers and boards (printing, embossing and UV varnishing). * Timber based materials (painting, varnishing and tanalising)
* Metal based materials (dip coating, powder coating and galvanizing).
* Polymers (polishing, printing and vinyl decals).
* Textile based materials (printing, dyes and stain protection).
* Electronic and mechanical systems (PCB lacquering, and lubrication).
 |
| 3.3.1 Investigation, primary and secondary data, looking at understanding client and user needs, writing a design brief and manufacturing specification, and carrying out investigations to identify problems and needs. | 1.1 How can exploring the context a design solution is intended for inform decisions and outcomes? |  |
| 3.3.2 Environmental, social and economic challenges that influence design and make tasks.3.3.3 The work of others with a minimum of two specific designers and two companies (see extensive list right) | 2.1 What are the opportunities and constraints that influence design and making requirements?3.3 What wider implications can have an influence on the processes of designing and making? | Designers: * Alexander McQueen
* Aldo Rossi
* Charles Rennie Macintosh
* Coco Chanel
* Ettore Sottsass
* Gerrit Rietveld
* Harry Beck
* Louis Comfort Tiffany
* Marcel Breuer
* Mary Quant
* Norman Foster
* Philippe Starck
* Raymond Templier
* Sir Alec Issigonis
* Vivienne Westwood
* William Morris.

Companies:* Alessi
* Apple
* Braun
* Dyson
* Gap
* Primark
* Under Armour
* Zara.
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| 3.3.4 Design Strategies including collaboration, user centred design, systems approach, iterative design and avoiding design fixation. | 3.3 What wider implications can have an influence on the processes of designing and making?4.2 How do designers source information and thinking when problem solving? |  |
| 3.3.4 Exploring and developing ideas through sketching, modelling, testing and evaluating.3.3.5 Communication of design ideas including freehand, 2D/3D sketching, system and schematic diagrams, annotation, exploded drawings, working drawings, audio and visual recordings, mathematical modelling, computer based tools and modelling. | 4.1 How can design solutions be communicated to demonstrate their suitability to a third party? |  |
| 3.3.6 Prototype Development looking at developing prototypes that satisfy requirements, demonstrate innovation, are functional/aesthetic, and marketable. | 1.2 Why is usability an important consideration when designing prototypes?7.1 How can materials and processes be used to make iterative models? |  |
| 3.3.7 Selection of materials and components to include functional need, cost and availability | 5.4 Why is it important to know the different available forms of specific materials and/or systems components? |  |
| 3.3.8 Tolerances when working with materials. | 7.3 How do designers and manufacturers ensure accuracy when making prototypes and products? | SI units e.g. accurate use of appropriate tolerances +/- 2mm, resistor tolerance and seam allowance. |
|  |  | 3.3.9 Material Management looking at planning the cutting and shaping of materials to minimise waste, marking out, data points and coordinates. |
| 3.3.10 Specialist tools and equipment 3.3.11 Specialist techniques and processes including surface treatments and finishes. | 7.2 Specialist techniques, hand tools and equipment to shape, fabricate, construct and assemble high quality prototypes.7.4 How do industry professionals use digital design tools when exploring and developing design ideas? |  |
| 3.3.11 Surface Treatments and Finishes | 6. 2 Material finishing for function, durability and aesthetics |  |

# Assessment

### Our Examination Offer

The format for the examination paper, The Principles of Design and Technology, is simple for students to understand, with only two sections to complete, A and B. The paper is well differentiated to deliver a paper that is appropriately accessible to students of all levels.

The Principles of Design and Technology paper will feature two extended response questions only. Both of these questions will allow students the opportunity to apply knowledge and understanding from their chosen area(s) of in-depth learning.

 By studying any one single material area to an in-depth level, students will be able to respond to all questions in Section B of the paper, but further areas can be added to offer them further optionality. When delivering the examined content, centres have the option to deliver it in a way that makes it specific to a design discipline, such as Fashion and Textiles or Design Engineering.

A comparison of the examination assessment is below:

| **OCR GCSE (9-1) Design and Technology** | **AQA GCSE (9-1) Design and Technology** |
| --- | --- |
| **Coverage of the paper** |
| One examination paper, worth 50% of the total GCSE, which assesses two areas, core knowledge and understanding of design and technology principles; and in-depth knowledge and understanding of at least one main material area. | One examination paper, worth 50% of the total GCSE, which assesses three areas; core technical principles (knowledge and understanding); specialist technical principles (knowledge and understanding) of at least one material category or system; and designing and making principles (knowledge and understanding). |
| In-depth material areas include:* Papers and boards;
* Natural and manufactured timber;
* Ferrous and non-ferrous metals;
* Thermo and thermosetting polymers;
* Natural, synthetic, blended and mixed fibres, woven, non-woven and knitted textiles.

Centres have the flexibility to delivery as few or as many in-depth areas dependent on the ability and aspirations of their students. | Categories/systems through which the principles can be delivered are:* Papers and boards
* Timber based materials
* Metal based materials
* Polymers
* Textile based materials
* Electronic and mechanical systems

**NB Not all material categories or systems above cover all required principles, but all must be taught.** |
| The in-depth material area for the examination can alternatively focus on design engineering. | Design Engineering is not available with AQA |
| **Overview of the paper** |
| Students have 2 hours to complete the examination paper, and it is assessed out of 100 marks. | Students have 2 hours to complete the examination paper, and it is assessed out of 100 marks. |
| Only 15% of the paper will assess mathematics | A minimum of 15% of the paper will assess mathematics |
| The science content is considered implicit; therefore no maximums or minimums are set. | A minimum of 10% of the paper will assess scientific content |
| The examination paper is split into 2 sections, with a supporting booklet of information for Section B. Section A is worth 55 marks, and focuses predominantly on core knowledge.Section B is worth 45 marks, and students choose a product within a situational context in (one of) their chosen in-depth material area (s). | The examination is split into 3 sections.Section A, Core technical principles, is worth 20 marks, and assesses a breadth of technical knowledge and understanding.Section B, Specialist technical principles, is worth 30 marks, and assesses a more in depth knowledge of technical principles.Section C, Designing and making principles, is worth 50 marks and assesses this in the context of a broad range of areas.  |
| **Structure of the paper** |
| Section A comprises 3 sets of wider questions, with a mixture of different levels of challenge, and will include one extended response question. The questions follow the same structure:* product analysis
* main maths question
* electronics, mechanics or wider issues
 | Section A comprises of a mixture of multiple choice and short answer questions targeted to the lower ability, and resulting in the remainder of the paper being less accessible to students.The questions will focus on the areas of:* new and emerging technologies
* evaluation
* how energy is generated and stored
* modern and smart materials
* understanding a systems approach when designing
* mechanical devices
* materials and their working properties
 |
| Section B is complemented with an insert booklet covering a situational context that is the same for all students. It comprises a mixture of different level questions, and again will include one extended response question. The questions follow the same structure:* core principles not covered in Section A
* in-depth technical principles of making and/or manufacture
* wider issues related to the situational context and/or manufacture of the in-depth products.
 | Section B comprises several short answer questions and one extended response question, and will see an increase in the level of challenge in the questions. The questions will focus on the areas of:* Selection of materials or components
* Forces and stresses on materials
* Ecological and social footprint
* Scales of production
* Sources and origins
* Physical and working properties
* Stock forms, types and sizes
* Specialist techniques (including quality control)
* Surface treatments and finishes
 |
| There is no section C in the Principles of Design and Technology paper | Section C comprises of a mixture of short answer questions and extended response questions, and will typically be the hardest section of the paper based on the level of ability required to respond to the questions. Question topics will include:* Contexts
* Primary and secondary data
* Needs and wants
* Investigation
* Environmental, social and economic challenges
* Idea development
* The work of others
* Design strategies
* Communication of design ideas
* Prototype development
* Selection
* Marking out
* Tolerances
* Waste
* Tools and equipment
* Techniques and processes
* Finishes
 |
| **Content covered in each section** |
| For the 55 mark Section A, students will be assessed on their knowledge of:* **Identifying requirements**
* **Learning from existing products and practice**
* **Implications of wider issues**
* **Design thinking and communication**
* **Core materials considerations** relating to materials available to designers and factors when considering their selection
* **Core technical understanding** relating to movement and electronics systems in products
* **Core understanding of processes and techniques** relating to new and emerging technologies
 | For the 20 mark **Core Technical Principles** section, students will be assessed on their knowledge of:* **New and emerging technologies**
* **Energy generation and storage**
* **Developments in new materials**
* **Systems approach to designing**
* **Mechanical devices**
* **Materials and their working properties**
 |
| * For the 45 mark Section B, students will be assessed on their knowledge of:
* **Identifying Requirements** relating to the situational context of a design solution
* **Design thinking and communication** relating to graphical communication
* **Material considerations** relating to specific materials, their origins and stock forms
* **Technical understanding** relating to structural integrity and finishes
* **Manufacturing processes and techniques** relating to iterative models, manipulating and joining materials for final prototypes, accuracy, digital manufacture, scales of production, and large scale manufacture.
* **Viability of design solutions**
 | For the 30 mark **Technical Specialist Principles** section, students will be assessed on their knowledge of:* **Selection of materials or components**
* **Forces and stresses**
* **Ecological and social footprint**
* **Sources and origins**
* **Using and working with materials**
* **Stock forms, types and sizes**
* **Scales of production**
* **Specialist techniques and processes**
* **Surface treatments and finishes.**
 |
| Not applicable | For the 50 mark **Designing and Making Principles** section, students will be assessed on their knowledge of:* **Investigation, primary and secondary data**
* **Environmental, social and economic challenge**
* **The work of others**
* **Design strategies**
* **Communication of design ideas**
* **Prototype development**
* **Selection of materials and components**
* **Tolerances**
* **Material management**
* **Specialist tools and equipment**
* **Specialist techniques and processes.**
 |
| The Mathematics content required to be covered for the examination includes:* **Arithmetic and numerical computation**
* **Handling data**
* **Graphs**
* **Geometry and trigonometry**
 | The Mathematics content required to be covered of the examination includes:* **Arithmetic and numerical computation**
* **Handling data**
* **Graphs**
* **Geometry and trigonometry**
 |
| Implicit within the content of design and technology | The Scientific content required to be covered for the examination includes:* **Use scientific vocabulary, terminology and definitions**
* **Life cycle assessment and recycling**
* **using materials**
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### Our NEA Offer

The OCR NEA assessment format is simpler for students to understand, with 3 assessment objectives, **explore**, **create** and **evaluate**, split into just 5 strands for assessment.

OCR will provide 3 contextual challenges for each cohort in June prior to the May submission deadline.

The approximate 40 hours and 24 A3 pages suggested is no more than a guide and students will not be penalised for producing more or less that this amount, so long is their work is relevant and concise.

The OCR NEA encourages students to approach the design process as industry would, by taking risks, managing multiple priorities, working in a non-linear fashion, and unrestricted by material areas.

Assessments of student work rewards the iterative design and make process the student follows rather than focusing on the outcome with a strong weighting towards manufacture. Assessing student work is simplified for the centre to help the assessor first identify an appropriate band for the evidence being assessed, before using easy to understand "convincingly", "adequately" and "just" meeting descriptors to define top, middle or bottom positions within that band.

 The language of the NEA matches 21st Century industry approaches, replacing dated terms such as ‘clients’ with ‘stakeholders’, and dated tasks such as writing a design specification are replaced by iterative approaches such as an evolving list of requirements.

A comparison of the **NEA** assessment is below:

| **OCR GCSE (9-1) Design and Technology** | **AQA GCSE (9-1) Design and Technology** |
| --- | --- |
| A single Non Exam Assessment (NEA) Iterative Design Challenge totalling 100 marks and worth 50% of the GCSE | A single Non Exam Assessment (NEA) design and make task totalling 100 marks and worth 50% of the GCSE |
| A guide time for completion of approximately 40 hours work. | The NEA project in its entirety should take between 30–35 hours to complete |
| Marking criteria giving learners the opportunity to:* **Explore** to identify needs and requirements
* **Create** solutions to meet those needs
* **Evaluate** whether the needs have been met
 | Marking criteria giving learners the opportunity to* **Identify and investigate** design possibilities
* **Produce a design brief and specification**
* **Generate design ideas**
* **Develop design ideas**
* **Realise design ideas**
* **Analyse and evaluate** the outcomes
 |
| Student portfolios can be submitted as a physical document (supported by videos) or as a complete e-portfolio | Student portfolios can be submitted as a physical document or as an e-portfolio |
| Students must make a working prototype | Students must make a working prototype |
| Marks are awarded holistically recognising that the nature of the portfolio is non-linear. | Marks are awarded holistically recognising that the nature of the portfolio is non-linear. |
| 3 Contextual Challenges released on the 1st of June prior to NEA submission. | 3 Contextual Challenges released on the 1st of June prior to NEA submission (though this is not stated within the course specification) |
| A guide of 24 A3 pages of work is suggested, but this is not a restriction, so long as communication is relevant and concise. | A maximum of 20 A3 pages may be submitted, with students **penalised** for not meeting this expectation of the assessment by being either over or under this page requirement. |
| Students are encouraged to take **calculated risks** by **managing competing priorities** when solving their identified **real world problems,** working in an **open ended fashion** not restricted by materials or processes to be used, **regardless of the in-depth material area** the student may have covered.A truly iterative process in delivery and assessment | Students should investigate a contextual challenge, define needs and wants of the user to produce a design brief and specification, generate ideas with flair and creativity, and develop these into a final design solution, before manufacturing a working prototype outcome.Delivered as a linear process and assessed as holistic one.  |
| The NEA is assessed against 3 Assessment Objectives (AOs) split into 5 strands* AO1 – Explore (Strand 1)
* AO2 - Create: Design thinking (Strand 2)
* AO2 - Create: Design communication (Strand 3)
* AO2 - Create : Final prototype (Strand 4)
* AO3 – Evaluate (Strand 5)
 | The NEA is assessed against 3 Assessment Objectives (AOs) and split into 6 sections* AO1 - Identify, investigate(Section A)
* AO1 - Outline design possibilities (Section B)
* AO2 - Generate design ideas (Section C)
* AO2 - Develop design ideas (Strand D)
* AO2 – Realise design ideas (Section E)
* AO3 - Analyse and evaluate the outcomes (Section F)
 |
| **Across the 5 strands**, the assessor will first place the student in the most appropriate of 4 bands for each aspect of the NEA work, before deciding the mark within that band. | **Across 6 sections**, the assessor will first select from the 5 band descriptors available, selecting the most appropriate to the student for each aspect of the NEA work, before deciding the specific mark for that section. |
| The students NEA is scored based on the judgement that the work ***convincingly*** meets the statement, ***adequately*** meets the statement, or ***just*** meets the statement.All statements are given equal weighting. | The students NEA is scored based on a judgement of it ***fully meeting* *all*** statements,***mostly meeting* *all*** statements, or ***just meeting the majority*** of statements, and where there are instances of overlap between descriptors, a best fit approach should be taken. |
| **Investigations of the context**Students must select a contextual challenge and use this as an authentic starting point to explore real world problems and opportunities for stakeholders in relation to their interests | **Taking the task**With reference to the context, students must develop a specific brief that meets the needs of a user, client or market. It should have a level of complexity and a degree of uncertainty. |
| **Investigations of user and stakeholder needs and wants and the outlining of stakeholder requirements (nontechnical specification)**Students are encouraged to iteratively identify the stakeholder requirements that cover specific needs, wants and interests. This will lead to the development of a relevant design brief. | **Identifying and investigating design possibilities**Students are encouraged to identify design possibilities, investigate a client’s needs or wants, and factors including economic and social challenges, and conduct research both primary and secondary in order to draw conclusions. |
| **Investigations of existing products and design practices**Students are encouraged to explore at any time, existing products and practice that might inform the design process no matter at which stage it is at.  |
| **Exploration of materials and possible technical requirements**Students are challenged to consider different materials in order to inform the technical features of their design solution |
| **Developing a brief**Students must write their own unique design brief in response to their chosen contextual challenge, that outlines their response to that challenge and how it will meet the needs and wants of related stakeholders.  | **Producing a design brief and Specification**Students must outline design possibilities by producing a design brief. They must also produce a design specification, based on conclusions from their investigations, that justifies the client/users’ needs and wants, a task not required in the OCR specification, nor seen in industrial practice. |
| **The Technical Specification**Students present their solution through a technical specification, which is the combination of both written and graphical information of how the solution meets the stakeholder requirements, and detailed sufficient that a third party could produce the final prototype. |
| **Generating Initial Ideas**Students must conceive ideas that respond to identified problems and requirements and that offer innovative challenge, producing a minimum of 10 ideas. Students should acknowledge when others provide ideas that influence the iterative process. | **Generating Design Ideas**Students must generate imaginative, creative and innovative ideas, avoid design fixation, and fully consider functionality, aesthetics and innovation. |
| **Design Developments**Students must narrow down and improve ideas through iteration, resolving identified requirements technically and conceptually. A minimum of 2 developments are required, but the quality and range of work to find suitable solutions is dependent on the students’ level of thinking. | **Developing Design Ideas**Students must produce detailed work in 2D/3D including CAD to develop a prototype, modelling and testing (at least one) idea that fully meet requirements. Students must select appropriate materials/components and produce a detailed and justified manufacturing specification. Developments will need to reference to the specification, and result in the production of sufficient accurate information for third party manufacture. |
| **Developing a Final solution**Students must consider the look and function of a final prototype as if it were being developed as a potential product, and be the result of experimentation of processes and techniques through modelling and testing. Digital design and manufacture must be used here or in the final prototype. |  |
| **Quality of chronological progression**Students are awarded marks for working systematically and evidencing their progress with real time evidence |  |
| **Quality of initial ideas**Students are awarded marks for their effective and consistent communication of their initial thinking |  |
| **Quality of design developments**Students are awarded marks for using a range of communication techniques when developing design concepts |  |
| **Quality of final design solution**Students are awarded marks for formal presentation of their design solution with suitable clarity for a 3rd party.  |  |
| **Critical Thinking**Students must systematically work through identified problems and show evidence of innovation throughout the design process |  |
| **Producing a final prototype**Students must produce the outcome authentically and safely. The most suitable alternative processes available should be used to deliver a high quality outcome. Students must use digital design and manufacture here if it has not been used in the iteration work previously. Hand tools and machinery are also required to be used either here or through earlier modelling. | **Realising Design Ideas**Students must work with a range of materials/components accurately and within tolerance, including the use of specialist equipment and CAM/CNC machines, involving shaping, fabrication, construction and assembly. Suitable finishes should be applied. A high level of quality control is required, with work having the potential for commercial viability. |
| **Analysing validity of the final prototype**Students must evaluate the prototype through stakeholder opinions against the technical specification, sought through meaningful sources outside of the school environment, ideally in context. | **Analysing and Evaluating**Students must continuously evaluate and analyse throughout the project, and comprehensively test against the design brief and specification, and with third party feedback. Modifications should be proposed. |

### The Explicit AQA Specification Content

Below you will find all the information you need to start teaching OCR GCSE (9-1) Design and Technology, with the freedom to deliver areas of learning without the constraint of specific content that must be covered and will be assessed within the exam paper. We have mapped below how our approach allows centres to not fixate on covering specific content.

### AQA Explicit Content list

| **AQA GCSE (9-1) Design and technology Specification Content** | **AQA GCSE (9-1) Explicit Content not Explicitly in the OCR specification** | **Matched OCR GCSE (9-1) Design and technology Specification** | **OCR GCSE (9-1) Explicit or illustrative Content** |
| --- | --- | --- | --- |
| 3.1.1 New and Emerging Technologies relating to industry, enterprise, sustainability, people, culture, society, environment, production techniques and systems. | **Enterprise -** crowdfunding, virtual marketing and retail, cooperatives.**People -** technology push/market pullChanging job roles**Culture -** faiths and beliefs**Society -** disabled, elderly and religious groups**Production Techniques and systems** - automation and flexible manufacturing systems (FMS)Planned Obsolescence | 2.2 How do developments in Design and Technology influence design decisions and practice?7.6 How do new and emerging technologies have an impact on production techniques and systems?3.1 What are the impacts of new and emerging technologies when developing design solutions? | **Illustrative content:**2.2 Ethics, the environment and product enhancement7.6a. Economies of scale, Disruptive Technology - 3D printing and robotics.**Explicit content:**3.1 Industry and enterprise such as circular economy, people, lifestyle, culture and society, the environment and sustainability. |
| 3.1.2 Energy generation and storage including fossil fuels, nuclear power, renewable energy, and energy storage systems including batteries | **Energy storage systems -** kinetic pumped storage systems | 3.2 How do designers choose appropriate sources of energy to make products and power systems? | **Explicit/illustrative content:**3.2 non |
| 3.1.3 Developments in new materials including modern materials, smart materials, composite materials and technical textiles. | **Modern Materials -** Metal foams and titanium, coated metals, liquid crystal displays.**Smart Materials -** SMAs, thermochromic pigments and photochromic pigments**Composites -** GRP and CRP**Technical Textiles -** kevlar and microfibres | 5.1 What are the main categories of materials available to designers when developing designsolutions? | **Explicit/illustrative content:**5.1 **Papers and boards, including:**1. papers, e.g. layout and cartridge, different weights and coatings
2. card, e.g. carton board, bleached card and corrugated card
3. boards/sheets, e.g. foam board, Styrofoam and polypropylene sheet
4. laminated layers, e.g. reflective surfaces.

**Natural and manufactured timber, including:**  1. hardwoods, e.g. oak, birch and teak
2. softwood, e.g. pine, cedar and spruce
3. manufactured boards, e.g. MDF, plywood and block board.

**Ferrous and non-ferrous metals, including:** 1. ferrous metals, e.g. iron, mild steel and stainless steel
2. non-ferrous metals, e.g. aluminium, copper and tin
3. alloys, e.g. brass, pewter and tin/lead solder.

**Thermo and thermosetting polymers, including:** 1. thermo polymers, e.g. PET, HDPE, PVC, LDPE, PS, PP, ABS, acrylic and TPE
2. thermosetting polymers, e.g. silicone; epoxy resin and polyester resin.

**Textile fibres and fabrics, including:** 1. natural fibres, e.g. cotton, wool and silk
2. synthetic fibres, e.g. nylon, polyester and acrylic
3. mixed/blended fibres, e.g. cotton/polyester
4. woven, non-woven and knitted fabrics.

**Modern and smart materials** such as graphene, super alloys, biopolymers and nano-materials**Composite materials** and their purpose in relation to contrasting applications**Technical textiles** used in different types of products dependent on context |
| 3.1.4 Systems approach to designing looking at inputs, processes and outputs. | **Inputs -** temperature and pressure sensors | 6.4 How do electronic systems provide functionality to products and processes? | **Explicit content:**6.2a1. Sensors - light dependent resistors, infrared sensors
2. Switches - tilt switches, push to make and time delay switches.

b1. Light emitting diodes
2. speakers and buzzers
3. motors

c1. i. Microcontrollers
 |
| 3.1.5 Mechanical devices looking at different types of movement and changing the magnitude and direction of force. | Levers **-** 1st, 2nd and 3rd orderLinkages - Bell cranks, push/pullRotary Systems - gear trains | 6.3 How do we introduce controlled movement to products | **Explicit content:**6.31. rotary, linear, oscillating, reciprocating
2. load, effort, fulcrum
3. c. cams, gears, pulleys and belts, levers, linkages
 |
| 3.1.6.1 Material categories includingPapers and boardsNatural and manufactured timbersMetals and alloysPolymersTextiles | papers including: • bleed proof • cartridge paper • grid • layout paper • tracing paper boards including: • corrugated card • duplex board • foil lined board • foam core board • ink jet card • solid white board.hardwoods including: • ash • beech • mahogany • oak • balsa softwoods including: • larch • pine • spruce manufactured boards including: • medium density fibreboard (MDF) • plywood • chipboard. ferrous metals including: • low carbon steel • cast Iron • high carbon/tool steel non-ferrous metals including: • aluminum • copper • tin • zinc alloys including: • brass • stainless steel • high speed steel.thermoforming including: • acrylic (PMMA) • high impact polystyrene (HIPS) • high density polythene (HDPE) • polypropylene (PP) • polyvinyl chloride (PVC) • polyethylene terephthalate (PET) thermosetting including: • epoxy resin (ER) • melamine-formaldehyde (MF) • phenol formaldehyde (PF) • polyester resin (PR) • urea-formaldehyde (UF).natural fibres including: • cotton • wool • silk synthetic fibres including: • polyester • polyamide (nylon) • elastane (lycra) blended and mixed fibres including: • cotton/polyester woven including: • plain weave non-woven including: • bonded fabrics • felted fabrics knitted textiles including: • knitted fabrics. | 5.1 What are the main categories of materials available to designers when developing design solutions?5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing? | **Explicit/illustrative content:**5.1 **Papers and boards, including:** 1. papers, e.g. layout and cartridge, different weights and coatings
2. card, e.g. carton board, bleached card and corrugated card
3. boards/sheets, e.g. foam board, Styrofoam and polypropylene sheet
4. laminated layers, e.g. reflective surfaces.

**Natural and manufactured timber, including:**  1. hardwoods, e.g. oak, birch and teak
2. softwood, e.g. pine, cedar and spruce
3. manufactured boards, e.g. MDF, plywood and block board.

**Ferrous and non-ferrous metals, including:** 1. ferrous metals, e.g. iron, mild steel and stainless steel
2. non-ferrous metals, e.g. aluminium, copper and tin iii. alloys, e.g. brass, pewter and tin/lead solder.

**Thermo and thermosetting polymers, including:** 1. thermo polymers, e.g. PET, HDPE, PVC, LDPE, PS, PP, ABS, acrylic and TPE
2. thermosetting polymers, e.g. silicone; epoxy resin and polyester resin.

**Textile fibres and fabrics, including:** 1. natural fibres, e.g. cotton, wool and silk
2. synthetic fibres, e.g. nylon, polyester and acrylic
3. mixed/blended fibres, e.g. cotton/polyester
4. .woven, non-woven and knitted fabrics.

**Modern and smart materials** such as graphene, super alloys, biopolymers and nano-materials**Composite materials** and their purpose in relation to contrasting applications**Technical textiles** used in different types of products dependent on context |
| 3.1.6.2 Material properties | Fusibility, toughness, malleability, elasticity | 5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing? | **Explicit content:**5.21. density, strength, hardness, durability, strength to weight ratio, resistance to chemicals and weather, flammability, absorbency, thermal and electrical conductivity.
2. N/A
3. Function, aesthetics, environmental, cost, social, cultural and ethical considerations.
 |
| 3.2.1 Selection of materials or components including functionality, aesthetics, environmental factors, availability, cost, social factors, cultural factors and ethical factors. | Fusibility, toughness, malleability, elasticityFunctionality: application of use, ease of working. Aesthetics: surface finish, texture and colour. Environmental factors: recyclable or reused materials. Availability: ease of sourcing and purchase. Cost: bulk buying. Social factors: social responsibility. Cultural factors: sensitive to cultural influences. Ethical factors: purchased from ethical sources such as FSC.  | 5.2 What factors are important to consider when selecting appropriate materials and/or system components when designing? | **Illustrative content:**5.21. density, strength, hardness, durability, strength to weight ratio, resistance to chemicals and weather, flammability, absorbency, thermal and electrical conductivity.
2. N/A
3. c. Function, aesthetics, environmental, cost, social, cultural and ethical considerations.
 |
| 3.2.2 Forces and Stresses focused on materials and objects that can be manipulated to resist and work with forces and stresses, and material that can be enhanced to resist and work with forces and stresses to improve functionality. | Tension, compression, bending, torsion and shear.Making materials more flexible: e.g. lamination, bending, folding, webbing, fabric interfacing.  | 6.1 What gives a product structural integrity? | **Illustrative content:**6.11. Reinforced and stiffened to withstand forces and stresses.
2. triangulation, boning, darts, layering, plastic webbing, reinforcing.
 |
| 3.2.3 Ecological and social footprint of at least on material category or system, looking at ecological issues in design and manufacture, the six R's, and Social Issues in design and manufacture. | Deforestation, farmingMileage of product from raw material source, manufactureCarbon production in manufactureReduce, refuse, re-use, repair, recycle and rethink.Safe working conditions; reducing oceanic/ atmospheric pollution and reducing the detrimental (negative) impact on others | 5.3 Why is it important to understand the sources or origins of materials and/or system components? | **Illustrative content:**5.31. N/A
2. extraction and conversion
3. mining, harvesting, manufacturing and transporting
4. N/A
5. recycling, sustainability schemes, eco-materials, upcycling.
 |
| 3.2.4 Sources and origins of at least one material category, including life cycle assessment. | Paper and board (how cellulose fibres are derived from wood and grasses and converted into paper). Timber based materials (seasoning, conversion and creation of manufactured timbers).Metal based materials (extraction and refining).Polymers (refining crude oil, fractional distillation and cracking).Textile based materials (obtaining raw material from animal, chemical and vegetable sources, processing and spinning). | 5.3 Why is it important to understand the sources or origins of materials and/or system components? | **Illustrative content:**5.3* 1. N/A
	2. extraction and conversion
	3. mining, harvesting, manufacturing and transporting
	4. N/A
	5. recycling, sustainability schemes, eco-materials, upcycling.
 |
| 3.2.5 Using and working with materials for at least one material category, looking at properties, modifications of properties, shaping and forming using cutting, abrasion and addition. | Papers and boards (flyers/leaflets and card based food packaging). • Timber based materials (traditional timber children’s toys and flat pack furniture) Metal based materials (cooking utensils and hand tools)Polymers (polymer seating and electrical fittings).Textile based materials (sportswear and furnishings).Electronic and mechanical systems (motor vehicles and domestic appliances).Additives to prevent moisture transfer (paper and boards). • Seasoning to reduce moisture content of timbers (timber based materials). • Annealing to soften material to improve malleability (metal based materials). • Stabilisers to resist UV degradation (polymers). • Flame retardants reduce combustion and fire hazards (textile based materials). • Photosensitive PCB board in PCB manufacture and anodizing aluminium to improve surface hardness (electronic and mechanical systems).Papers and boards (how to cut, crease, score, fold and perforate card).Timber based materials (how to cut, drill, chisel, sand and plane).Metal based materials (how to cut, drill, turn, mill, cast, braze and weld).Polymers (how to cut, drill, cast, deform, print and weld).Textile based materials (how to sew, pleat, gather, quilt and pipe).Electronic and mechanical systems (how to cut, drill and solder). | 7.2 How can materials be manipulated and joined in different ways in a workshop environment when making final prototypes? | **Explicit/illustrative content:**7.2a.1. **wastage -** paper and boards, e.g. cutting and punching o timber, e.g. sawing, drilling and turning o metals, e.g. sawing, drilling, shearing and turning o polymers, e.g. sawing and drilling o fibres and fabrics, e.g. cutting and shearing o design engineering, e.g. etching\*.
2. **addition -** paper and boards, e.g. adhesion and laminating timber, e.g. adhesion, joining and laminating metals, e.g. adhesion, welding/brazing and riveting polymers, e.g. adhesion and heat welding fibres and fabrics, e.g. sewing, bonding and laminating design engineering, e.g. soldering\*.
3. **deforming and reforming -** paper and boards, e.g. perforating and folding timber, e.g. steaming and pressing metals, e.g. pressing, bending and casting polymers, e.g. moulding, vacuum forming and line bending fibres and fabrics, e.g. heat treatments, pleating and gathering design engineering, e.g. moulding\*.
 |
| 3.2.6 Stock forms, types and sizes of at least one material category. | Papers and boards: • sheet, roll and ply • sold by size e.g. A3, thickness, weight and colour • standard components e.g. fasteners, seals and bindings • cartridge paper and corrugated card. Timber based materials: • planks, boards and standard moldings • sold by length, width, thickness and diameter • standard components e.g. woodscrews, hinges, KD fittings. Metal based materials: • sheet, rod, bar and tube • sold by length, width, thickness and diameter • standard components e.g. rivets, machine screws, nuts, and bolts. Polymers: • sheet, rod, powder, granules, foam and films • sold by length, width, gauge and diameter • standard components e.g. screws, nuts and bolts, hinges. Textile based materials: • yarns and fabrics • sold by roll size, width, weight and ply • standard components e.g. zips, press studs, velcro. Electrical and mechanical components: • sold by quantity, volt and current rating • standard components e.g. E12 resistor series, dual in line IC packages (DIL), microcontrollers (PIC). | 8.1 How can cost and availability of specific materials and/or system components affect their selection when designing? | **Explicit content:**8.1* 1. Commercial viability, different stakeholder needs and marketability
1. Calculate quantities
 |
| 3.2.7 Scales of production | Prototype volume production | 7.5 How do processes vary when manufacturing products to different scales of production? | **Explicit/illustrative content:**7.5* 1. batch production, mass production, lean manufacturing and just-in-time (JIT) methods
1. paper and boards, e.g. offset lithography, screen process printing, digital printing, vinyl cutting, die cutting timber, e.g. CNC routers, sawing and steam bending machines and lathes
2. metals, e.g. CNC milling, turning, sheet metal folding, pressing and stampings, and die casting polymers, e.g. compression moulding, injection moulding, vacuum forming, rotational moulding, extrusion and blow moulding fibres and fabrics, e.g. band saw cutting, flatbed and rotary screen printing, digital lay planning, industrial sewing machines and overlockers, automated presses and steam dollies
3. design engineering, e.g. laser cutting, rapid prototyping and 3D printing.
 |
| 3.2.8 Specialist techniques and processes covering tools, equipment, processes, cutting and shaping to tolerance, commercial processes and quality control. | Scaling of drawings, working to datums. Material quantities required.**wastage**, such as: • die cutting • perforation • milling**addition**, such as: soldering • 3D printing • batik • printing**deforming and reforming** such as: • creasing • pressing • drape forming • blow moulding• injection moulding • extrusion Papers and boards (offset lithography and die cutting).Timber based materials (routing and turning).Metal based materials (milling and casting). Polymers (injection molding and extrusion). Textile based materials (weaving, dying and printing).Electrical and mechanical systems (pick and place assembly and flow soldering).Papers and boards (registration marks).Timber based materials (dimensional accuracy using go/no go fixture). Metal based materials (dimensional accuracy using a depth stop).Polymers (dimensional accuracy by selecting correct laser settings).Textile based materials (dimensional accuracy checking a repeating print against an original sample).Electrical and mechanical systems (UV exposure, developing and etching times in PCB manufacture). | 7.2 Specialist techniques, hand tools and equipment to shape, fabricate, construct and assemble high quality prototypes. | **Explicit/illustrative content:**7.2ai. **wastage**paper and boards, e.g. cutting and punching o timber, e.g. sawing, drilling and turning o metals, e.g. sawing, drilling, shearing and turning o polymers, e.g. sawing and drilling o fibres and fabrics, e.g. cutting and shearing o design engineering, e.g. etching\*.ii. **addition**paper and boards, e.g. adhesion and laminating timber, e.g. adhesion, joining and laminating metals, e.g. adhesion, welding/brazing and riveting polymers, e.g. adhesion and heat welding fibres and fabrics, e.g. sewing, bonding and laminating design engineering, e.g. soldering\*.iii. **deforming and reforming**paper and boards, e.g. perforating and folding timber, e.g. steaming and pressing metals, e.g. pressing, bending and casting polymers, e.g. moulding, vacuum forming and line bending fibres and fabrics, e.g. heat treatments, pleating and gathering design engineering, e.g. moulding\*. |
| 3.2.9 Surface treatments and finishes | Papers and boards (printing, embossing and UV varnishing). • Timber based materials (painting, varnishing and tanalising). • Metal based materials (dip coating, powder coating and galvanizing). • Polymers (polishing, printing and vinyl decals). • Textile based materials (printing, dyes and stain protection). • Electronic and mechanical systems (PCB lacquering, and lubrication). | 6. 2 Material finishing for function, durability and aesthetics6.2 How can materials and products be finished for different purposes? | **Explicit content:**6.2Surface treatments for function, durability, resistance, environment and aesthetics |
| 3.3.1 Investigation, primary and secondary data, looking at understanding client and user needs, writing a design brief and manufacturing specification, and carrying out investigations to identify problems and needs. | Market research, interviews and human factors • focus groups and product analysis and evaluation • the use of percentiles. | 1.1 How can exploring the context a design solution is intended for inform decisions and outcomes? | **Explicit content:**1.1Where and how, primary user and wider stakeholder requirements, social, cultural, moral and economic factors. |
| 3.3.2 Environmental, social and economic challenges that influence design and make tasks.3.3.3 The work of others with a minimum of two specific designers and two companies (from a provided list). | Deforestation • possible increase in carbon dioxide levels leading to potential global warmingDesigners: • Alexander McQueen • Aldo Rossi • Charles Rennie Macintosh • Coco Chanel • Ettore Sottsass • Gerrit Rietveld • Harry Beck • Louis Comfort Tiffany • Marcel Breuer • Mary Quant • Norman Foster • Philippe Starck • Raymond Templier • Sir Alec Issigonis • Vivienne Westwood • William Morris.Companies: • Alessi • Apple • Braun • Dyson • Gap • Primark • Under Armour • Zara.  | 2.1 What are the opportunities and constraints that influence design and making requirements? | **Explicit content:**2.1Materials, components, processes, fashion, trends, taste, style, marketing, branding, society, usability, environment, lifecycle, past and present professionals. |
| 3.3.4 Design Strategies including collaboration, user centred design, systems approach, iterative design and avoiding design fixation. | collaborationavoiding design fixation.testingevaluation of their work to improve outcomes | 4.2 How do designers source information and thinking when problem solving? | **Explicit content:**4.2User Centred Design and Systems Thinking |
| 3.3.4 Exploring and developing ideas through sketching, modelling, testing and evaluating.3.3.5 Communication of design ideas including freehand, 2D/3D sketching, system and schematic diagrams, annotation, exploded drawings, working drawings, audio and visual recordings, mathematical modelling, computer based tools and modelling. | freehand sketching, isometric and perspectivesystem and schematic diagrams annotated drawingsworking drawings: audio and visual recordingscomputer based tools | 4.1 How can design solutions be communicated to demonstrate their suitability to a third party? | **Illustrative content:**4.12D/3D sketching, sketch modelling, exploded drawings, mathematical modelling and flow charts. |
| 3.3.6 Prototype Development looking at developing prototypes that satisfy requirements, demonstrate innovation, are functional/aesthetic, and marketable. | How the development of prototypes: • satisfy the requirements of the brief • respond to client wants and needs • demonstrate innovation • are functional • consider aesthetics • are potentially marketable.able to: • reflect critically, responding to feedback when evaluating their own prototypes • suggest modifications to improve them through inception and manufacture • assess if prototypes are fit for purpose | 7.1 How can materials and processes be used to make iterative models? | **Illustrative content:**7.1 N/A |
| 3.3.7 Selection of materials and components to include functional need, cost and availability | functional need • cost • availability | 5.4 Why is it important to know the different available forms of specific materials and/or systems components? | **Explicit/illustrative content:**5.4 Weights and sizes Stock forms - lengths, sheets, pellets, reels, rolls and rods Standard components - paper and boards, e.g. clips, fasteners, bindings timber, e.g. hinges, brackets, screws metals, e.g. bolts, rivets, hingespolymers, e.g. caps, fasteners, bolts fibres and fabrics, e.g. zips, buttons, poppers system components, e.g. resistors, capacitors, diodes, transistors and drivers, microcontrollersmechanical components, e.g. gears and cams, pulleys and belts, levers and linkages. |
| 3.3.8 Tolerances when working with materials. |  | 7.3 How do designers and manufacturers ensure accuracy when making prototypes and products? | **Explicit content:**7.3 Measuring points, lines and surfacesTemplates, jigs or patterns Working in tolerancesCutting to minimise waste |
| 3.3.9 Material management | The importance of planning the cutting and shaping of material to minimise waste e.g. nesting of shapes and parts to be cut from material stock forms. How additional material may be removed by a cutting method or required for seam allowance, joint overlap etc.  | N/A | N/A |
| 3.3.10 Specialist tools and equipment 3.3.11 Specialist techniques and processes including surface treatments and finishes. | Specialist tools and equipment, including hand tools,How to use them safely to shape, fabricate and construct a high quality prototype, including techniques such as wastage, addition, deforming and reforming.  | 7.2 Specialist techniques, hand tools and equipment to shape, fabricate, construct and assemble high quality prototypes. | **Explicit/illustrative content:**7.2a.1. **wastage**paper and boards, e.g. cutting and punching o timber, e.g. sawing, drilling and turning o metals, e.g. sawing, drilling, shearing and turning o polymers, e.g. sawing and drilling o fibres and fabrics, e.g. cutting and shearing o design engineering, e.g. etching\*.
2. **addition**paper and boards, e.g. adhesion and laminating timber, e.g. adhesion, joining and laminating metals, e.g. adhesion, welding/brazing and riveting polymers, e.g. adhesion and heat welding fibres and fabrics, e.g. sewing, bonding and laminating design engineering, e.g. soldering\*.
3. **deforming and reforming**paper and boards, e.g. perforating and folding timber, e.g. steaming and pressing metals, e.g. pressing, bending and casting polymers, e.g. moulding, vacuum forming and line bending fibres and fabrics, e.g. heat treatments, pleating and gathering design engineering, e.g. moulding\*.
 |
| 3.3.11 Surface Treatments and Finishes | How to use them safely to shape, fabricate and construct a high quality prototype, including techniques such as wastage, addition, deforming and reforming.  | 6. 2 Material finishing for function, durability and aesthetics | **Illustrative content:**6.2Surface treatments for function, durability, resistance, environment and aesthetics |
|  |  | 1.2 Why is usability an important consideration when designing prototypes? | **Explicit content:**1.2Lifestyle, ease of use and inclusivity, ergonomics and anthropometrics, aesthetics. |
|  |  | 3.3 What wider implications can have an influence on the processes of designing and making? | **Explicit content:**3.3Environmental initiatives, fair trade social and ethical awareness, global sustainable development |
|  |  | 7.4 How do industry professionals use digital design tools when exploring and developing designideas? | **Illustrative content:**7.4a. Rapid prototyping, image creation and manipulation, digital manufacture, 3D models, CAD, CAM, CAE |

### Want to switch to OCR?

If you’re an OCR-approved centre, all you need to do is download the specification and start teaching. Your exams officer can complete an intention to teach form which enables us to provide appropriate support. When you’re ready to enter your students, you just need to speak to your exams officer to:

1. Make estimated entries by **10th October** so we can prepare the question papers and ensure we’ve got enough examiners.
2. Make final entries by **21st February**. If you are not already an OCR-approved centre please refer your exams officer to the centre approval section of our admin guide.

### Next steps

1. Familiarise yourself with the specification, sample assessment materials and teaching resources on the Design and Technology qualification page of the OCR website.
<https://www.ocr.org.uk/qualifications/gcse/design-and-technology-j310-from-2017/>
2. Browse the online delivery guides for teaching ideas.
<https://www.ocr.org.uk/qualifications/gcse/design-and-technology-j310-from-2017/planning-and-teaching/>
3. Get a login for our secure extranet, Interchange – this allows you to access the latest past/practice papers and use our results analysis service, Active Results.
<https://interchange.ocr.org.uk>
4. Sign up to receive subject updates by email.
<http://www.ocr.org.uk/i-want-to/email-updates>
5. Sign up to attend a training event or take part in webinars on specific topics running throughout the year and our QandA webinar sessions every half term.
<https://www.cpdhub.ocr.org.uk>
6. Contact your OCR Subject Advisor to find out about arranging a local network meeting with other centres in your region. These are hosted at the end of the school day in a school or college near you, with teachers sharing best practice and subject advisors on hand to lead discussion and answer questions.
design.technology@ocr.org.uk



***DISCLAIMER***

This resource was designed using the most up to date information from the specification at the time it was published. Specifications are updated over time which means there may be contradictions between the resource and the specification, therefore please use the information on the latest specification at all times.If you do notice a discrepancy please contact us on the following email address: resources.feedback@ocr.org.uk