# The Hart School – Faculty of Design
# Yr 10 GCSE Design and Technology (AQA 8552) Curriculum Overview

**Curriculum intent:** GCSE Design and Technology (AQA 8552) develops pupils who design and make prototypes that solve real problems, and who understand the materials, technologies and wider issues behind products. The written exam (2 hours, 100 marks) is 50% of the GCSE and covers core technical principles, specialist technical principles and designing and making principles, with at least 15% mathematics and 10% science. The non-exam assessment (NEA, about 30 to 35 hours, 100 marks) is the other 50%: a design and make project in response to a contextual challenge that AQA releases on 1 June in the year before submission.

All of the exam theory (core technical principles, specialist technical principles and designing and making principles) is taught in Year 10, alongside practical skills, and the NEA is launched when AQA releases the contexts on 1 June. Year 11 completes the NEA by the end of February (investigating, designing, developing, realising, and analysing and evaluating); from March, lessons focus entirely on the written exam.

Progress is tracked against the exam and NEA assessment criteria, and every test, mock and PPE is followed by question level analysis (QLA) by topic and cohort, with PP and SEND work reviewed first. Practical work is risk-assessed, access arrangements are in place, and JCQ regulations apply to the NEA.

**Yr 10 end points:** By the end of Year 10 pupils have been taught all of the exam content: the core technical principles (new technologies, energy, new materials, systems, mechanical devices and materials), the specialist technical principles and the designing and making principles. They can apply mathematics and science to design problems, use specialist practical techniques, and have started their NEA investigation on the context released by AQA.

**Yr 10 key dates (LTP):** All exam theory taught by the end of Summer 1 (w/c 24.5.27) · Year 10 assessment week w/c 4.1.27 and 11.1.27 · Year 10 reports home 2.2.27 · AQA NEA contexts released 1.6.27 · AP2 window w/c 7.6.27 to 28.6.27 (full mock exam on all content) · NEA investigation begins w/c 7.6.27 · reports home 14.7.27

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| **Core Course Topic:** Topics taught in this half term. Bold = summative assessment. | **Core Principles: Technology, Energy and New Materials**<br>3.1.1 New and emerging technologies<br>3.1.2 Energy generation and storage<br>3.1.3 Modern, smart and composite materials<br>Practical: skills baseline and workshop safety | **Core Principles: Systems, Mechanical Devices and Materials**<br>3.1.4 Systems approach: inputs, processes, outputs<br>3.1.5 Mechanical devices: motion, levers, linkages, cams, gears, pulleys<br>3.1.6 Materials and their working properties<br>Focused practical task | **Specialist Technical Principles**<br>3.2 Selection of materials; forces and stresses<br>3.2 Ecological and social footprint; sources and origins<br>3.2 Stock forms, scales of production, specialist techniques<br>3.2 Surface treatments and finishes; practical task | **Designing and Making Principles**<br>3.3 Investigation, primary and secondary data<br>3.3 Environmental, social and economic challenges; the work of others<br>3.3 Design strategies; communication of design ideas<br>3.3 Prototype development, tolerances, material management, specialist tools | **All Theory Complete: Consolidation and NEA Skills**<br>Whole-course retrieval and gap closure from QLA<br>Exam technique: calculation and extended questions<br>NEA skills: research, modelling, CAD, presenting evidence<br>**End-of-theory assessment** | **Mock Exam and NEA Launch**<br>**AP2: full mock exam on all content**<br>NEA contexts released by AQA (1 June): choose a context<br>NEA: investigation, client and user research<br>Summer task: research for the NEA |
| **Additional support links:** Topic-specific pages from trusted sources (links checked September 2026) | **AQA** GCSE Design and Technology 8552 at a glance<br>**Seneca (GCSE preview)** New technology in industry<br>**Seneca (GCSE preview)** Renewable energy<br>**Seneca (GCSE preview)** Smart materials | **Seneca (GCSE preview)** Cams, gears and pulleys<br>**Seneca (GCSE preview)** Inputs and sensors<br>**Seneca (GCSE preview)** Papers and boards<br>**Seneca (GCSE preview)** Timbers | **Seneca (GCSE preview)** Metals and alloys<br>**Seneca (GCSE preview)** Polymers<br>**Seneca (GCSE preview)** Forces and stresses<br>**Seneca (GCSE preview)** Production techniques and systems | **Seneca (GCSE preview)** Design strategies<br>**Seneca (GCSE preview)** Designers<br>**Seneca (GCSE preview)** Sustainability and LCA<br>**Seneca (GCSE preview)** Market research and clients | **AQA** GCSE Design and Technology 8552 at a glance<br>**Onshape** Free CAD for education | **AQA** GCSE Design and Technology 8552 at a glance<br>**Design Museum** Designers and collections |
| **Knowledge:** The specific knowledge your child will learn in detail | New and emerging technologies change industry and society: automation, CAD/CAM, flexible manufacturing and just-in-time production; enterprise and crowdfunding; and the impact on people, culture and the environment. Energy is generated from fossil fuels, nuclear and renewable sources (wind, solar, tidal, hydro-electric, biomass) and stored in batteries and systems such as pumped storage. Modern materials (graphene, metal foams, titanium), smart materials (shape memory alloys, thermochromic and photochromic pigments) and composites (glass and carbon fibre reinforced plastics) are developed for new properties. | Electronic systems use inputs (switches and sensors), processes (microcontrollers) and outputs (lamps, buzzers, motors). Mechanical devices change the type, direction or size of motion and force: levers (three classes), linkages, cams and followers, gear trains and pulleys, with mechanical advantage, velocity ratio and gear ratio calculated. Papers and boards, natural and manufactured timbers, metals and alloys, polymers, textiles and electronic components are compared by their physical and working properties, such as strength, hardness, toughness, malleability and conductivity. | Materials are selected by function, aesthetics, environmental factors, availability, cost and social, cultural and ethical factors. Forces (tension, compression, torsion, bending and shear) act on products, and materials are reinforced or stiffened by lamination, bending, folding, webbing and interfacing. Every material has an ecological and social footprint, from extraction to disposal. Materials come in standard stock forms and sizes. Production depends on scale (one-off, batch, mass, continuous) and uses specialist techniques for wasting, addition, deforming and reforming, with surface treatments and finishes for protection and appearance. | Designers investigate primary and secondary data (client interviews, surveys, product analysis, anthropometrics) and study past and present designers and companies. Products raise environmental, social and economic issues, such as deforestation, pollution, fair trade and the 6 Rs. Design strategies (collaboration, user-centred design, systems approach, iterative design) help avoid design fixation. Ideas are communicated by sketching, exploded views, orthographic and isometric drawing, CAD, models and annotation. Prototypes are developed using appropriate materials, tolerances, cutting and marking out to minimise waste, specialist tools and finishes. | With all exam content taught, this half term closes gaps identified by QLA and practises every question type: multiple choice, short answer, calculation (at least 15% mathematics), and extended responses on designing and making. Pupils also rehearse the skills the NEA needs: client research, modelling, CAD, photographing the making process and annotating decisions. | AQA releases three contextual challenges on 1 June; pupils choose one and identify a problem and a client. The NEA is worth 50% (100 marks, about 30 to 35 hours) and must be the pupil's own work under JCQ rules. Investigation uses primary and secondary research to identify needs, leading to a design brief and specification. |
| **Key vocabulary:** Subject terms your child should know, spell and use | *automation, CAD/CAM, flexible manufacturing, just-in-time, enterprise, fossil fuel, renewable, pumped storage, modern material, smart material, composite* | *input, process, output, microcontroller, mechanical advantage, velocity ratio, gear ratio, linkage, cam, follower, physical property, working property* | *stock form, tension, compression, torsion, shear, lamination, ecological footprint, social footprint, one-off, batch, mass, continuous, wasting, addition, deforming, reforming, surface treatment* | *primary data, secondary data, anthropometrics, 6 Rs, fair trade, design fixation, iterative design, exploded view, tolerance, material management, nesting* | *retrieval, QLA, command word, extended response, calculation, NEA evidence, annotation* | *contextual challenge, client, investigation, design brief, specification, authentication, JCQ* |
| **Exam & Practical Skills:** Exam skills and practical techniques your child will develop | Exam technique for short and extended answers; practical baseline task; safe use of workshop tools | Calculating ratios; system block diagrams; comparing material properties; focused practical task | Selecting materials by properties; specialist shaping, forming, joining and finishing techniques; quality control | Research methods; communicating ideas through drawing and CAD; modelling and prototyping; working to tolerance | Answering every exam question type under time; NEA research, modelling and presentation skills | Analysing a context; interviewing a client; planning research |
| **How it is assessed:** Formative checks and summative assessments | Baseline practical task; end-of-topic tests with QLA by topic; live feedback in practical lessons; PP and SEND first. | End-of-topic tests with QLA; mathematics questions practised in every topic (at least 15% of the exam). | Year 10 assessment week (w/c 4.1.27 and 11.1.27): written paper on all content so far, QLA by topic. Reports home 2.2.27. | End-of-topic tests with QLA; extended-response practice marked against the AQA levels. | End-of-theory assessment on all content with QLA by topic and AO, PP and SEND first. | AP2 window w/c 7.6.27 to 28.6.27: full mock exam on all content with QLA by topic and AO, PP and SEND first; revision targets set for Year 11. Reports home 14.7.27. |
| **Builds on / leads to:** How this topic connects to prior and future learning | Builds on: KS3 materials, energy and systems. Leads to: systems and materials (Autumn 2); exam core technical principles. | Builds on: Y8 mechanisms and systems. Leads to: specialist technical principles (Spring 1); exam calculation questions. | Builds on: core technical principles. Leads to: designing and making principles (Spring 2); NEA material and process choices. | Builds on: specialist principles. Leads to: whole-course consolidation (Summer 1); the NEA. | Builds on: all Year 10 theory. Leads to: the mock exam and NEA launch (Summer 2). | Builds on: all Year 10 theory. Leads to: the Year 11 NEA (complete by the end of February). |

**Year 10 Assessment Week** w/c 4.1.27 and 11.1.27

**All Theory Taught** by w/c 24.5.27

**NEA Starts** contexts released 1.6.27

**AP2 Assessment** w/c 7.6.27 to 28.6.27

# The Hart School – Faculty of Design
# Yr 10 Engineering Design (OCR J822) Curriculum Overview

**Curriculum intent:** The OCR Cambridge National in Engineering Design (J822) develops pupils who design like engineers: identifying requirements, communicating ideas through sketches, engineering drawings and CAD, and testing ideas through product analysis and modelling. R038 Principles of engineering design is an exam (1 hour 15 minutes, 70 marks, 40%). R039 Communicating designs (30%) and R040 Design, evaluation and modelling (30%) are non-exam assessments: OCR sets the assignments, the school marks them and OCR moderates them.

Both non-exam units are completed in Year 10: pupils learn the design processes and requirements that underpin them, build the skills, then complete R039 (freehand sketching, engineering drawing and CAD) in Spring 1 and R040 (product analysis, modelling and evaluation) by the end of Summer 1. Year 11 focuses entirely on the R038 exam: designing processes, design requirements, communicating design outcomes and evaluating design ideas.

Progress is tracked against the OCR marking criteria for each unit, and every end-of-topic test and timed practice paper is followed by question level analysis (QLA) by topic and cohort, with PP and SEND work reviewed first. Practical work is risk-assessed, access arrangements are in place, and JCQ regulations apply to the set assignments.

**Yr 10 end points:** By the end of Year 10 pupils have completed both non-exam units: R039 Communicating designs (freehand sketches, engineering drawings to BS 8888 and CAD) and R040 Design, evaluation and modelling (product analysis, virtual and physical modelling, and evaluation), each worth 30%. They also know the R038 design processes and design requirements that underpin the coursework.

**Yr 10 key dates (LTP):** Year 10 assessment week w/c 4.1.27 and 11.1.27 · Year 10 reports home 2.2.27 · R039 deadline: end of Spring 1 (w/c 8.2.27) · R040 deadline: end of Summer 1 (w/c 24.5.27) · coursework authenticated and internally standardised in Summer 2 · AP2 window w/c 7.6.27 to 28.6.27 · reports home 14.7.27

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| **Core Course Topic:** Topics taught in this half term. Bold = summative assessment. | **Foundations: Design Processes, Requirements and Sketching**<br>R038 TA1 Designing processes: iterative and user-centred design<br>R038 TA2 Design requirements: brief, needs, wants, specification<br>Freehand sketching in 2D and 3D<br>Workshop and CAD induction | **R039 Skills: Engineering Drawing and CAD**<br>Orthographic and isometric drawing to BS 8888<br>Assembly and exploded drawings<br>3D CAD: parts, assemblies and drawings<br>R039-style practice task | **R039 Set Assignment: Communicating Designs**<br>**R039: freehand sketches of design ideas**<br>**R039: manual engineering drawings**<br>**R039: CAD models and drawings**<br>R039 complete and authenticated | **R040 Skills and Set Assignment Launch**<br>Product analysis and disassembly<br>Virtual modelling and simulation<br>Physical modelling: card, foam, 3D printing<br>R040 set assignment: scenario and product analysis | **R040 Set Assignment: Modelling and Evaluation**<br>**R040: virtual modelling**<br>**R040: physical modelling**<br>**R040: evaluating models against requirements**<br>R040 complete and authenticated | **Coursework Complete; R038 Exam Course Begins**<br>R039 and R040 internally standardised<br>**AP2: R038 assessment on content taught**<br>R038 TA3 Communicating design outcomes begins<br>Summer task: R038 retrieval |
| **Additional support links:** Topic-specific pages from trusted sources (links checked September 2026) | **OCR** Engineering Design J822 at a glance<br>**Seneca (GCSE preview)** Design strategies | **Technology Student** Third-angle orthographic drawing<br>**Onshape** Free CAD for education | **OCR** Engineering Design J822 at a glance<br>**Onshape** Free CAD for education | **STEM Learning** Design and technology resources<br>**Technology Student** CNC and CAM | **OCR** Engineering Design J822 at a glance<br>**Seneca (GCSE preview)** Sustainability and LCA | **OCR** Engineering Design J822 at a glance<br>**Tomorrow's Engineers** Engineering careers |
| **Knowledge:** The specific knowledge your child will learn in detail | Engineers use design strategies including iterative, inclusive, user-centred, sustainable and ergonomic design. The iterative process cycles through identifying needs, writing a specification, generating ideas, modelling, testing and evaluating. Design requirements come from the brief and the client and become a specification covering needs and wants, function, cost, safety, materials and manufacture. Freehand sketches in 2D and 3D, with annotation, are the first way engineers communicate ideas. | R039 Communicating designs assesses freehand sketching, manual engineering drawing and CAD. Third-angle orthographic projection shows front, plan and end views with dimensions, line types and hidden detail; isometric drawing shows the product in 3D; assembly and exploded drawings show how parts fit together. CAD produces accurate parts, assemblies and drawings that can be edited quickly. | R039 is completed under supervision in response to OCR's scenario. Pupils produce freehand sketches of ideas, manual engineering drawings to BS 8888 conventions, and CAD models and drawings, each matched to the marking criteria. Work must be the pupil's own under JCQ rules. | R040 Design, evaluation and modelling assesses product analysis, modelling and evaluation. Disassembly identifies components, materials, joining methods and manufacturing processes. Virtual models (CAD and simulation) test fit and function; physical models (card, foam, 3D printing) test size, form and use. | R040 is completed under supervision: pupils model design ideas virtually and physically, then evaluate the models against the design requirements and justify improvements with evidence, recording each stage against the marking criteria. | Both coursework units are marked, internally standardised and prepared for OCR moderation in the series agreed with the exams officer. With the coursework complete, the R038 exam course begins: communicating design outcomes and the exam skills needed for short and extended answers. |
| **Key vocabulary:** Subject terms your child should know, spell and use | *iterative design, user-centred design, ergonomics, sustainability, brief, needs, wants, specification, freehand sketch, annotation* | *third angle, orthographic, isometric, BS 8888, dimension, line type, assembly drawing, exploded drawing, CAD* | *set assignment, scenario, marking criteria, authentication, JCQ* | *product analysis, disassembly, component, virtual model, physical model, rapid prototyping* | *virtual model, physical model, evaluation, justification, marking criteria, authentication* | *internal standardisation, moderation, R038, exam technique, command word* |
| **Exam & Practical Skills:** Exam skills and practical techniques your child will develop | Analysing a brief; writing a specification; freehand sketching in 2D and 3D | Manual engineering drawing; 3D CAD modelling and drawings; completing an R039-style practice task | Producing assessed sketches, drawings and CAD to the criteria; managing time | Safe disassembly and analysis; virtual and physical modelling | Modelling to the criteria; writing justified evaluations; managing time | Reviewing marked coursework; exam-style answers |
| **How it is assessed:** Formative checks and summative assessments | Baseline; end-of-topic tests with QLA; sketching skills check; PP and SEND first. | Practice task assessed against the R039 criteria; end-of-topic tests with QLA. | Year 10 assessment week (w/c 4.1.27 and 11.1.27): R038 paper on TA1 and TA2, QLA. R039 marked against the OCR criteria. Reports home 2.2.27. | Practice tasks assessed against the R040 criteria; R040 product analysis marked against the criteria. | R040 marked against the OCR criteria. | AP2 window w/c 7.6.27 to 28.6.27: R038 assessment on content taught with QLA, PP and SEND first; coursework marks recorded. Reports home 14.7.27. |
| **Builds on / leads to:** How this topic connects to prior and future learning | Builds on: KS3 iterative design and drawing. Leads to: R039 skills (Autumn 2). | Builds on: Y9 orthographic drawing and CAD. Leads to: the R039 set assignment (Spring 1). | Builds on: Autumn 2 skills. Leads to: R040 (Spring 2). | Builds on: Y9 disassembly and modelling. Leads to: completing R040 (Summer 1). | Builds on: Spring 2. Leads to: coursework standardisation and R038 (Summer 2). | Builds on: completed coursework. Leads to: the Year 11 R038 exam course. |

**Year 10 Assessment Week** w/c 4.1.27 and 11.1.27

**R039 Complete** deadline w/c 8.2.27

**R040 Complete** deadline w/c 24.5.27

**AP2 Assessment** w/c 7.6.27 to 28.6.27

**The Hart School – Faculty of Design**
**Design and Technology: Curriculum Map and KS4 Pathways**

Each strand is taught in every year and revisited at greater depth, so pupils build on what they already know. Year 9 follows the same design process as both Key Stage 4 courses, so pupils are ready for either pathway.

| Strand | Year 7 | Year 8 | Year 9 | GCSE D&T (AQA 8552) | Engineering Design (OCR J822) |
|---|---|---|---|---|---|
| **Designing** | Design brief, user needs, ACCESS FM, specification | Designing for a target user; briefs from product analysis | Client research, measurable specification, design strategies, biomimicry | NEA investigation, brief, specification and ideas | R038 designing processes and design requirements |
| **Communicating** | 2D and isometric sketching, rendering, templates | 2D CAD; flowcharts; block diagrams | Third-angle orthographic to BS 8888; 3D CAD; annotation | Sketches, exploded views, CAD and models | R039 freehand sketches, engineering drawings and CAD |
| **Materials** | Timbers, manufactured boards, polymers; FSC | Smart and modern materials | Material choice for function, cost and sustainability | Core and specialist materials and their properties | Material properties in design requirements |
| **Making** | Marking out, sawing, joining, finishing to ±1 mm; acrylic | Mechanisms; CAM laser cutting | Making to tolerance; quality control | NEA prototype with quality control | R040 virtual and physical modelling |
| **Systems and mechanisms** | LED circuits, polarity, resistors | Levers, linkages, cams; inputs, processes, outputs; microcontrollers | Systems within analysed products | Mechanical devices and electronic systems; ratio calculations | Systems in product analysis |
| **Structures and forces** | Stable, square assemblies | Rigid frames and triangulation | Forces in product analysis and prototypes | Forces, stresses, reinforcement and stiffening | Requirements and modelling |
| **Evaluating and wider issues** | Testing with a user; designers and cultures | Life cycle and circular economy; careers | Evidence-based evaluation; 6 Rs; responsibilities of designers | NEA analysis and evaluation; environmental, social and economic issues | R038 evaluating design ideas; R040 evaluation |

**Key Stage 4 courses at a glance**

| Course | Exam | Non-exam assessment |
|---|---|---|
| **GCSE Design and Technology, AQA 8552** | Written exam: 2 hours, 100 marks, 50% (core technical principles, specialist technical principles, designing and making principles; at least 15% mathematics and 10% science). | Non-exam assessment: about 30 to 35 hours, 100 marks, 50%; contextual challenges released by AQA on 1 June in the year before submission; marked in school and moderated by AQA. |
| **Cambridge National in Engineering Design, OCR J822** | R038 Principles of engineering design: exam, 1 hour 15 minutes, 70 marks, 40%. | R039 Communicating designs (30%) and R040 Design, evaluation and modelling (30%): OCR-set assignments, marked in school and moderated by OCR. |

**The Hart School – Faculty of Design**
**Design and Technology: National Curriculum Coverage**

**National Curriculum coverage: every Key Stage 3 statement (lesson numbers)**

| Area | Key Stage 3 National Curriculum statement | Year 7 | Year 8 | Year 9 |
|---|---|---|---|---|
| **Design** | use research and exploration, such as the study of different cultures, to identify and understand user needs | L3, L15 | L4, L9 | L7 |
| **Design** | identify and solve their own design problems and understand how to reformulate problems given to them | L3, L5 | L4 | L7–L8 |
| **Design** | develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations | L3 | L9 | L8 |
| **Design** | use a variety of approaches [for example, biomimicry and user-centred design] to generate creative ideas and avoid stereotypical responses | L5 | L4 | L8 |
| **Design** | develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations | L2, L5, L11 | L2, L10 | L3–L5, L9 |
| **Make** | select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture | L6–L8, L12 | L5, L11–L12 | L10–L11 |
| **Make** | select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties | L4, L9 | L13 | L9–L11 |
| **Evaluate** | analyse the work of past and present professionals and others to develop and broaden their understanding | L15 | L9, L15 | L2 |
| **Evaluate** | investigate new and emerging technologies | L12 | L11, L13 | L4–L5 |
| **Evaluate** | test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups | L8, L14 | L6, L14 | L12–L14 |
| **Evaluate** | understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists | L4 | L14, L15 | L14 |
| **Technical** | understand and use the properties of materials and the performance of structural elements to achieve functioning solutions | L4, L7, L9 | L5, L13 | L9 |
| **Technical** | understand how more advanced mechanical systems used in their products enable changes in movement and force | — | L2–L6 | L2 |
| **Technical** | understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] | L10, L13 | L7 | L2 |
| **Technical** | apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors] and control outputs [for example, actuators] using programmable components [for example, microcontrollers] | — | L7–L8 | — |

Statements quoted from the National Curriculum in England: design and technology programmes of study (DfE). Cooking and nutrition is delivered in Food Preparation and Nutrition.