The Hart School – Faculty of Design
Yr 8 Design and Technology Curriculum Overview

Curriculum intent: Design and Technology at The Hart School teaches every pupil to design and make products that solve real problems for real people. The curriculum delivers the Key Stage 3 National Curriculum for design and technology: designing (research, specifications and creative ideas), making (selecting and using tools, materials and processes safely and accurately), evaluating (testing and improving products and learning from designers) and technical knowledge (materials, structures, mechanisms, electronic systems and programming). Cooking and nutrition is taught in Food Preparation and Nutrition.

Pupils have one Design lesson a fortnight, about 15 lessons a year. Each year returns to the same strands at greater depth: designing, communicating, materials, making, systems and mechanisms, structures and forces, and evaluating. Year 7 builds workshop safety, drawing and accurate making in timber and polymers; Year 8 adds mechanisms, electronics and CAD/CAM; Year 9 works like a KS4 candidate, with technical drawing, 3D CAD, product analysis and the full iterative design process. Every lesson opens with retrieval, and work is judged against one ladder from Bronze (identify) to Diamond (evaluate and justify).

Practical work is risk-assessed and taught in small, demonstrated steps, with machine sign-off before independent use. Tasks are scaffolded for pupils with SEND through templates, visual instructions and adapted tools, and Pupil Premium and SEND work is live-marked and analysed first. The curriculum prepares pupils for both Key Stage 4 pathways: AQA GCSE Design and Technology and the OCR Cambridge National in Engineering Design.

Yr 8 end points: By the end of Year 8 pupils can describe types of motion and explain levers, linkages and cams, calculating mechanical advantage; design and make a working mechanism with a stable structure for a target user; describe and program a simple electronic system; design in 2D CAD and make parts by CAM; explain smart and modern materials; and evaluate products, including their life cycle.

Yr 8 key dates (LTP): Baseline recap in L1 · summative assessments at L6 and L14 · AP1 data capture from the L6 summative assessment, data drop deadline 17.12.26 · Year 8 reports home 19.1.27 · 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: Lesson (L) numbers; Design is taught once a fortnight. Bold = summative assessment.	**Mechanisms: Motion, Levers, Linkages and Cams** L1 · Machine safety and Year 7 recap L2 · Motion, levers and linkages L3 · Cams and followers	**Structures and Applying Mechanisms** L4 · Designing for a target user L5 · Structures: rigid frames and triangulation **L6 · Making, testing and evaluating a mechanism**		**Electronic Systems and Programming** L7 · Systems: input, process and output L8 · Programming a microcontroller	**Product Analysis, Ergonomics and CAD/CAM** L9 · Product analysis and design briefs L10 · 2D CAD: drawing to size L11 · CAM: preparing and cutting parts	**Smart and Modern Materials; Life Cycle and Evaluation** L12 · Assembling and finishing CAM parts L13 · Smart and modern materials **L14 · Testing, evaluation and life cycle**	**Engineers, Careers and Year 9 Bridge** L15 · Engineers and designers; end-of-year review	
Additional support links: Topic-specific pages from trusted sources (links checked September 2026)	**Technology Student** Classes of lever **Technology Student** Cams and mechanisms **Seneca (GCSE preview)** Linkages	**Technology Student** Cams and mechanisms **Seneca (GCSE preview)** Cams, gears and pulleys **STEM Learning** Bridges and structures challenges		**IET Education** Inputs and outputs of design (KS3) **Seneca (GCSE preview)** Inputs and sensors **Tinkercad** Learn circuits and 3D design	**Technology Student** CNC and CAM **Tinkercad** Learn circuits and 3D design **IET Education** Ergonomics and design (KS3)	**Seneca (GCSE preview)** Smart materials **Ellen MacArthur Foundation** The circular economy	**Tomorrow's Engineers** Engineering careers **National Careers Service** Mechanical engineer	
Knowledge: The specific knowledge your child will learn in detail	There are four types of motion: linear, rotary, reciprocating and oscillating. A lever has a fulcrum, load and effort; mechanical advantage = load ÷ effort. Linkages transfer motion and change its direction (for example reverse-motion and bell-crank linkages). A cam turns rotary motion into the reciprocating or oscillating motion of a follower; the cam's shape (pear, eccentric, snail) sets how the follower moves.	Designing for a target user means meeting their needs for safety (for example no small parts, rounded edges and non-toxic finishes for children) and appeal (colour, form and movement). A structure must be strong, stable and rigid: frames are kept square, and triangulation, corner blocks and gussets stop them twisting so moving parts run freely. Testing checks movement, strength and safety, and improvements are made from the results.	**AP1 Data Capture** deadline 17.12.26	A system has an input (switch or sensor), a process and an output (LED, buzzer or motor). Light-dependent resistors (LDRs) sense light and thermistors sense temperature. A microcontroller is programmed to make decisions, for example 'if it is dark, switch on the light'. Programs are planned with a flowchart, then tested and debugged.	Product analysis looks at the function, user, materials, manufacture and sustainability of existing products. Ergonomics uses measurements of people (anthropometrics) to set sizes and angles. 2D CAD draws accurate shapes to size; slots must match the material thickness, allowing for kerf (the width the laser removes). CAM sends the file to the laser cutter, which is teacher-run with the extraction on and the lid closed.	Smart materials respond to a change in their surroundings: thermochromic pigments change colour with heat, photochromic pigments with light, and shape memory alloys return to a set shape when heated. Modern materials, such as graphene and flexible MDF, are developed for new properties. A life cycle assessment follows a product from raw materials to disposal; the circular economy keeps materials in use through repair, reuse and recycling.	Engineers and designers work in teams to solve problems, from transport to medical devices. Reviewing the year shows which strands are secure and sets targets for Year 9. Careers: mechanical engineer, product designer, CAD technician.	**AP2 Assessment** w/c 7.6.27 to 28.6.27
Key vocabulary: Subject terms your child should know, spell and use	*linear, rotary, reciprocating, oscillating, lever, fulcrum, effort, load, mechanical advantage, linkage, cam, follower*	*target user, safety, structure, frame, rigid, stable, triangulation, gusset, prototype, test, improve*		*system, input, process, output, sensor, LDR, thermistor, microcontroller, flowchart, debug*	*product analysis, ergonomics, anthropometrics, CAD, CAM, laser cutter, kerf, slot, tolerance*	*smart material, thermochromic, photochromic, shape memory alloy, modern material, life cycle, circular economy, evaluation*	*engineer, designer, teamwork, career, review, target*	
Practical Skills: The design and making skills your child will learn and practise	Identifying motion; calculating mechanical advantage; modelling linkages and cams in card	Designing for a user; making a rigid frame; fitting a working mechanism; testing and improving		Drawing block diagrams; planning with a flowchart; programming and testing a microcontroller	Analysing a product; drawing to size in 2D CAD; designing slot joints allowing for kerf; preparing files for cutting	Assembling and finishing CAM parts; testing with a user; evaluating against the specification; simple life cycle analysis	Researching a career; reflecting on progress; setting targets	
How it is assessed: Formative checks and summative assessments	Baseline retrieval of Year 7; machine sign-off recorded. Live marking against the ladder, Bronze (identify) to Diamond (evaluate and justify); PP and SEND pupils checked first. Mechanical advantage exit ticket (L2).	L6: summative assessment of designing, making and evaluating against the ladders, QLA; DIRT follows. AP1 data capture: this grade is recorded as the Year 8 AP1 (data drop deadline 17.12.26); no separate test is sat.		Live marking against the ladder, Bronze (identify) to Diamond (evaluate and justify); PP and SEND pupils checked first. Program working on test; flowchart exit ticket. Year 8 reports home 19.1.27.	Live marking against the ladder, Bronze (identify) to Diamond (evaluate and justify); PP and SEND pupils checked first. CAD file checked against measurements before cutting.	L14: summative assessment of designing, making and evaluating against the ladders, QLA; DIRT follows.	AP2 window w/c 7.6.27 to 28.6.27: end-of-year knowledge assessment and summative grades recorded at AP2; QLA by strand and cohort, PP and SEND first. Reports home 14.7.27.	
Builds on / leads to: How this topic connects to prior and future learning	Builds on: Y7 making and forces. Leads to: structures and applying mechanisms (Autumn 2); Y9 product analysis; GCSE mechanical devices.	Builds on: Autumn 1 mechanisms. Leads to: electronic systems (Spring 1); GCSE structures and mechanical devices.		Builds on: Y7 circuits. Leads to: Y9 product analysis; GCSE electronic systems; OCR R038.	Builds on: Y7 templates. Leads to: smart materials and evaluation (Summer 1); Y9 3D CAD; OCR R039.	Builds on: Spring 2 CAD/CAM. Leads to: Y9 iterative design and sustainability; GCSE new materials.	Builds on: all Year 8 learning. Leads to: Year 9 engineering design.	

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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.