JOHN PORT SPENCER ACADEMY

Engineering & Technology

Curriculum Overview

Key Stage – KS3 Years 7-9

Joy Progress Success Act with care, kindness, respect and integrity

Our curriculum is carefully sequenced to ensure cumulative knowledge and progression. Each unit builds on the last, with clear concepts that students must grasp to progress. We define end points to illustrate what mastery looks like by year-end.

Location of resources:	- Lesson Resources - 25-26
Curriculum intent and rationale:	**Curriculum Intent:** The engineering & technology curriculum develops students who are not just a generation of hobbyists, but are work ready members of society who possess a comprehensive knowledge, understanding and skills set to resiliently tackle everyday design problems. They are able to create innovative and high-quality solutions that strive to make life better in an increasingly technological world. **Rationale:** Teaching Engineering and Technology at Key Stage 3 is vital for developing students' practical, creative, and analytical abilities. It provides hands-on experiences that encourage innovation, problem-solving, and resilience. Students learn to design, make, and evaluate products, gaining insight into materials, sustainability, and the impact of technology on society. Engineering and Technology also support cross-curricular learning by applying concepts from maths, science, and computing in real-world contexts. They nurture communication and project management skills—essential for both academic success and future careers. By exploring how things are made and how systems work, students become more informed, capable, and responsible citizens. This also open doors to STEM pathways and helps address the growing demand for skilled professionals in design, engineering, and manufacturing. Ultimately, it empowers students to think critically, act creatively, and engage confidently with the technological world around them. This foundation not only prepares them for future learning and employment but also helps them understand their role in shaping an innovative future. Offering Engineering at KS3 in the Midlands supports the region's strong industrial heritage and future growth. With major employers in automotive, aerospace, and manufacturing, early exposure helps address local skills gaps. By 2030, the UK is projected to face a shortfall of 1 million engineers, according to research by strategy firm Stonehaven. At KS3, workbooks are used to aid learning, with a large proportion of practical and computer-based evidence. This practical and computer-based evidence shows application of the learning that has taken place in each learning module.
National Curriculum:	**Design** D1 use research and exploration, such as the study of different cultures, to identify and understand user needs D2 identify and solve their own design problems and understand how to reformulate problems given to them D3 develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations D4 use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses D5 develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools **Make** M1 Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture M2 select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties **Evaluate** E1 analyse the work of past and present professionals and others to develop and broaden their understanding E2 investigate new and emerging technologies E3 test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups E4 understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **Technical knowledge** Tk1 understand and use the properties of materials and the performance of structural elements to achieve functioning solutions Tk2 understand how more advanced mechanical systems used in their products enable changes in movement and force Tk3 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] Tk4 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].

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What content needs to be covered? Key Knowledge and skills / misconceptions to address (with vocab in bold and spelling underlined)
By the end of each learning module, students will know:

Yr 7 Module 1	Year 7 Module 2	Year 8 Module 1	Year 8 Module 2	Year 9 Module 1	Year 9 Module 2
Module Title: Electronic Product	**Module Title:** Graphic Product – Inclusive Design	**Module Title:** Engineering Manufacture (3D CAD)	**Module Title:** Engineering Systems (2D CAD)	**Module Title:** Product Design – User Centred Design	**Module Title:** Iterative Design
NC Links: D2, D4, D5, M1, M2, E1, E4, TK1, TK3, TK4	**NC Links:** D1, D2, D4, D5, M1, E1, E4, TK1	**NC Links:** D5, M1, M2, E1, E3, TK1	**NC Links:** D4, D5, M2, E1, E2, E3, E4, TK2, TK3, TK4	**NC Links:** D1, D2, D3, D4, D5, M1, M2, E1, E2, E3, E4, TK1	**NC Links:** D1, D2, D3, D4, D5, M1, M2, E1, E2, E3, E4, TK1
Students will learn key knowledge: - What is meant by the term PCB, solder and component sides - Identification and the correct orientation of components - Explain the process of fitting and soldering a component to a PCB - What is meant by voltage, current and resistance - Identification of real world and circuit symbols - How a basic circuit functions – what does each component do within the circuit? - How to calculate resistor colour codes - How to work safely in a practical environment - Names / part of tools and equipment and how to use them to produce an electronic product. E.g. coping saw, pillar drill, files, drill bits, machine vice - The different finishing techniques that can be performed on plastic and correct order – cross filing, draw filing, wet & dry, polishing - Explain the process of using a vacuum former to mould plastic. - Identify the specific plastics used in creation of an electronic product and some of their properties / characteristics. - How to use coloured pencils to effectively render.	**Students will learn key knowledge:** - What makes an Inclusive Design and how this can / and has been applied to the design of products - The analytical stages of the Design Process and how they inform the development of a design proposal - The importance of analysing a design context and writing a design brief - What are design movements (Gothic, Arts & Crafts, Bauhaus, American Industrial) Why did they happen? How have they influenced design? - The key angles, equipment and techniques to draw and present in isometric - What is crating and how can it be used to develop complex isometric drawings - How and why tonal and textural shading can enhance the presentation of a design - What is scale and how can it be used in the production of drawings / products. - The benefits and application of 3D CAD - How to access and submit work using Google Classroom - How to access network and cloud-based storage.	**Students will learn key knowledge:** - What is Engineering –understanding the wide range of Engineering sectors e.g. AI, Genetics, Civil) - A developed understanding of Health and Safety - What is a Risk Assessment (Risk, Hazard and Prevention) and how are these managed in workshop context. - Industry Standard Drawing Conventions and how to interpret information from 2D (Orthographic) and 3D (Isometric) Engineering Drawings. - The importance of planning / documenting evidence of manufacture – including sequencing, tools, materials and QC. - Safe Working Practices when using a centre lathe. - Parts of a centre lathe and the key processes - How to work within tolerances and apply quality control checks and judgements – working to +/-1mm accuracy - Features of 3D CAD, including: Planes, Sketch, Drawing tools, Dimensioning, Extrude, Cut, Chamfer and Fillet. Assembly of parts (mates) and conversion to working drawing.	**Students will learn key knowledge:** - Features of 2D CAD, including: line, trim, contour, vectorise and measure - The difference between a microcontroller and microprocessor. - The four types of motion - The difference between input, process and output components - What is meant by the term ‘system block diagram’ - How cams can be used to create motion - What is the difference between ‘driven’ and ‘driver’ when using gears - How linkages can be used to create motion - The difference between block-based and text-based coding	**Students will learn key knowledge:** - Why User Centred Design is an essential part of the design process. How do we design for different clients / age groups? Why does it have to differ? - The difference between user needs & wants. - The ethical and social responsibilities of designers - Why it is important to analyse existing products / previous designs - What makes an effective mould design suitable for casting – including identifying errors. - Why designs should be ‘original’ / unique in approach - Types and uses of common metals and composite materials, and their classification - What is meant by ‘product life cycle’ - Features of 2D CAD which can support the development of high-quality design ideas, including output to CNC (specifically laser cutting) in the manufacture of products - Stages of the sand casting process - Identify uses of casting in the real world - The different finishing techniques that can be performed on metal and correct. - The importance of testing / beta testing	**Students will learn key knowledge:** - Features of 3D CAD, including: Planes, Sketch, Drawing tools, Dimensioning, Extrude, Cut, Loft, Shell, Fillet and Sweep - The difference between a part and an assembly - The difference between primary and secondary research - The iterative design process and its importance in effective product development - How we develop designs so that they are suitable for manufacture (DFMA) - Additive manufacturing methods and how they function - Why supports are used when 3D printing parts - Advantages & disadvantages of CAD / CAM - CNC manufacturing methods – lathe, miller, router - Why it is important to plan / document evidence - What is a technical specification and why are they needed to manufacture a product
Students will learn key skills: - Populate and solder components to a PCB - Identify circuit components - Apply filing and finishing techniques to plastic - Respond to a design context - Create imaginative design ideas - Test electronic circuits, identifying faults and rectification methods	**Students will learn key skills:** - Investigate and analyse a design context, and develop a detailed design brief - Recognise needs, wants and constraints in a design situation - Apply sketching techniques (including crating) to create 3D isometric drawings - Apply tone and texture, to enhance the appearance of drawings and design proposals - Use annotation to explain the key features of a design - Apply scale to reduce / enlarge items or designs	**Students will learn key skills:** - Understand and analyse an Engineering Drawing - Accurately plan / document evidence of manufacture - Interpret risks, identifying hazards and take preventative action - Independently setup and use a centre lathe to accurately and safely create part from working drawings - Apply QC and tolerance to evaluate making - in relation to the engineering drawing	**Students will learn key skills:** - Use 2D CAD software independently, using a range of Basic and Advanced Tools including Image Manipulation - Identify uses of microcontrollers and microprocessors - Identify input and output components in everyday products - Create system block diagrams - Use a block editor to solve problems. - Download from a block editor to a microcontroller - Calibrate servos to allow for precise control of linear and rotary motion **Challenge:** - Mircobit tutorial tasks 6&7 – extension - Alarm assessment task – additional functionality – shake to be added - Explain the mechanisms and motion on the grab (extension) robots - Tackle the three ‘grab’ challenges - Using pulse width for control of the servos instead of servo pluggin	**Students will learn key skills:** - Investigate a given context - Write a design specification using ACCESSFM - Recognise the needs and wants of a client - Present creative and original design ideas in 2D and 3D - Demonstrate understanding through annotation	**Students will learn key skills:** - Analyse / Investigate a context - Conduct relevant research to allow a design to develop - Analyse existing products - Accurately use measuring equipment (in mm) - Use 3D CAD to accurately and independently draw and assemble parts - Prepare a 3D CAD file for additive manufacture – conversion to STL / slicing - Produce a prototype - Project management – logging progress - Carry out effective product testing

- Set up and use a pillar drill to create holes in materials.
- Work safely and with precision
- Use a vacuum former to create a product casing
- Calculate resistor colour codes
- Apply Quality Control during production of a product
- Use coloured pencils to accurately add colour to card

Challenge:
- Production of more than one design idea.
- Applying the resistor colour code to create your own resistor values.
- Calculating resistors in series
- Explaining the function of an NPN transistor as a switch / boosting current
- Being able to correctly identify faults in given circuits + explain how to rectify
- Apply knowledge of circuit components to develop a given circuit to solve a set problem.
- Complexity of screen design
- Complexity of the screen shape + the ability to cut and finish it.
- Working from written instructions to populate a PCB – go back and read again.

Misconceptions:
- It doesn't matter which side of the board is used to insert components
- All components can be inserted in any direction
- More solder = better connection
- All components just "make things work"
- All saws or drills are the same.
- When finishing plastic, you can skip steps and still get a good finish
- Any plastic can be vacuum formed
- All plastics are the same
- If a circuit doesn't work, it is broken
- Batteries are all about power and electricity
- You get a new one if it doesn't work

- Navigate 3D CAD to generate a detailed virtual 3D prototype
- Produce a presentation of work to demonstrate a depth of detail and understanding in their design proposal
- Navigate network and cloud-based storage to save and re-open documents

Challenge:
- Apply knowledge of design movements to accurately create a product inspired by one of the movements studied
- Sketch complex isometric shapes
- Detail within the context analysis
- Detail within the site survey
- Complexity / creativity of design ideas
- Complexity and accuracy of the scale drawing
- Multiple floors
- Curved surfaces
- Interior detail
- Complexity of the CAD drawing
- Depth of consideration for needs / wants and inclusive design

Misconceptions:
- Inclusive design is only for people with disabilities
- The design process is linear and fixed
- You can jump straight into designing without research.
- Crating is only for beginners
- The first idea is the best
- 90 degrees is the key angle in isometric drawing
- Cloud-based storage is up in the sky

- Work to given tolerances and calculate differences. (1mm for Bronze standard (PASS), 0.5mm for Silver, 0.2mm for Gold; however some will achieve better and work within 10-100µm (microns) (0.01 – 0.1mm).
- Use 3D CAD to accurately and independently draw and assemble parts, leading to the production of engineering drawings.

Challenge:
- Explain the various views used within a working drawing
- Be able to drill and tap an internal thread
- Use 3D CAD to accurately create a working drawing
- Detail within the manufacture plan / diary – could someone follow it to make the part?
- Overall accuracy within 0.2mm
- Production of the additional features to 0.2mm tolerance
- Independent assembly of 3D parts

Misconceptions:
- Engineering is only about fixing machines or cars
- Health and safety rules are just about avoiding injury
- The lathe only does one thing—cutting
- The lathe can create any shape
- Being "close enough" is fine
- Only the teacher is in charge of H&S

Misconceptions:
- Microprocessor and microcontroller are the same thing
- A system block diagram is a circuit diagram
- Motion is just movement
- All gears do the same job
- block coding is just for beginners and not "real" coding
- Inputs and outputs are always physical buttons and lights
- Once code is written, it automatically works
- A camera is an output

- Explain the life cycle of a product
- Use 2D CAD software independently, using a range of Basic and Advanced Tools including Image Manipulation - To accurately prepare a file for CAM
- Select appropriate tools to cut and finish MDF and pewter (non-ferrous metal)
- Set up and use a pillar drill to create holes in materials.
- Confidently and safely use a buffer and pillar drill
- Apply quality control measures/checks to
ensure a high-quality product
- Evaluate a product with a focus around client feedback.

Challenge:
- Students to set their own context to investigate
- Creating designs that use more than one layer
- Independence when producing the 2D design file
- Preparing their own file fully for pewter casting
- Complexity of designs & creativity
- Develop retail packaging

Misconceptions:
- One design can suit everyone
- Needs & wants are the same thing
- Designers only focus on aesthetics and function
- Copying an existing product is bad
- Any shape can be cast
- All metals are the same, and composites are just plastic
- Testing is only done at the end
- QC is only done at the end

- Evaluate a prototype, identifying +/-
- Create an online folio of evidence
- Produce an accurate technical specification for a product

Challenge:
- Apply knowledge of 3D CAD to create a vehicle for the lego figure to sit in
- Apply knowledge of 3D CAD to create accurate accessories
- Setting of their own project context
- Complexity in the design of the product
- Multiple part product
- Appropriate tolerances for accurate assembly / fitting external items
- Response to external feedback
- Creating accurate engineering technical drawings to industry standard

Misconceptions:
- A part and an assembly are the same
- Design is a straight line from idea to product
- If a design looks good, it can be made
- All 3D printers work the same way
- Supports are optional
- CAD/CAM is always better than manual methods
- CAD is easier than drawing by hand
- 3D printing is just for plastic and for small items

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Previous learning that is particularly relevant:

Year 7 – previous learning: Varied approach to the Design & Technology NC at KS2, with most feeder schools focussing on more craft-based activities. Some feeder schools have used coping saws at some point during the key stage.	**Year 8 – previous learning:** Pupils will have had an experience of using hand tools. This leads on to use of manually operated machinery in the engineering manufacture unit. From working to the nearest cm/mm, they are now working to tighter tolerances at 0.2mm. From the circuit fundamentals in year 7, they are now building on this further with the introduction of microcontrollers and further input/output devices. Going from circuits that just have one given function, to circuits that can be programmed to perform different tasks. Pupils have used google SketchUp in Year 7 and are now moving to 2D design and Solidworks, to continue to develop CAD skills in various forms.	**Year 9 – previous learning:** CAD skills learnt in Year 7 and 8 are further developed with the use of Onshape and recalling knowledge of 2D Design. Both now move away from manual production to the use of CAM in the form of laser cutting and 3D printing. The design skills learnt in year 7 are further developed to produce 2D and 3D sketches. Moving from more rigid contexts in Year 7 & 8, to open contexts in Year 9 – to support the transition to GCSE.

Future Learning - How content prepares students for future units, Key Stage 4, or Key Stage 5?

Circuit component knowledge and manufacture skills lead into Engineering Programmable Systems Hand skills lead into GCSE Product Design and onto A Level Design & Technology CAD skills support GCSE Product Design and Engineering Manufacture Material knowledge links to both GCSE Product Design and Engineering Manufacture Sketching skills support GCSE Product Design	Lathe processes link to Engineering Manufacture Working to tolerance links to GCSE Product Design and Engineering Manufacture CAD skills support GCSE Product Design and Engineering Manufacture Block based programming supports Engineering Programmable Systems, alongside use of system block diagrams and recognition of input and output devices Mechanisms, linkages and motion link to GCSE Product Design	Pupils are working through a folio in a similar way to GCSE Product Design – context, brief, research, existing products, designs, development, proposal CAD skills support GCSE Product Design and Engineering Manufacture Use of 3D printing and laser cutting support GCSE Product Design and Engineering Manufacture Iterative process links to GCSE Product Design Hand finishing and QC links to GCSE Product Design and Engineering Manufacture

Outcomes:

By the end of the module, pupils will be able to solve/create/produce/write:

- Gain knowledge and understanding of how to accurately and safely populate / solder a PCB. - Use hand and machine tools safely to apply material removal techniques to plastic. - Explain the function of an electronic circuit; including component recognition, values and uses.	- Gain knowledge and understanding of how to investigate a context and solve design problems. - Gain knowledge and understanding of how to accurately sketch and present design ideas in isometric, including the use of scale. - Design, develop and present an inclusive 3D CAD model.	- Gain knowledge and understanding of how to plan for the making of a pre-production part and interpret information from 2D and 3D working drawings - Be able to use process, tools and equipment safely to manufacture an accurate pre-production part - Undertake appropriate Quality Control checks, with justified conclusions	- Gain knowledge and understanding of a range of input, process and output devices - Use block-based coding to design, develop and test solutions to given problems - Gain knowledge and understanding of mechanisms / motion and there use in real world scenarios	- Fully Investigate a Design Context; that allows for production of a detailed product specification. - Develop creative design proposals that are suitable for metal casting. - Use hand and machine tools with independence to create a bespoke cast prototype.	- Gain knowledge and understanding of the iterative design process. - Gain knowledge and understanding in the application of 3D printing and CNC systems in manufacture. - Gain skills in project management, to design, develop and manufacture a marketable 3D product.

Assessment Strategy How we know our students are knowing and remembering more –

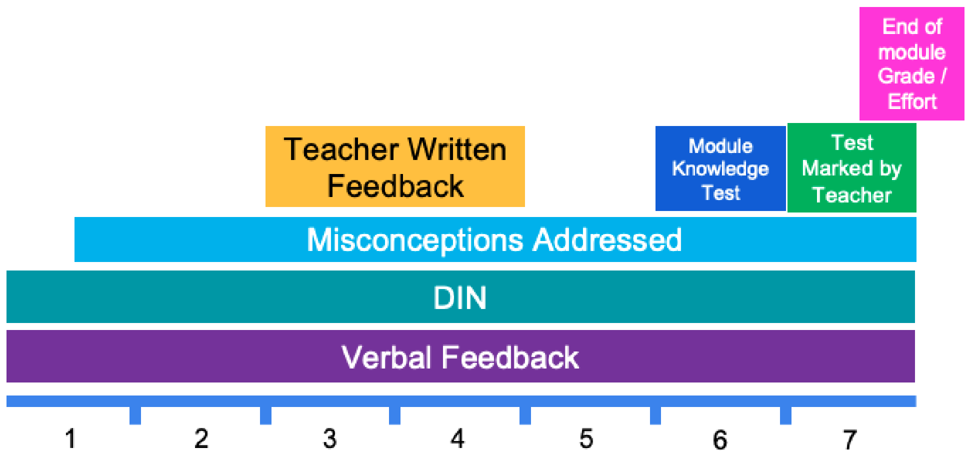
Data from hunting not fishing, formative and summative assessment/s is used to adapt teaching and provide targeted challenge and intervention, supporting SEND and disadvantaged pupils.

Formative:

Each module contains one piece which is assessed within the workbook.
Recall knowledge tests
Questioning
Teacher verbal feedback (continual)
Knowledge organiser tests
Peer feedback

Summative (& cumulative)

Each module contains an end of module test (teacher assessed out of 50) and overall grade / effort awarded.



Opportunities to revisit past learning:

Summative end of module test at the end of each module.
Dedicated module test feedback lesson, with a focus on addressing misconceptions

Opportunities for homework (including apps):

KS3 knowledge organisers
Investigation and research work

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How is the curriculum adapted to meet the needs of SEND and disadvantaged pupils, while maintaining high expectations?

The curriculum uses differentiated tasks based on a growing intelligence of pupils needs and abilities, accessible resources, assistive technology, and targeted support to ensure inclusive learning. High expectations are upheld through clear goals, regular feedback, and flexible assessments that allow all students to succeed and progress confidently.

- Practical applications make learning more meaningful and accessible
- Repetition and retrieval practice from formative and summative assessments
- DT Contribution paid for Pupil Premium – to allow items to be taken home / support materials used in school
- PP and SEND students take priority seating within our classrooms
- Scaffolding e.g. modelling, showing exemplar work
- Teaching Materials – clear font, coloured backgrounds, videos / step-by-step images projected on the board to show key processes
- Written Feedback for identified assessments
- Dedicated time in lessons to address misconceptions
- We maintain ambitious goals for SEND and disadvantaged pupils
- Variety of teaching styles used to support individual needs
- Access to SEND information e.g. passports
- We use formative assessment to identify barriers and adapt teaching in real time
- Feedback is specific, actionable, and encouraging, helping pupils understand how to improve

Wider Curriculum and Enrichment – cultural capital and real world application -

Enriching experiences:

KS3 Design and Technology enriches student experiences by fostering creativity, problem-solving, and practical skills. Through hands-on projects, pupils explore materials, tools, and technologies, encouraging innovation and resilience. It integrates STEM principles, promoting collaboration and critical thinking. Students gain real-world insights by designing solutions to everyday challenges, enhancing engagement and confidence. The curriculum supports personal growth, cultural awareness, and environmental responsibility, preparing learners for future careers and life. By blending theory with practice, KS3 Design and Technology cultivates curiosity and empowers students to shape their world thoughtfully and imaginatively.

Our curriculum supports the school value of:

Joy	*Foster enthusiasm and engagement by: hands-on creativity, problem-solving, teamwork, and the satisfaction of turning imaginative ideas into real, functional products that reflect personal expression and shared achievement.*
Progress	*We monitor and support progress through: Faculty feedback method using verbal, formative and summative tests. Scaffolded practical and written tasks, and clear success criteria. Students are guided to develop both practical skills and competencies step-by-step, with targeted interventions and personalised support to ensure every learner moves forward—regardless of starting point*
Success	*We celebrate success by: giving verbal praise, positive phone calls homes, reward points and showcasing work highlighting success for students of all abilities.*

Literacy, Oracy and disciplinary language:

Literacy

- Reading for purpose: Pupils engage with design briefs, technical specifications, and user research, developing comprehension of complex texts, reading of instructions to support the production of a circuit
- Writing for clarity: Students write design specifications, evaluations, and annotations, using structured formats like ACCESSFM to express ideas clearly.
- Vocabulary building: Exposure to subject-specific terminology (e.g. "tolerance," "isometric," "ergonomics") enhances technical literacy.
- All workbooks contain 'key words' lists on the front cover – reading and writing out some with supporting explanations of what they mean (across all workbooks)

Oracy

- Discussion: Pupils justify design choices and critique peer work. They develop confidence in speaking and listening through use of key words throughout the lessons or when asking teachers / others for key pieces of equipment / components e.g coping saw, resistor, diode, servo

Disciplinary Language

- Precision: Students learn to use accurate terminology when describing materials, tools, processes, and systems.
- Contextual Use: Language is embedded in hands-on tasks, helping students understand and apply it meaningfully.
- Cross-curricular Links: Reinforces language from science, maths, and computing, supporting broader academic development.

Cross-Curricular opportunities / Opportunities to develop 'character':

Science
- Understanding **materials, motion and electronics**.
- Applying knowledge of **conductivity, resistance, and motion**.
- Exploring **sustainability and environmental impact** of materials and manufacturing.

Mathematics
- Using **measurement, scale, ratio, and geometry** in technical drawings and product design.
- Applying **tolerances, angles, and dimensions** in CAD and workshop tasks.
- Calculating **resistor values**.

Computing
- Programming **microcontrollers** using block-based or text-based code.
- Using **CAD/CAM software** for digital design and manufacturing.
- Understanding **data flow, input-process-output systems**, and automation.

English (Literacy & Oracy)
- Writing **design briefs, specifications, and evaluations**.
- Developing **technical vocabulary** and disciplinary language.
- Presenting and justifying design ideas through peer **critique**.

Geography
- Investigating the **global impact of manufacturing**, material sourcing, and product life cycles.
- Exploring **sustainable design** and ethical production.

SHE / Citizenship
- Discussing **ethical design**, inclusive products, and social responsibility.
- Exploring **careers in STEM and design industries**.

Art & Design
- Developing **sketching, rendering, and visual communication** skills.
- Exploring **aesthetics, form, and function** in product design.

Act with care, kindness, respect, and integrity	*We build meaningful connections with our students by: encouraging teamwork, inclusive design, ethical material/ingredient use, and sustainable thinking during collaborative and creative problem-solving tasks. We create a supportive, inclusive classroom environment where every voice is heard, and every student feels respected, valued, and safe to express their views.*

Opportunities to develop 'character'

Resilience and Perseverance
- Students learn to **embrace failure as part of the design process**, testing and refining ideas through iteration.
- Practical tasks like prototyping and manufacturing teach them to **overcome setbacks** and keep improving.

Problem-Solving and Critical Thinking
- Learning modules challenge pupils to **think creatively and analytically**, solving real-world problems with practical solutions.
- They learn to **evaluate options**, make decisions, and justify their choices.

Teamwork and Communication
- Pupils develop **oracy and empathy** by presenting ideas and giving/receiving constructive feedback.

Responsibility and Independence
- Students take ownership of their work, from planning to production, learning to **manage time, tools, and materials safely**.
- They develop a sense of **pride and accountability** in producing high-quality outcomes.

Ethical Awareness and Citizenship
- Through topics like **inclusive design, and ethical manufacturing**, students explore their **social and environmental responsibilities** as future designers and consumers.

Our curriculum supports personal development by:

Builds Confidence and Independence
- Students take ownership of their ideas and projects, learning to **plan, create, and evaluate** independently.
- Success in practical tasks boosts **self-esteem** and encourages a "can-do" attitude.

Develops Problem-Solving and Critical Thinking
- Pupils are challenged to **solve real-world problems** through design, encouraging creativity and logical thinking.
- They learn to **analyse, test, and refine** their ideas, building resilience and adaptability.

Encourages Teamwork and Communication
- Peer feedback helps students develop **listening, and leadership** skills.
- Presenting ideas and justifying decisions builds **oracy and confidence** in communication.

Promotes Responsibility and Ethical Awareness
- Pupils explore **sustainability, inclusive design, and ethical manufacturing**, helping them become thoughtful, responsible citizens.
- They learn to consider the **impact of their choices** on people and the environment.

Fosters Practical and Life Skills
- Students gain hands-on experience with tools, materials, and digital technologies, developing **skills for life and future careers**.
- They learn to work safely, manage time, and meet deadlines—key attributes for personal and professional success.

Careers / Employability skills:
How does the curriculum link to the following employability skills:

Listening –
- **Understand design briefs** through active listening.
- **Follow verbal instructions** accurately during practical tasks.
- **Collaborate in teams**, listening to peers' ideas and feedback.
- **Respond to teacher guidance** to improve designs and outcomes.

Speaking –
- **Present ideas and designs** clearly to peers and teachers.
- **Explain their thinking** during evaluations.
- **Give and receive feedback** constructively.

Problem solving –
- **Design challenges** that require creative thinking and practical solutions.
- **Iterative processes**, where students identify issues and improve their work.
- **Material and tool selection**, encouraging strategic decision-making.
- **Real-world scenarios**, simulating workplace tasks that demand logical reasoning and adaptability.

Aiming high –
- **Set ambitious goals** for their design projects.
- **Strive for high-quality outcomes** through planning, testing, and refining.
- **Take pride in their work**, aiming to meet or exceed design criteria.
- **Reflect on progress** and seek ways to improve.

Critical thinking –
- **Analyse design problems** and evaluate multiple solutions.
- **Make informed decisions** about materials, tools, and processes.
- **Reflect on their work**, identifying strengths and areas for improvement.
- **Justify their design choices** using evidence and reasoning.

Staying positive –
- **Overcome challenges** during the design and making process.
- **Learn from mistakes** and view setbacks as opportunities to improve.
- **Build resilience** through trial and error in practical tasks.
- **Celebrate progress and effort**, not just final outcomes.

Leadership –
- **Make decisions** and delegate roles during collaborative work.
- **Support and motivate others**, encouraging teamwork and shared success.
- **Communicate a clear vision**, especially when presenting ideas or prototypes.

Teamwork –
- **Listen to and respect others' opinions**, building mutual understanding.
- **Solve problems together**, using each person's strengths.
- **Communicate effectively**, ensuring tasks are completed efficiently.

Creativity –
- **Generate original ideas** to solve real-world design problems.
- **Experiment with materials and techniques**, exploring innovative solutions.
- **Think outside the box**, challenging conventional approaches.
- **Develop unique products**, combining function and aesthetics.

		Employment Sectors discussed include: - **Engineering** – mechanical, electrical, civil, and structural engineering. - **Manufacturing** – product design, production processes, and quality control. - **Construction** – architecture, building design, and materials technology. - **Automotive** – vehicle design, maintenance, and innovation. - **Aerospace** – aircraft design, aerodynamics, and materials science. - **Fashion and Textiles** – clothing design, production, and sustainability. - **Product Design** – consumer goods, packaging, and ergonomics. - **Electronics and Robotics** – circuit design, programming, and automation. - **Architecture and Interior Design** – spatial planning and aesthetic design. - **Sustainable Technologies** – renewable energy, eco-design, and green engineering.

Curriculum impact is evaluated through pupil study, work scrutiny, and progress data. Findings inform regular curriculum review to ensure continuous improvement.

When was this curriculum last reviewed? Include date	What changes were made and why?	How is ongoing improvement ensured?
July 25		Work scrutiny
		Learning Walks
		CPD sessions