JOHN PORT SPENCER ACADEMY

A level Product Design

Curriculum Overview
Key Stage – KS5

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:	
Curriculum intent and rationale:	***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.*** Students are taught in mixed ability groups, with a total of 5 lessons per week. Students follow the OCR A level Design & Technology specification: AS and A Level - Design and Technology - H004-H006, H404-H406 The **rationale for teaching OCR A level Design & Technology** is to equip students with the creative, technical, and analytical skills needed to thrive in modern design, engineering, and manufacturing industries. The course encourages learners to explore real-world problems through iterative design, critical thinking, and innovation. It integrates knowledge from science, maths, and other disciplines, helping students develop a deep understanding of materials, processes, and user needs. By engaging with contemporary issues such as sustainability and inclusive design, students become thoughtful, responsible designers. The qualification also supports progression to higher education, apprenticeships, and careers in a wide range of STEM and creative sectors.
National Curriculum Links:	**N/A at KS5**

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

Yr 12 Half Term 1	Yr 12 Half Term 2	Yr 12 Half Term 3	Yr 12 Half Term 4	Yr 12 Half Term 5	Yr 12 Half Term 6
Students will learn key knowledge and skills about: Sketching techniques :Line work, isometric sketching, perspective sketching, rendering using markers, orthographic projections, Material finishes, presentation drawings. Mini project: Emergency seating - applying sketching techniques to the iterative design process to create a range of concept sketches and developed ideas (modelling Strand 2 of the NEA). One lesson a week is focussed on the theory content of the course. Product analysis including ACCESSFM Material properties, strength, elasticity, plasticity, ductility, tensile strength, malleability, electrical conductivity, thermal conductivity. Ferrous and non-ferrous metals and material extraction. Alloys Natural woods (hardwoods/softwoods),	**Students will learn key knowledge and skills about:** Mini project emergency seating continues into this term building on CAD skills following the sketching phase (modelling Strand 3 of the NEA) CAD techniques include sketching, extruding, shelling, revolves, lofting, planes, adding material colour and texture, file formats. This section of the course starts with three tutorials to teach the skills and students then use these skills to create two concept models from their design iterations. Independent skills building using online tutorials is encouraged as all projects will require different elements of the CAD software. Following this two prototypes are created using either a 3D printer and/or laser cutter depending on the fitting style of the students design. Knowledge includes file formats, H&S on machines, material use and setup. Students must be able to demonstrate safe, competent use of the machines. Accuracy of modelling. One lesson a week is focussed on the theory content of the course. Thermo and thermoset polymers, intro to forming, resin identification codes. Types of Smart materials - Shape memory Alloy (SMA) Thermochromic Pigments, Phosphorescent, Photochromic pigments, muscle wire, polymorph. Coatings, epoxy powders, galvanising, Modern Materials – Carbon fibre, Nomex, Pro Biotic, Tofu, Lenticular sheet.	**Students will learn key knowledge and skills about:** Pewter casting mini project using silicone casting techniques. This project focuses on Strand 1and 4 of the NEA. Using different manufacturing processes to create the models and final product. Students will learn to: * investigate a range of problems in order to come up with a feasible design problem. *Create a design brief with scope for challenge and consideration for the client. *Undertake some primary user and stakeholder research ensuring the value of first hand research is understood. *Anthropometric and ergonomic considerations must be evident in the research. Students will use the skills and knowledge from term 1,2 & 3 to create a range of design concepts and move on to CAD modelling their prototype. (this section of the project should be as independent as possible to ensure students are prepared for the final NEA). One lesson a week is focussed on the theory content of the course.	**Students will learn key knowledge and skills about:** Pewter casting mini project using silicone casting techniques.- manufacturing stage Students will learn the value of prototyping and quality control checks, Independent use of the 3D printer should be evident at this stage. Students will cast their mold from a 3D printed prototype and pewter cast under the supervision of a teacher/technician. Demonstrating excellent standards and high levels of accuracy. **Skills based woods project to improve wasting, joints and hand tool skills in preparation for the NEA.** One lesson a week is focussed on the theory content of the course.	**Students will learn key knowledge and skills about:** Skills based woods project to improve wasting, joints and hand tool skills in preparation for the NEA - manufacturing stage. Students will learn: * How to use a router and router table safely to cut rebates in hardwoods including H&S requirements. *How to cut a dovetail joint accurately and replicate this for the four corners of their box. (understanding wasting and effective hand tool use and tool recognition). *Apply a laser cut engrave to the top surface of their box. * Understand dry testing before the application of glue and clamps. * Use appropriate tools to carry our QC techniques at every stage of the make. * Cut rebates to fit the hinges and apply an appropriate finish following COSHH guidelines.	**Students will learn key knowledge and skills about:** One week of Work experience and mock examinations take place during term 6. (Paper 1) Start will start the Non Examined Assessment NEA – 50% of final grade. The NEA runs until Easter of Year 13. Strand 1 • Students will create at least three contexts to research working independently to create a digital portfolio. • Students will undertake primary and secondary research including identifying a client and potential stakeholders. A range of clearly defined requirements must be documented with potential design briefs. • SWOT analysis is carried out on the contexts to access the most viable problem. A detailed design brief and client profile is created.

Felling, air and kiln drying (processing & seasoning) Manmade boards Stock form **Challenge:** Differentiated by outcome, quality of the marker rendered imaged and presentation drawings. **Misconceptions:** How light reflection impacts the quality of a marker rendered image The importance of visual communication in iterative design Mix hard and softwoods and their uses. Mix ferrous and nonferrous metals and their uses. Mix alloy and composite materials and their definition. Confuse properties of materials, hardness, strength, toughness.	Nanoparticles Composite Materials Textiles fabrics and fibres- Gortex, synthetic and natural fibres. Health and Safety legislation – HASAW 1974 Additive manufacturing – 3D printers Steam bending **Students will recap, retrieve and build on key knowledge and skills from half term 1:** **Recap will cover** Ferrous and non-ferrous metals, Alloys, Natural woods (hardwoods/softwoods), Manmade boards, Thermo and thermoset polymers. Exam style DIN questions are used in all lessons. **Challenge:** Students are challenged to be creative and innovative and to try to achieve the criteria to satisfy mark band four and above of the NEA marking criteria this includes: OCR A Level Design and Technology - H404/H405/H406 - NEA Marking Criteria Strand 2 Different and relevant design approaches that lead to ideas that fully avoid design fixation, offer excellent scope for challenge and fully reflect requirements. Iterative developments are comprehensive and progressive, incorporating all technical requirements and fully respond to identified next-steps of development. Clear and comprehensive progression from earlier developments and all of the identified opportunities and requirements have been met. Systematic and effective responses to all identified problems. Clear and systematic evidence of innovation* throughout the design process. Strand 3 Design iterations are clear, systematic and chronological, fully supported by real-time evidence Informal graphical and modelling skills are excellent and are effective and consistent in appropriately communicating initial thinking. The range of communication techniques* used are excellent and are effective and consistent in appropriately developing or communicating design concepts. Formal presentation of the final design solution(s) is excellent and provides impact and appropriate clarity to a third party. **Misconceptions:** Fixated ideas – students will try to start with one idea and change very little along the process. The importance and value of feedback, students can take this as criticism instead of it being a valuable part of the design evolution of their product.	Maths content of the A Level, these are all taught using applied maths methods linked to the theory content of the course. Topics include, significant figures, cost calculations, percentages, ratio's, area, volume, perimeter, mass, density, trigonometry, coordinates, nets, histograms, frequency, percentiles **Students will recap, retrieve and build on key knowledge and skills from half term 2:** Students will use all of their skill and knowledge from term one and two to create a portfolio of evidence for strand two, three and four of the NEA. Sketching, presentation drawings and CAD skills should be improving all of the time. **Challenge:** **Strand 1** Comprehensive investigations identify a breadth and/or depth of challenging problems and opportunities for further consideration. Objective consideration of market potential through the approaches taken. Clear and fully relevant to the context offering scope for challenge and a focused identification of a primary user and other stakeholders. Full and objective consideration of primary user and other stakeholders needs and wants. A range of comprehensive requirements are identified that offer scope to support the design process. Comprehensive and relevant information and sources of inspiration are identified to influence design iterations and thinking when required throughout the design process. High levels of accuracy, outlines details that clearly communicate all requirements to a third party **Misconceptions:** Students can make errors in the complexity of the design and not think about how the original will be extracted from the mould. As the maths content in Higher GCSE level students can often be falsely confident, they have not practiced like year 11 and the content can seem quite daunting especially when applied to manufacturing scenario's.	Understanding how ICT and digital technology is changing modern manufacturing, including rapid prototyping, additive and digital manufacturing methods, stock control, monitoring, purchasing and logistics. Stereo Lithography (SLA) Laminated Object Modelling (LOM) Selective Laser Sintering (SLS) Manufacturing methods, job, batch mass, continuous (flow) production. Kaizen, Lean manufacture, Kanban, Six Sigma, Total Quality Management (TQM) Students will be able to apply their knowledge to industrial manufacturing methods and products. **Students will recap, retrieve and build on key knowledge and skills from half term 3:** Students will use all of their skill and knowledge from term 1,2 &3 to create a portfolio of evidence for strand two, three and four of the NEA. Sketching, presentation drawings and CAD skills should be improving all of the time. **Challenge:** Strand 4 Excellent standard, demonstrating high levels of accuracy. Finishing is appropriate and the outcome will present well and provide impact to a stakeholder. Excellent and are effective and consistently appropriate to materials/components being used. Use and selection of hand tools and machinery are effective and consistently appropriate. Digital design and manufacture* are used effectively and appropriately to demonstrate excellent skills and knowledge. **Misconceptions:**	One lesson a week is focussed on the theory content of the course. Students will have a thorough understanding of the following process and be able to apply the correct manufacturing process to existing products. Students will also be able to draw and explain the manufacturing process. Polymer Moulding and forming including blow moulding, extrusion, injection moulding, rotation moulding, compression moulding, vacuum forming, line bending, Adhesion and heat welding. Standards BSI, ISO COSHH guidelines. Quality control and Quality assurance **Students will recap, retrieve and build on key knowledge and skills from half term 4:** Students will use knowledge from the maths module to ensure the CAD drawings for the dovetails are accurate. Students will also build on their use of CAD to create orthographic projections and exploded views of their design. **Challenge:** Students are accessed on the quality and accuracy of their physical outcome compared to a CAD orthographic projection of the final prototype. The tolerance is +/- 1mm for an excellent outcome. Students are encouraged to be as independent as possible when using the tools once instructed. Personalised support is given if required. Students are challenged to be as resourceful and accurate as possible to reduce waste. Tolerance testing is carried out during the making to ensure accuracy.	One lesson a week is focussed on the theory content of the course. Design movements 6R's of sustainability – Reduce, Re-use, Recycle, Rethink, Refuse, Repair. Lifecycle analysis – initial launch, growth, maturity, decline Life cycle assessment – from Raw material extraction to disposal. Students will have two revision theory lessons before the year 12 examination. **Students will recap, retrieve and build on key knowledge and skills from half term 5:** **Challenge:** Students find the concept of researching potential problems challenging and con often limit themselves by choosing safe options. Students are encouraged to think about problems they or family members encounter in everyday life and to research these areas. Students work on a digital portfolio in line with the marking criteria for Strand 1. **Strand 1** Comprehensive investigations identify a breadth and/or depth of challenging problems and opportunities for further consideration. Objective consideration of market potential through the approaches taken. Clear and fully relevant to the context offering scope for challenge and a focused identification of a primary user and other stakeholders. Full and objective consideration of primary user and other stakeholders needs and wants. A range of comprehensive requirements are identified that offer scope to support the design process.

	Mix up smart and modern materials and their uses. Mix hard and softwoods and their uses. Mix ferrous and nonferrous metals and their uses. Mix alloy and composite materials and their definition.	Students will often use the incorrect trigonometry technique to work out the angles. Students will not include their workings in a sensible format to ensure marks can be give inf the answer in incorrect. Students do not understand the carry forward marks. (as long as the method is correct if they have made a calculating error marks can still be awarded.)	Students will often think mass production is best, they sometimes struggle to apply the appropriate manufacturing method to an existing product. Students struggle to remember subject specific terminology and apply the manufacturing technique to real world projects. Stereo Lithography (SLA) Laminated Object Modelling (LOM) Selective Laser Sintering (SLS)	**Misconceptions:** Students will mix up injection and blow moulding, sometime blow and rotation moulding, Students will struggle to apply the manufacturing process to products not used in the examples. (exam question asks about a water but when the example for rotational moulding is a wheely bin). Students can struggle to read an orthographic projection and make errors in marking out dimensions on the practical.	Comprehensive and relevant information and sources of inspiration are identified to influence design iterations and thinking when required throughout the design process. **Misconceptions:** Students can often prioritise the NEA and sacrifice the revision time before the mock exams. Students will mix up life cycle analysis and life cycle assessment. QLA analysis will give an opportunity to address individual misconceptions.
Yr 13 Half Term 1	**Yr 13 Half Term 2**	**Yr 13 Half Term 3**	**Yr 13 Half Term 4**	**Yr 13 Half Term 5**	
Students will learn key knowledge and skills about: Strand 2 – The design Phase. NEA design ideas and iterations. Students will carry out a SCAMPER exercise to demonstrate how small changes to a concept can change the design and function without a complete re-design. Students will apply learning from Y12 working independently to create iterations, review designs using client and stakeholder feedback, evaluate, and research potential solutions or modifications to the design. The process is not linear, students will spend lots of time creating ideas, sketching, making low cost paper and card models and documenting the journey in real time using photos and annotations on their digital portfolio. The NEA must include evidence to satisfy the marking criteria for Strand one.	**Students will learn key knowledge and skills about:** Strand 3 and Strand 4 run consecutively over term 3 and term 4. Mock examinations take place during the first 2 weeks of this term. Students will apply learning from Y12 to create detailed CAD components for their final prototype ensuring all dimensions are accurate. From this they will create an assembly (and sub-assemblies if required). An orthographic projection is created for each component part and the final assembly. Students will also apply research and make iterations at this stage if they find their original design is not suitable for DFMA. Additive manufacturing can be used during the cad phase to test prototypes fit effectively before final production. One lesson a week is focussed on the theory content of the course. Revision for mock examination (Paper 2) Patents, Intellectual property and design rights DFMA – Design for manufacture and assembly DFD – Design for disassembly Sheet metal forming and stamping, Die Casting and Sand Casting. Inclusive design Students will recap, retrieve and build on key knowledge and skills from half term 1:	**Students will learn key knowledge and skills about:** Strand 3 and Strand 4 run consecutively over term 3 and term 4. Students will apply learning from Y12 to create an accurate scaled or full size model of their final prototype. QA processes should be build into this phase to ensure appropriate functionality or fit as required. The journey is documented using photographs and videos and recorded in a digital portfolio. Appropriate H&S considerations need to be evident in this phase to ensure the risk assessment is adhered to when using workshop tools and machines. One lesson a week is focussed on the theory content of the course. Risk assessments and production planning (Gantt Chart) Safety standards and symbol recognition BSI, CE, Safety Labelling, WEEE, FCC, Electrically Insulated, Kitemark, HSE, HASAW Act 1974 Modern manufacturing systems (QRM) Electronic point of sale (EPOS) Flexible manufacturing Systems (FMS)	**Students will learn key knowledge and skills about:** Strand 5 – Students will undertake a: * Feasibility study, testing against the design specification and client requirements. *The study will include video and photographic evidence of the product in use in its intended environment. *Include evidence of a comprehensive risk assessment including analysis of risk and prevention methods to ensure safety. *A full and critical evaluation including strengths and weaknesses with suggestions for modifications that would allow design optimisation for real world manufacturing. Mock examinations take place during this term. (Paper 1 and paper 2). One lesson a week is focussed on the theory content of the course. The theory lessons will focus on examination technique, the use of	**Students will learn key knowledge and skills about:** This term is used to prepare for the summer examination. Topics are tailored using analysis from the February mock examinations and highlighted areas of weakness from the student RAG document. **Students will recap, retrieve and build on key knowledge and skills from half term 4:** **Challenge:** **Misconceptions:**	

One lesson a week is focussed on the theory content of the course. Ecological and social footprint of materials Natural sources of raw materials and energy and the impact on the environment. Renewable energy and the social and ethical issues of implementation. Planned obsolescence Environmental incentives and directives -WEEE directive. Anthropometrics and Ergonomics **Challenge:** **Strand 1** Comprehensive investigations identify a breadth and/or depth of challenging problems and opportunities for further consideration. Objective consideration of market potential through the approaches taken. Clear and fully relevant to the context offering scope for challenge and a focused identification of a primary user and other stakeholders. Full and objective consideration of primary user and other stakeholders needs and wants. A range of comprehensive requirements are identified that offer scope to support the design process. Comprehensive and relevant information and sources of inspiration are identified to influence design iterations and thinking when required throughout the design process. High levels of accuracy, outlines details that clearly communicate all requirements to a third party. **Misconceptions:** Students will think they have lots of time and quickly fall behind in this section. Students can also become fixated on an idea and fail to communicate (or document enough evidence in their	**Challenge: By outcome against the NEA marking criteria.** Design iterations are clear, systematic and chronological, fully supported by real-time evidence. Informal graphical and modelling skills are excellent and are effective and consistent in appropriately communicating initial thinking. The range of communication techniques* used are excellent and are effective and consistent in appropriately developing or communicating design concepts. Formal presentation of the final design solution(s) is excellent and provides impact and appropriate clarity to a third party **Misconceptions:** Students will often think DFMA is only used in mass production, they will struggle to apply this to their own project and design components accordingly. Students will mix up patents and intellectual property.	**Students will recap, retrieve and build on key knowledge and skills from half term 2:** **Challenge: By outcome against the NEA marking criteria.** Comprehensive and relevant, covering all requirements and safety considerations identified from the technical specification to effectively manage the making process. Excellent standard, demonstrating high levels of accuracy. Finishing is appropriate and the outcome will present well and provide impact to a stakeholder. Use of specialist tools and processes are excellent and are effective and consistently appropriate to materials/components being used. Use and selection of hand tools and machinery are effective and consistently appropriate. Digital design and manufacture* are used effectively and appropriately to demonstrate excellent skills and knowledge. Meets all of the technical specification and demonstrates excellent potential to become a marketable/industrial product. **Misconceptions:** Students often confuse risk and prevention, they struggle to use the risk matrix effectively. Students often forget what the acronyms for the processes mean and this can lead to an incorrect use of term in an exam question.	command words and subject specific terminology. Key areas to re-visit are: Thermo and thermoset polymers, intro to forming, resin identification codes. Types of Smart materials - Shape memory Alloy (SMA) Thermochromic Pigments, Phosphorescent, Photochromic pigments, muscle wire, polymorph. Coatings, epoxy powders, galvanising, Modern Materials – Carbon fibre, Nomex, Pro Biotic, Tofu, Lenticular sheet. Nanoparticles Composite Materials Textiles fabrics and fibres- Gortex, synthetic and natural fibres. Health and Safety legislation – HASAW 1974 Additive manufacturing – 3D printers Steam bending. Understanding how ICT and digital technology is changing modern manufacturing, including rapid prototyping, additive and digital manufacturing methods, stock control, monitoring, purchasing and logistics. Stereo Lithography (SLA) Laminated Object Modelling (LOM) Selective Laser Sintering (SLS) Manufacturing methods, job, batch mass, continuous (flow) production. Kaizen, Lean manufacture, Kanban, Six Sigma, Total Quality Management (TQM). COSHH guidelines.		

portfolio) effectively with their client. Students underestimate the importance of chronological progression and recording a “next steps” commentary on each slide. Students create ideas with limited technical complexity, it is important to show technical complexity without over engineering a product.			**Students will recap, retrieve and build on key knowledge and skills from half term 3:** **Challenge: By outcome against the NEA marking criteria.** Strand 5 Comprehensive and systematic analysis and evaluation of investigated sources of information from stakeholders, existing products and wider issues, offering clear and focused support to inform the design process. Full and critical evaluations with focused reflection on requirements and feedback. Ongoing, clear and comprehensive reviews to identify problems and next-steps for future iterations to effectively and consistently support design progression. Comprehensive analysis and evaluation that result in clear and focused considerations of health and safety risks. Comprehensive with fully appropriate methods used to analyse and test whether the design solution is fit for purpose. Full and critical evaluation of strengths and weaknesses with comprehensive suggestions for modification and consideration of possible design optimisation presented. Student will be challenged with past paper questions form both paper one and paper two, they will be encouraged to engage with all revision activities. Questions can range from 2 to 16 marks and students need to practice how to answer the questions effectively to achieve a band 3 or 4 answer. Model answers are used to improve writing technique. Students will create a revision plan to ensure all areas of the content are		

			covered before the summer exam series. **Misconceptions:**		

Previous learning that is particularly relevant:

From KS3: **Design Process and Problem Solving** Understanding and applying the iterative design process Responding to design briefs and user needs Generating, developing, and communicating ideas through sketches, models, and digital tools **Materials and Their Properties** Exploring a range of materials: woods, metals, plastics and composites Understanding basic material properties and appropriate uses Making informed decisions about material selection **Making and Practical Skills** Safe and accurate use of tools, equipment, and machinery Measuring, marking out, cutting, joining, and finishing techniques Producing functional prototypes and evaluating outcomes	**From KS3:** **Technical Knowledge** Introduction to mechanical systems and electronics Understanding motion in products Knowledge of CAD/CAM and digital manufacturing **Sustainability and Ethical Design** Awareness of environmental impact Considering social, moral, and cultural factors in design **Evaluation and Reflection** Testing and evaluating products against design criteria Using feedback to improve designs and processes	**From OCR GCSE Design and Technology (J310), students bring:** **Deeper technical knowledge:** Core and specialist principles, including materials, manufacturing processes, and systems. **Design and communication skills:** Use of CAD, orthographic drawings, modelling, and annotation. **NEA experience:** Managing a full design project from brief to evaluation, including research, development, and testing. **Understanding of wider issues:** Sustainability, ergonomics, inclusive design, and technological innovation. **Exam preparation:** Familiarity with structured responses, technical terminology, and analytical thinking.

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

The **OCR A Level in Design & Technology** lays a strong foundation for future learning by blending creativity with analytical thinking and technical knowledge. **Academic Progression** • **Supports STEM pathways**: Combines maths, physics, and computing with design principles—ideal for engineering, architecture, product design, or industrial design degrees. • **Develops research and evaluation skills**: Encourages critical analysis of existing products and technologies, useful for university-level coursework and dissertations. **Practical & Technical Skills** • **Hands-on prototyping**: Students learn to design, test, and refine products using CAD/CAM and physical modelling—skills directly transferable to higher education and industry. • **Iterative design thinking**: Promotes problem-solving through cycles of development, a key approach in professional design and engineering fields.	**Real-World Relevance** • **Industry-informed content**: Reflects authentic practices from engineering and manufacturing sectors, helping students understand how design decisions impact users, businesses, and the environment. • **Enterprise and innovation**: Introduces concepts like entrepreneurship, stakeholder analysis, and market needs—valuable for business and design-related careers. **Collaboration & Communication** • **Teamwork and presentation**: Students learn to communicate ideas visually and verbally, collaborate with peers, and respond to feedback—essential for university projects and workplace settings.	

Outcomes:
By the end of the year pupils will be able to solve/create/produce/write:

- Solve complex design problems by applying critical thinking, user-centred design, and iterative development processes
- Create innovative and functional prototypes that respond to real-world needs, using a wide range of materials, tools, and digital technologies.
- Produce detailed and technically accurate design documentation, including CAD models, development sketches, and testing records.
- Write analytical and evaluative reports that justify design decisions, reflect on user feedback, and demonstrate understanding of sustainability, ethics, and manufacturing processes.

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:	**Summative (& cumulative)**	**Opportunities to revisit past learning:**
- Monitor ongoing progress: We assess students' understanding of design principles, materials, and processes through classwork, discussions, and practical tasks. - Provide feedback: Regular, constructive feedback helps students refine their ideas, improve technical skills, and develop their design thinking. - Support NEA preparation: Formative assessment guides students through the iterative design process, helping them document research, develop prototypes, and evaluate outcomes.	**Written Examinations (50%)** Two papers assess students' understanding of: Core technical and designing principles Specialist knowledge (e.g. product design, fashion and textiles, or design engineering) Problem-solving and critical thinking These are taken at the end of the course and are externally marked.	**Iterative Design Project (NEA)** The Non-Exam Assessment (NEA) is inherently cyclical, encouraging students to revisit earlier stages such as: Research and user needs Design development Testing and evaluation

- Encourage reflection: Students are encouraged to self-assess and peer-assess, promoting critical thinking and ownership of learning.
- Tracking Progress Against Assessment Objectives: We use checklists and observation records to monitor how well students are meeting the criteria. This helps inform teaching and ensures students are on track for success.

Others include:
- Verbal feedback during lessons
- Written comments on digital portfolios
- Checklists and rubrics aligned with assessment objectives
- Peer and self-assessment activities
- 1:1 progress reviews to set targets and next steps
- Marking of mock examinations & use of mock feedback lessons

Non-Exam Assessment (NEA) – Iterative Design Project (50%)
A substantial design-and-make project where students:
Identify a real-world problem
Research, design, prototype, and evaluate a solution
Internally assessed and externally moderated
Encourages creativity, independence, and application of knowledge

Cumulative assessment is embedded throughout the course by:
- Progressive Skill Development: Students build on prior knowledge from GCSE and earlier A Level content, applying it in increasingly complex contexts.
- Integrated Learning: Theory from written papers is applied in the NEA, reinforcing understanding and skill transfer.
- Synoptic Assessment: The NEA and final exams require students to draw on knowledge and skills from across the entire course, demonstrating depth and breadth of learning
- Milestone Reviews: We often use checkpoints, mock exams, and portfolio reviews to track progress and inform teaching.

This iterative process reinforces learning by applying theory in practical, evolving contexts.
Theory Embedded in Practice
Concepts from the written exams (e.g. materials, manufacturing processes, sustainability, and user-centred design) are revisited and applied during NEA work.
This helps students consolidate theoretical knowledge through real-world application.
Mock Exams and Practice Papers
We use mock exams and past paper questions to revisit content from earlier in the course.
These help identify gaps in understanding and prepare students for the final written assessments.
Cross-Topic Integration
Topics such as ergonomics, inclusive design, and environmental impact are revisited across multiple units and contexts.
This supports synoptic learning and helps students make meaningful connections.
Use of Exemplars and Departmental Displays
Students are encouraged to refer to examples of past work and departmental displays to revisit successful approaches and structures.
This supports planning, organisation, and reflection on their own progress.
Teacher-Led Reviews and Feedback
Regular feedback sessions, peer reviews, and class discussions provide opportunities to revisit and refine earlier work.
We also use retrieval practice and starter activities to reinforce key concepts.

Opportunities for homework (including apps):

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

Bursary students are supported financially with equipment for the subject (Markers Paper, Practical resources for the final NEA), The A Level classes are often under 10 students therefore personalised support can be given to disadvantaged students as and when required.
Adaptations to timings are given for DIN and assessments if recorded as access arrangements.
Coloured paper documents are given if required
Digital copies of presentations are printed or loaded onto google classroom if required to allow students to revisit content.

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

Enriching experiences:
The OCR A Level in Design & Technology supports enriching experiences by combining creativity, technical skill, and real-world relevance. Students engage in open-ended design projects that promote innovation and personal expression. The NEA encourages exploration of social, ethical, and environmental issues, linking learning to global contexts. Hands-on work with CAD/CAM and prototyping tools builds confidence and pride. Cross-curricular links with science, maths, and computing deepen understanding and broaden perspectives. Opportunities to collaborate with clients or local industries add authenticity and insight. Through reflection, problem-solving, and practical engagement, learners grow as independent, thoughtful individuals prepared for further study and future careers.

Our curriculum supports the school value of:

Joy	*Foster enthusiasm and engagement by offering hands-on, creative learning that connects to real-world challenges. Students enjoy designing for purpose, using modern tools like CAD/CAM, exploring sustainability, and taking ownership of*

Literacy, Oracy and disciplinary language:

Literacy

- **Reading:** Students engage with technical texts, specifications, and case studies, building comprehension and analytical skills. A key terms list is given at the beginning of the course to help with definitions and subject specific terminology. These are also printed in the Y13 consolidation booklet.
- **Writing:** Through design portfolios, evaluations, and NEA documentation, learners practise structured, purposeful writing using subject-specific terminology.
- **Vocabulary:** Exposure to terms like *ergonomics*, *anthropometrics*, *iterative design*, and *CAD/CAM* fosters precision and fluency in technical language.

Oracy

Cross-Curricular opportunities / Opportunities to develop 'character':
- **Mathematics:** Students apply geometry, algebra, and data analysis in technical drawings, material calculations, and cost **estimations.**
- **Science (Physics & Chemistry):** Supports understanding of forces, energy transfer, material properties, and environmental impact.
- **Computing & ICT**: Integrates CAD/CAM software, digital prototyping, and coding in programmable systems.
- **Art & Design:** Encourages creativity, aesthetics, and visual communication through sketching, modelling, and product styling.
- **Business Studies**: Explores market research, product viability, entrepreneurship, and stakeholder analysis.
- **Geography & Environmental Science:** Links to sustainability, ethical sourcing, and lifecycle analysis of products.
- **English:** Enhances literacy through design documentation, evaluations, and persuasive communication.

	projects—making learning meaningful, empowering, and personally relevant.
Progress	*We monitor and support progress through a combination of formative and summative assessment strategies. Teachers track student progress through regular **practical tasks, design reviews, and written assessments** aligned with the assessment objectives (AO1–AO3). Feedback is provided through **peer critiques, teacher marking, and one-to-one discussions**, helping students reflect and improve. Progress in the **Non-Exam Assessment (NEA)** is monitored through milestone check-ins and portfolio reviews. Differentiated support, including scaffolding, modelling, and targeted intervention, ensures all learners can succeed. Digital tools like CAD software and online portfolios also help track development and showcase learning over time.*
Success	*We celebrate success by giving verbal praise, positive phone calls, reward points and showcasing exceptional performance – such as practical work, NEA content or written pieces.*
Act with care, kindness, respect, and integrity	*We build meaningful connections with our students by creating a supportive, inclusive, and inspiring learning environment. Teachers can foster strong relationships by showing genuine interest in students' ideas, offering personalised feedback, and encouraging creativity and risk-taking. Giving students ownership of their projects—especially in the NEA—helps them feel valued and motivated. Regular one-to-one discussions, celebrating individual progress, and linking learning to real-world contexts also deepen engagement. By listening actively, respecting diverse perspectives, and nurturing a collaborative classroom culture, teachers help students feel confident, connected, and empowered to succeed in both design and life.*

- **Verbal Communication:** Learners present ideas, justify decisions, and participate in peer critiques—developing confidence and clarity in spoken expression.
- **Collaborative Dialogue:** Group work encourages active listening, questioning, and constructive feedback, mirroring real-world design team dynamics.
- **Disciplinary Oracy:** Students learn to "speak like designers"—using appropriate genre, tone, and reasoning aligned with design thinking and engineering logic.

Disciplinary Language

- **Subject-Specific Discourse:** Students are immersed in the language of design, engineering, and manufacturing, learning how experts communicate ideas and solve problems.
- **Genre Awareness:** They explore different forms of writing and speaking—such as design briefs, technical reports, and presentations—each with its own conventions.
- **Cognitive Development:** Using disciplinary language helps students think more deeply and rigorously, connecting language with reasoning and conceptual understanding.

This course fosters character development by encouraging resilience, independence, and ethical thinking. Students learn to persevere through iterative design, take responsibility for long-term projects, and reflect critically on their decisions. Empathy grows through user-centered design and stakeholder analysis, while teamwork and communication are strengthened via peer collaboration. The course promotes integrity, creativity, and social awareness by exploring sustainability, inclusivity, and the impact of design on society. These experiences shape confident, thoughtful individuals prepared for higher education, employment, and responsible citizenship—making character growth a natural outcome of the design process.

Our curriculum supports personal development by:

Self-Management & Independence
- Encourages ownership of learning through self-directed projects and independent research.
- Develops time management and organisational skills via long-term coursework and iterative design processes.

Critical Thinking & Problem Solving
- Promotes analytical thinking by evaluating design decisions, materials, and user needs.
- Fosters resilience through trial-and-error, prototyping, and refining ideas.

Creativity & Innovation
- Inspires original thinking and imaginative solutions to real-world problems.
- Builds confidence in expressing ideas visually, verbally, and through physical models.

Collaboration & Communication
- Enhances teamwork through peer feedback, group critiques, and shared design challenges.
- Strengthens communication skills—students learn to articulate complex ideas clearly and persuasively.

Ethical & Social Awareness
- Encourages reflection on sustainability, user needs, and the social impact of design.
- Builds empathy and user-centered thinking, preparing students to design responsibly.

Career Readiness
- Develops transferable skills valued by employers: initiative, adaptability, and strategic thinking.
- Offers insight into creative industries, engineering, architecture, and entrepreneurship.

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

Listening –
Encourages students to engage with user feedback, collaborate in teams, respond to peer critique, and adapt designs based on verbal input—mirroring real-world professional communication.

Speaking –

		Encourages students to present ideas, justify design decisions, engage in peer critiques, and communicate with clarity—developing confidence and professionalism essential for workplace collaboration and client interaction. **Problem solving –** Challenges students to identify real-world needs, generate creative solutions, test prototypes, and evaluate outcomes—mirroring the iterative thinking and adaptability required in modern, solution-focused workplaces **Aiming high –** Encourages students to set ambitious goals, take ownership of long-term projects, reflect on progress, and strive for excellence in both creative and technical aspects of their work **Critical thinking –** Challenges students to analyse problems, evaluate materials and processes, and justify design decisions. Through iterative design and reflective practice, students build the analytical mindset essential for innovation and workplace decision-making **Staying positive –** Encourages students to persist through design challenges, learn from setbacks, and embrace feedback—building resilience, optimism, and a growth mindset essential for success in the workplace **Leadership –** Encourages students to take initiative in project work, guide peer collaboration, make informed decisions, and confidently present and justify their ideas—mirroring leadership roles in real-world design and industry settings **Teamwork –** Encourages students to collaborate on design tasks, share feedback, solve problems collectively, and respect diverse perspectives—mirroring the cooperative, communicative environments found in modern workplaces **Creativity –** Encourages students to generate original ideas, experiment with materials and processes, and solve real-world problems through innovative thinking—mirroring the creative demands of modern design, engineering, and manufacturing industries. **Employment Sectors discussed include:** **Engineering & Manufacturing** • Mechanical, electrical, civil, and aerospace engineering • Product and systems manufacturing • Robotics and automation **Creative & Design Industries** • Product design and industrial design • Furniture and interior design • Fashion and textiles • Graphic and packaging design **Architecture & Built Environment** • Architecture and urban planning • Construction and structural design • Sustainable building technologies **Business & Enterprise** • Marketing and branding • Entrepreneurship and innovation • Project management and consultancy **Digital & Technology**

		• CAD/CAM and digital prototyping • UX/UI design and human-centered systems • Software development in design contexts **Science & Research** • Materials science and environmental design • Ergonomics and anthropometrics • Research and development roles **Education & Training** • Teaching design, engineering, or technology • Curriculum development and educational resources

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, QA monitoring, Learning Walks, CPD sessions
		Faculty meetings, examination reports, recall of exam scripts
		NEA and Mock moderation