



KS4 Engineering Curriculum Map cover sheet

Subject: NCFE Engineering	Year Group 10-11	Key Stage 4
Links to prior learning • The KS4 engineering curriculum builds directly on knowledge and skills developed at KS3, reinforcing continuity and progression. • New topics are introduced by explicitly linking them to foundational concepts such as materials, forces, and basic design principles. • Regular revisiting of key ideas ensures prior learning is embedded and gaps are addressed. • Practical tasks and problem-solving activities draw on students' previous experiences, encouraging application of earlier knowledge in new contexts. • Scaffolded learning supports students to make clear connections between past and current content, preparing them for more complex concepts and future study.	Retrieval Practice • Knowledge Quizzes: Regular use of quick, engaging quizzes-such as multiple-choice, short-answer, or matching key terms to definitions-encourages students to recall information from previous topics, not just recent lessons. • Spaced Retrieval: Key concepts are revisited after increasing intervals (weeks or months), ensuring knowledge is retained over time rather than crammed for exams. • Peer Assessment and Feedback: Students often mark each other's quizzes, discuss answers, and receive immediate feedback to address misconceptions and reinforce correct understanding. • Linking Topics: Teachers explicitly connect current learning to previous content, for example by using word banks of key terms from earlier units or prompting students to apply old vocabulary in new contexts. • Use of Technology: Online tools and platforms are used for low-stakes, user-friendly quizzes and recall activities, making retrieval practice regular and accessible. KS3 RP DT Pictionary word games KS4 DT Retrieval Practice (RP) Questions	Adaptive teaching strategies • Anticipating Barriers: Before lessons, teachers identify potential obstacles to learning, such as complex vocabulary or common misconceptions, and plan resources or supports accordingly. This might include providing additional materials, differentiated worksheets, or technology for specific learners. • Knowing Your Learners: Teachers use assessment data and prior work to understand each student's needs, including SEND requirements or areas where high-attaining students may need extra challenge. • Formative Assessment: During lessons, techniques such as mini-whiteboard responses, hinge questions, and low-stakes quizzes are used to check understanding in real time. This allows teachers to quickly identify misconceptions or gaps. • In-the-Moment Adaptations: Teachers adjust their approach as needed-such as reading texts aloud, using diagrams, analogies, or increasing scaffolding for those who need more support. Stretch tasks or open-ended questions are provided for high prior attainers. • Peer Support and Group Work: Structured group activities and peer explanations help all students, especially those with SEND, to

		access learning through collaboration. After the Lesson: Teachers reflect on what worked, identify students needing further support or challenge, and adapt future planning accordingly. Seating plans and medium-term plans are regularly updated to reflect changing needs.  Annotation-Sentence-Starters.pdf  Connectives Mat.pdf  KS3-Access-FM-cards.pdf
Literacy - Students engage with a variety of technical texts, diagrams, and specifications to develop reading comprehension and subject-specific vocabulary. - Writing tasks include producing design briefs, technical reports, evaluations, and reflective logs, helping students structure their ideas clearly and use accurate engineering terminology. - Opportunities for discussion, presentations, and peer feedback support the development of both spoken and written literacy. - Emphasis on explaining processes, justifying decisions, and evaluating outcomes strengthens students' ability to communicate technical information effectively.  DT Word Mat  Connectives Mat.pdf  how to answer a 9 marker	Oracy - Group Discussions: Students regularly participate in structured discussions, allowing them to articulate technical ideas, justify design decisions, and critique solutions. - Presentations: Learners present project work or research findings, developing confidence and clarity in spoken communication. - Debates: Students debate contemporary engineering issues, such as sustainability or ethical considerations, building persuasive argumentation and critical thinking skills. - Collaborative Problem Solving: Activities such as team design challenges and peer teaching encourage students to communicate effectively, negotiate, and explain their reasoning. - Explicit Modelling: Teachers model effective spoken language, including the use of technical vocabulary and appropriate levels of formality, and scaffold opportunities for students to practise these skills.  Annotation-Sentence-Starters.pdf	Numeracy - Embedding Mathematical Skills: Students regularly apply mathematics to solve engineering problems, such as calculating forces, measuring components, interpreting graphs, and using formulae in context. - Cross-Curricular Consistency: Methods and language used in mathematics lessons are reinforced in engineering, ensuring students can transfer and apply their numeracy skills confidently. - Practical Application: Tasks such as weighing materials, measuring dimensions, and analysing data in projects make numeracy relevant and meaningful. - Problem Solving: Students are encouraged to reason mathematically, spot patterns, and select appropriate methods to tackle real-world engineering challenges. - Use of Technology: Online platforms and software support numeracy development through interactive tasks and immediate feedback.  Maths Skills for DT booklet.pdf
Careers across the Curriculum	Wider Curriculum opportunities	Super Curriculum

• The curriculum integrates real-world engineering practices, exposing students to industry standards, manufacturing processes, and modern technologies. • Links with local engineering companies • Collaborative projects and portfolio work help students develop and showcase transferable skills such as problem-solving, teamwork, and communication. • Career education supports students in preparing for further education, apprenticeships, or employment within engineering and related sectors. • Emphasis on employability skills ensures students understand the expectations and opportunities within the engineering workforce.  Careers across the Curriculum	STEM Workshops: In-school and external workshops, including robotics, coding, and large-scale construction challenges, allow students to explore engineering concepts in engaging, real-world contexts. • Competitions: Participation in local and national engineering competitions encourages innovation and application of classroom learning. • STEM Clubs: After-school clubs provide opportunities for collaborative projects, further exploration of engineering topics, and development of practical skills.  Trips Audit 2025  Queensmead Extra Curricular Activities 24/5 Su...	Academic Competitions: Participation in national engineering and STEM competitions, such as the CREST Award or design challenges, encourages independent research and creative problem solving. • Clubs and Societies: After-school STEM clubs, robotics teams, and engineering societies allow students to explore topics of interest and develop practical skills. • Lectures and Workshops: Access to guest speakers, industry professionals, and university taster sessions broadens students' understanding of engineering careers and current developments. • Personal Projects: Students are encouraged to undertake independent projects, such as designing and building prototypes or researching areas of interest, which can be showcased in school exhibitions. • Online Learning: Engagement with MOOCs, online tutorials, and subject-specific resources enables students to explore advanced topics at their own pace  Engineering - Super Curriculum
Assessment and feedback (Detail how often feedback is given, how it is given, when etc) Whole class feedback Mini Whiteboards Coursework mock feedback one every 12 weeks, its marked once a week  Design and Technology Department Feedback Policy		

KS5 Engineering Curriculum Map cover sheet

Subject: AAQ Engineering	Year Group 12/13	Key Stage 5
Links to prior learning At KS5, the engineering curriculum is carefully sequenced to build on students' prior knowledge and skills developed at KS3 and KS4. For example, mathematical and scientific principles introduced in earlier years are further developed and applied to more complex engineering contexts, such as advanced mechanics, electronics, and design processes. Students revisit foundational concepts-like static and dynamic systems, circuit theory, and manufacturing processes-but at a higher level of complexity and with increased emphasis on application and problem-solving. Practical skills such as safe workshop practice, teamwork, and project management, first encountered in earlier key stages, are reinforced and extended through collaborative projects and industry-linked assignments. This ensures continuity and progression, allowing students to make meaningful connections between previous learning and new content, and to see how their knowledge evolves towards real-world engineering applications.	Retrieval Practice • Quizzes and Questioning: Utilising multiple choice, short answer, and true/false questions to prompt factual recall. • Varying Difficulty: Questions are set at different levels of challenge, from basic recall to more complex tasks requiring explanation, analysis, or evaluation. This ensures students are stretched appropriately and can build on their knowledge over time. • Spaced and Repeated Retrieval: Concepts are revisited after increasing intervals, making recall more challenging and strengthening memory. • Self-Assessment: Students use RAG (Red, Amber, Green) rating to identify areas of strength and weakness, guiding independent study and revision. • Addressing Misconceptions: Retrieval activities are followed by feedback and discussion, allowing misconceptions to be identified and corrected through class dialogue. • Self-Explanation: Students are encouraged to explain their reasoning or expand on factual statements, promoting higher-order thinking. 📄 KS4 DT Retrieval Practice (RP) Questions	Adaptive teaching strategies • Scaffolding: Temporary support is provided through visual, verbal, or written aids such as writing frames, knowledge organisers, sentence starters, and worked examples. These supports are gradually removed as students gain independence. • Explicit Instruction: Teacher-led approaches, including clear modelling of tasks and thought processes, are used. This involves demonstrating strategies, thinking aloud, and providing guided practice before students work independently. • Differentiation: Tasks are adapted in complexity and format to match students' needs. For high-attaining students, stretch and challenge activities are provided, such as open-ended problems and independent research projects, while SEND students may receive more structured guidance and practical demonstrations. • Practical and Visual Learning: Lessons are made as practical as possible, with demonstrations and hands-on activities to reinforce understanding. Visual aids and concrete examples help make abstract concepts accessible to all learners 📄 Annotation-Sentence-Starters.pdf

	 A-Level Product Design Roulette UNIT 1.xlsx	 Connectives Mat.pdf  KS3-Access-FM-cards.pdf
Literacy - Students engage with a range of technical texts, including textbooks, standards (such as BS 8888), and industry publications, to develop their reading comprehension and ability to extract relevant information from complex sources. - Writing skills are developed through the production of technical reports, design documentation, and reflective logs. Students are taught to use precise engineering terminology, structure their writing logically, and present arguments or design decisions clearly and concisely. - Opportunities for extended writing are provided in coursework and project work, where students must explain processes, justify design choices, and evaluate outcomes. - Oral literacy is promoted through presentations, group discussions, and peer feedback, helping students articulate technical ideas and collaborate effectively.  Copy of Copy of Unit 3 Engineering A part 2 Desi...  Copy of Unit 3 Engineering A part 1 Design trigg...	Oracy - Structured Discussions: Regular group and class discussions allow students to articulate technical ideas, justify design choices, and critique solutions. - Debates: Students engage in debates on contemporary engineering topics, such as sustainability or ethical considerations in design, developing their ability to argue a point and consider alternative perspectives. - Presentations: Students deliver presentations on project work, research findings, or design proposals, building confidence and clarity in spoken communication. - Peer Feedback: Opportunities for students to provide and receive feedback on spoken contributions help refine their language use and presentation skills.  Annotation-Sentence-Starters.pdf	Numeracy - Applied Mathematics: Core mathematical concepts such as algebra, trigonometry, statistics, and calculus are embedded within engineering principles and problem-solving tasks. Students learn to interpret and manipulate data, perform calculations, and apply mathematical reasoning to real-world engineering scenarios. - Contextualised Learning: Numeracy is taught within the context of engineering systems, such as analysing forces, electrical circuits, and fluid dynamics, helping students connect mathematical theory to practical applications.  Maths Skills for DT booklet.pdf  Copy of Unit 1 Topic A.pptx  Copy of Unit 1 Topic B  Copy of Unit 1 Topic C  Copy of Unit 1 Topic - D
Careers across the Curriculum The curriculum explicitly explores different engineering career pathways, including apprenticeships, university routes, and direct employment, and students are supported in clarifying their own career aspirations and	Wider Curriculum opportunities - National Competitions: Participation in events like the IMechE Design Challenge, where students design, build, and present engineering solutions to real-world problems. - STEM Clubs and Societies: Opportunities to	Super Curriculum STEM Enrichment Activities: Involvement in STEM clubs, national competitions, and collaborative projects with industry partners provides opportunities for deeper exploration and application of engineering concepts.

• preparing for progression. • Employability skills-such as teamwork, project management, communication, and problem-solving-are embedded in both practical and theoretical components of the course. • Industry links and guest speakers are used to contextualise learning and provide up-to-date information about the skills and attributes valued by employers.  Careers across the Curriculum	join engineering or STEM clubs, fostering collaboration on projects beyond the classroom.  Trips Audit 2025  Queensmead Extra Curricular Activities 24/5 Su...	• Independent Projects: Students are supported to undertake independent research or design projects, encouraging creativity, critical thinking, and self-directed learning. •  Engineering - Super Curriculum
Assessment and feedback (Detail how often feedback is given, how it is given, when etc) Feedback is given at the end of every unit for practicals its given as whole class and non specific or individual as fitting with the JCQ guidelines THeory works we use mini whiteboards to feedback and mock exams once a half term  Design and Technology Department Feedback Policy		

