



love the journey

Curriculum Implementation 2024-25

Secondary

LCA Strand	Technology, Enterprise & Sport
Subject	Design and Technology
Key Stage	Key Stage 4 (Chapter 10-11)

<p>What are the key concepts taught?</p>	<p>Key stage four Design and Technology develops knowledge, understanding and skills required to undertake the iterative design process of exploring, creating and evaluating. This is delivered primarily through the practical application of this knowledge and understanding. These principles include:</p> <p>Core technical principles.</p> <ul style="list-style-type: none"> • <i>new and emerging technologies</i> - The impact of new and emerging technologies on: the design and organisation of the workplace including automation and the use of robotics. • <i>energy generation and storage</i> - How power is generated from coal, gas and oil. Arguments for and against the selection of fossil fuels. • <i>developments in new materials</i> - Developments made through the invention of new or improved processes eg Graphene, Metal foams and Titanium. • <i>systems approach to designing</i> – Input, process and output. • <i>mechanical devices</i> - Visualise and represent 2D and 3D objects including 2D diagrams of mechanisms/ mechanical movement. • <i>materials and their working properties</i> - Classification of the types and properties of a range of materials. Physical properties of materials related to use and knowledge applied when designing and making. <p>Specialist technical principles.</p> <ul style="list-style-type: none"> • <i>selection and working with materials or components</i> - Functionality: application of use, ease of working, aesthetics: surface finish, texture and colour, environmental factors: recyclable or reused materials. Availability: ease of sourcing and purchase. Cost: bulk buying. Social factors: social responsibility. Cultural factors: sensitive to cultural influences. Ethical factors: purchased from ethical sources such as FSC. • <i>forces and stresses</i>
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- *ecological and social footprint*
- *sources and origins*
- *stock forms, types and sizes*
- *scales of production – Mass, batch, one-off and JIT production.*
- *specialist techniques and processes*
- *surface treatments and finishes.*

Designing and making principles.

Pupils will demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas:

- *Developing manufacturing skills* – Integrating manufacturing skills including CAD, Machinery, hand tools, and materials properties.
- *selection and manipulation of materials and components* – metal casting with links to creative design ideas and inspirational designers.
- *investigation, primary and secondary data* – research and interviews with clients.
- *environmental, social and economic challenge* – Ecology and ethics in design.
- *the work of others* - Students should investigate, analyse and evaluate the work of past and present designers and companies to inform their own designing.
- *design strategies and communication of design ideas* - Develop, communicate, record and justify design ideas using a range of appropriate techniques such as: freehand sketching, isometric and perspective 2D and 3D drawings, system and schematic diagrams, annotated drawings that explain detailed development or the conceptual stages of designing, exploded diagrams to show constructional detail or assembly working drawings: 3rd angle orthographic, using conventions, dimensions and drawn to scale.
- *prototype development* – use of mathematical modelling techniques including CAD/CAM.
- *tolerances* – Quality control and quality assurance.
- *material management* - The importance of planning the cutting and shaping of material to minimise waste eg nesting of shapes and parts to be cut from material stock forms. How additional material may be removed by a cutting method or required for seam allowance, joint overlap etc. Expression in decimal and standard form eg calculation of required materials. Calculate surface area and volume eg material requirements.
- *selection of specialist tools and equipment and techniques and processes*
- *Managing large scale design project* – analysis, research, project planning and iteration.

What is the sequencing of units?

Pupils will build on their prior learning in KS3 and continue to develop the core skills in Design and Technology and Engineering. The GCSE units have been sequenced to transition from Chapter 9. For example, at the end of Chapter 9 pupils study a Bauhaus

storage project which introduces key design movements and research techniques along side the design and manufacture of a high quality outcome. In Chapter 10, pupils then study Alessi and develop their understanding of the Non-Examined Assessment.

Chapter 10:

The Child's chair and Desk tidy schemes of work have been developed to enable pupils to learn how to design and manufacture products safely using a wide range of Resistant Materials and manufacturing methods.

Aims

- Pupils will deepen their knowledge and understanding of working with a range of Resistant Materials;
- Pupils will further develop manufacturing techniques;
- Pupils will deepen their knowledge of consumer choice;
- Pupils will be able to apply their knowledge to make informed choices;
- Pupils will develop the creative, technical and practical expertise needed to perform everyday tasks confidently;
- Pupils will build and apply a repertoire of knowledge, understanding and skills in order to design and make high quality products for a wide range of users;
- Pupils will evaluate and test their ideas and products and the work of others.

Learning outcomes overview

Through the schemes of work, pupils will develop their knowledge and understanding of:

Research – Pupils are expected to acquire relevant research and provide detailed analysis of existing products. They are required to develop a strict design criteria and to identify their target market for their major project in year 11.

Development – In this section of the design folder pupils must develop imaginative and innovative ideas. This can be through a planned approach encompassing initial design ideas, final design drawings, paper and sketch modelling and the use of Computer Aided Design software to support this section.

Making – The pupil's final outcome must demonstrate a high level of making skills. This includes the safe and accurate use of hand tools, machinery, power tools and Computer Aided Manufacturing equipment. Pupils work independently to manufacture product placing quality control at the forefront of their manufacturing. They will also develop an awareness of industrial manufacturing processes and be expected to explain how their final product could be manufactured commercially.

Evaluation – Underpinning all of the work that pupils will undertake at GCSE level are the problem solving skills that they will develop. All pupils will complete detailed testing of their final products, comparing their final outcome to their design specification. They will identify future developments and changes that could be introduced to improve their products.

Prior learning

Pupils will build on the learning from ks2 and 3 Design and Technology. Knowledge and skills include:

- *The Design Process*
- Developing the knowledge, understanding and skills needed to engage in an iterative process of designing and making.

Chapter II:

Term I will be spent on the NEA.

It's intended to be an iterative process so the learning activities will be directed by the student and will depend on their project.

Practical application of:

- Core technical principles
- Specialist technical principles
- Designing and making principles

How it's assessed

- Non-exam assessment (NEA): 30–35 hours approximately
- 100 marks 50% of GCSE

Task(s)

- Substantial design and make task
- Assessment criteria:
 - Identifying and investigating design possibilities
 - Producing a design brief and specification
 - Generating design ideas
 - Developing design ideas
 - Realising design ideas using a range of skilled academic practical skills.
 - Analysing & evaluating
- In the spirit of the iterative design process, the above should be awarded holistically where they take place and not in a linear manner
- Contextual challenges to be released annually by AQA on 1 June in the year prior to the submission of the NEA
- Students will produce a prototype and a portfolio of evidence
- Work will be marked by teachers and moderated by AQA

The latter part of Chapter II is focussed on honing and consolidating skills. Data from Progress Point 'PP' assessments and mock data is used to identify specific areas for improvement across the texts, questions and skills with a focus on

Section A – Core technical principles (20 marks)

A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding.

Section B – Specialist technical principles (30 marks)

	<p>Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles.</p> <p>Section C – Designing and making principles (50 marks) A mixture of short answer and extended response questions.</p> <p>How it's assessed - 50% of GCSE</p> <ul style="list-style-type: none"> • Written exam: 2 hours • 100 marks
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<p>How do we encourage pupils to see the links between different units and concepts?</p>	<ul style="list-style-type: none"> • For each of the stages of the NEA, pupils will develop a set of skills that are revisited throughout KS4, deepening in complexity. • Pupils will be encouraged to see the links between different units and concepts through teacher questioning and class discussion. • Teachers will make links to prior learning. • Adapting exam board mark schemes into 'pupil speak' so that pupils understand the assessment criteria for specific units and the course as a whole. 'Walking' and 'talking' theory lessons to refer to exemplar material.
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<p>What are the planned opportunities for adaptive teaching, including for SEND, the more and able and disadvantaged pupils?</p>	<p>Due to the nature of Design and Technology teachers build good relationships with every student and plan lessons which ensure that individual needs are met. Pupils receive one to one support with Safety and complex manufacturing techniques.</p> <p>Differentiation – Developed through collaborative planning to develop personalised learning for students with SEN in their understanding of subject specific terminology. Issues with mobility and engagement in practical activities are skilfully dealt with through detailed planning by experienced faculty staff. Scaffolded workbooks that support learners with a range of needs.</p> <p>Support materials are developed to support students across the key stages with their knowledge and understanding of numeracy and literacy in Design and Technology lessons. Adaptive methods of teaching and learning employed during all schemes at KS3 with the use of subject specific support sheets such as ACCESSFM to support learners.</p> <p>Pupil voice used to measure student engagement and attitude to the schemes and lessons. Faculty staff monitor behaviour and attitudes to learning. Dept reports used to monitor behaviour when appropriate. Extra-curricular clubs and competitions (success in Unilever competition). Students awarded certificates and trophies in recognition of their achievements.</p> <p>FIP used annually to analyse the curriculum and the impact on attainment in the dept. National data and school data used to identify and implement areas for improvement and establish changes required to improve teaching and learning.</p>
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	<p>Schemes are renewed annually to assess the impact on pupil progress. Regular consultation with the department to establish the most appropriate ways to improve the quality of schemes and most appropriate way to deliver lessons that stretch and challenge the more able. As a result of work scrutiny, more challenging activities and differentiated work in Design and Technology lessons to challenge higher ability students, with a focus on Maths and Science content in design lessons. Challenging the curriculum intent, to ensure all areas are offering an engaging curriculum.</p> <p>Pupils receive written and verbal feedback on their electronic design portfolio and practical work.</p> <p>Intervention for individual and small groups of pupils focussed on specific needs.</p> <p>Design and Technology and Engineering teachers have shared access to all units of work and resources through Microsoft Teams so that adaptations can be made according to pupil need.</p> <p>SEND – use of pupil profiles and SEN strategies to adapt learning according to pupil need.</p> <p>More able pupils – more complex subject specific terminology linked to industrial contexts.</p> <p>Access to wider reading in the College library and via online learning resources such as GCSE Pod.</p>
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<p>What are the planned opportunities for retrieval and reflection by pupils?</p>	<ul style="list-style-type: none"> • ‘Do Now’ retrieval practice tasks • Summative ‘Progress Point’ assessments revisit skills and indicate retention of learning. • Links to prior learning • knowledge organisers, toolkits and revision aids in a variety of formats • Boxed learning revision worksheets used to support and assess learning.
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<p>What are the opportunities for feed forward by the teacher post assessment outcomes?</p>	<ul style="list-style-type: none"> • Progress Point ‘PP’ assessments and mock exams to inform their future planning and teaching. • Use of a centralised faculty marksheet to track pupil progress. Analysis of outcomes will inform pupil intervention, teacher lesson planning and revision. • Pupils record Progress Point ‘PP’ assessments on a tracker sheet so that they can monitor their progress across different units during the course. • Teacher feedback on pupil responses is in line with guidance from AQA NEA. • Use of external examination data and examiner reports to identify areas of focus for the coming academic year which is then built into lesson planning.
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	<ul style="list-style-type: none"> • Summative Progress Point 'PP' assessments and mock exams are marked by experienced teachers which allows the identification of trends and patterns across the cohort and course which is then fed back to the faculty and pupils.
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<p>What are the planned opportunities for developing Reading?</p>	<ul style="list-style-type: none"> • Pupils use Design library in the department to develop their knowledge and understanding of key designers throughout the course of the 2 years. • Use of the College Library for additional reading • Reading lists related to and beyond the course of study
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<p>What are the planned opportunities for developing literacy, numeracy, oracy and SMSC?</p>	<p>Literacy:</p> <ul style="list-style-type: none"> • LC Tests and 'Do Now' retrieval practice tasks e.g. focussed on key vocabulary/terminology, spellings, grammar • Literacy mats and resources provided a key point in the GCSE course. <p>Numeracy:</p> <ul style="list-style-type: none"> • Extensive links to mathematics and numeracy through the use of digital modelling. Numeracy mats provided by all staff to support learning in Design lessons. Embedded in to schemes of work and all practical activities. <p>Oracy:</p> <ul style="list-style-type: none"> • Class and small group discussion <p>SMSC:</p> <ul style="list-style-type: none"> • Social, moral, cultural issues embedded into schemes of work across the faculty. Discussion embedded into lessons in all Keystages. Pupils participate in a range of activities which discuss the use of Resistant Materials and the positive and negative impacts of these materials in the environment. The Design and Technology curriculum outlines that students should also understand the social and cultural impact of the manufacturing industry. Pupils discuss these issues and integrate them into their design work to establish an ethical solution to the set brief.
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