Curriculum Intent

It is our intent in GCSE Design & Technology to offer our students the chance to use creative thinking, problem solving and design and making skills, within a defined purpose to produce tangible outcomes. Through a variety of creative and practical activities, pupils are taught the knowledge, understanding and skills needed to engage in a process of designing and making and comprehend the creative and manufactured world around them. They work in a range of contexts through our wide range of subject topics to design, make and evaluate a variety of different practical outcome based projects.

GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise.

Through the study of Resistant Materials and Product Design students acquire a broad range of subject knowledge and draw on and enhance their application of disciplines such as mathematics, science, engineering, computing, ethics and art. Students learn how to and are encouraged to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, students will develop a critical understanding of its impact on daily life and the wider world. Design & Technology students will learn about the wider impact of global issues such as Sustainability and modern manufacturing techniques as well as the development of modern materials and manufacturing processes, this will ensure that our students are equipped and empowered with the skills and knowledge that they need to make a positive difference to our society and become well rounded knowledgeable citizens.
High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

This GCSE allows students to study core technical and designing and making principles, including a broad range of design processes, materials techniques and equipment. They will also have the opportunity to study specialist technical principles in greater depth.

Year		Term		Content
10	3.1 Core Technical principles	Autumn	1	3.1.1. New and Emerging Technologies Students must know and understand the impact of new and emerging technologies on contemporary and potential future scenarios in relation to the following areas: • Industry • Enterprise • Sustainability • People • Culture • Society • Environment • Production Techniques and Systems • How the critical evaluation of new and emerging technologies informs design decisions. This is the starting point that is aimed to ensure students understand the context of what influences the design process and industry. The information learnt in this section will underpin students understanding in later units allowing them to comprehend the impact of the use of materials on wider social issues and also the impact on, for example, the selection of processes etc. This unit also outlines the history and establishment as well as the ongoing developments of technology and materials, students will need this knowledge to help them understand the origins of materials, for example, Smart materials which will be taught later on in the course. 3.1.2 Energy Generation and Storage Students should understand how energy is generated and stored and how this is used as the basis for the selection of products and power systems. • Fossil Fuels • Nuclear Power • Renewable Energy • Energy storage systems including batteries This unit of work sets the foundations for many of the subsequent topics including sustainability. It also builds on some of the information that was taught during 3.1.1. 3.1.3 Developments in New Materials Students should be aware of developments in new materials- • Modern Materials • Smart Materials • Composite Materials • Technical Textiles This unit sets the foundations for many of the subsequent topics. Understanding the properties of different materials and their working

				characteristics. Students will use this information to make materials choices in their NEA as well as being able to compare properties of a wide range of materials as also covered in more traditional materials in 3.1.6
		Autumn	2	3.1.4 Systems approach to designing: • Inputs • Processes • Outputs This unit will teach students the basics of Electronic Processes and enable them to identify different categories of components as well have a sound understanding of the functionality of a range of components which fit within each of these categories. Students will build on knowledge learnt in KS3. Students could use this knowledge to incorporate Systems into their NEA, which would support them increasing the complexity of their design concepts and make more marks accessible for complexity and range of design ideas. Students will also be able to apply these principles to a range of contextual areas of study at higher level of study. 3.1.5 Mechanical Devices: • Different Types of Movement • Changing magnitude and direction of force. Students learn how mechanisms are present in everyday objects such as door handles and mechanical whisks, and how they can make life easier and effect change in effort and or direction of movement. This knowledge will support students to apply this added level of complexity to their NEA if they wish, but will be assessed on Paper 1. *Students will also complete a focused practical activity to help underpin and re-inforce theory from these units.*

		Spring	3	3.1.6 Materials and their working Properties: Students should know and understand the categorisation of the types and properties of the following materials. • Papers and Boards • Natural and Manufactured Timbers • Metals and Alloys • Polymers • Textiles Students have already been taught the basic categorisation of woods, metals and plastics, they will be taught more in depth knowledge that builds on this existing familiarity to further develop a more in depth understanding with a wider range of examples taught. This will further support students' knowledge and understanding 3.1.6.2 Material Properties: Students should have an understanding of the working and physical properties of the materials they specialise in. (see 3.1.6 list) • absorbency (resistance to moisture) • density • fusibility • electrical and thermal conductivity. • strength • hardness • toughness • malleability • ductility and elasticity. Students at KS3 have been taught the basic categorisation of woods Metals and plastics and have indeed worked with these materials. They will therefore have some prior knowledge of their working properties to build on. *Students will also complete a focused practical activity to help underpin and re-inforce theory from these units.*
				End of unit 3.1 Assessment as well as an assessment using past exam questions to be used at the end of each sub unit taught.

	3.2 Specialist technical principles	Spring	4	3.2 – Specialist Technical principles In addition to the core technical principles, all students should develop an in-depth knowledge and understanding of the following specialist technical principles in relation to at least one of the materials categories (timber based materials, metal based materials and or polymers) • selection of materials or components • forces and stresses • ecological and social footprint • sources and origins • using and working with materials • stock forms, types and sizes • scales of production • specialist techniques and processes • surface treatments and finishes. Students need to understand the working properties of materials as well as availability of materials which will underpin multiple future units as well as support students to make informed decisions about the selection of appropriate materials to use in the NEA project. Students will also learn more about the footprint of martials which will help students to become environmentally aware and responsible designers. This unit builds on the information taught in 3.1.6 which they needed to understand prior to this unit being taught.
		Summer	5	3.3 Designing and making principles Students should know and understand that all design and technology activities take place within a wide range of contexts. They should also understand how the prototypes they develop must satisfy wants or needs and be fit for their intended use. For example, the home, school, work or leisure. They will need to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas: • investigation, primary and secondary data • environmental, social and economic challenge • the work of others • design strategies • communication of design ideas • prototype development • selection of materials and components • tolerances • material management • specialist tools and equipment • specialist techniques and processes. The majority of these principles will be initially introduced but will then be further underpinned by the teaching of the NEA in Summer HT5 where students will have the opportunity to further solidify their understanding by producing pieces of work which apply their understanding for example; ‘the work of others’ students will be

				taught about 2 distinct designers from a set list and 2 design companies, the in their NEA students will have to evidence that they are drawing influence from a designer/design movement or the design of existing products.
				End of Unit 3.3 Assessment
	NEA	Summer	6	NEA Coursework- Students will start their NEA coursework, which the titles for are released on 1st June each year. Students' work should consist of an investigation into a contextual challenge, defining the needs and wants of the user and include relevant research to produce a design brief and specification. Students should generate design ideas with flair and creativity and develop these to create a final design solution (including modelling). A manufacturing specification should be produced to conclude your design findings leading into the realisation of a final prototype that is fit for purpose and a final evaluation. Students should investigate, analyse and evaluate throughout the portfolio and evidence all decisions made. Section A - Identifying & investigating design possibilities- By analysing the contextual challenge students will identify design possibilities, investigate client needs and wants and factors including economic and social challenges. Students should also use the work of others (past and/or present) to help them form ideas. Research should be concise and relate to their contextual challenge. Students are also advised to use a range of research techniques (primary/secondary) in order to draw accurate conclusions. Students should be encouraged to investigate throughout their project to help inform decisions. Section B – Producing a design brief and specification- Based on conclusions from their investigations students will outline design possibilities by producing a design brief and design specification. Students should review both throughout the project. Section A & B are taught in this order as they for the foundations of research and planning that students will build on the subsequent sections. Sections A-B are researching a design need then writing a design Brief and Specification using alive client, these sections will inform students designing in section C which will be taught next in the sequence. These sections will build on student's theory knowledge that they learn throughout Year 10 to help them to design and make a product that solves a contextual problem set by the exam board. These topics and skills have been thoroughly taught throughout the KS3 curriculum so will be familiar to students, Students will need to apply their knowledge and understanding and skills to a context set by the exam board which is different each year.
11		Autumn	1	NEA Section C - Generating design ideas - Students should explore a range of possible ideas linking to the contextual challenge selected. These design ideas should demonstrate flair and originality and students are encouraged to take risks with their designs. Students may wish to use a variety of techniques to communicate. Students will not be awarded for the quantity of design

				ideas but how well their ideas address the contextual challenge selected. Students are encouraged to be imaginative in their approach by experimenting with different ideas and possibilities that avoid design fixation. In the highest band students are expected to show some innovation by generating ideas that are different to the work of the majority of their peers or demonstrate new ways of improving existing solutions. NEA Section D- Developing Design Ideas- Students will develop and refine design ideas. This may include, formal and informal 2D/3D drawing including CAD, systems and schematic diagrams, models and schedules. Students will develop at least one model, however marks will be awarded for the suitability of the model(s) and not the quantity produced. Students will also select suitable materials and components communicating their decisions throughout the development process. Students are encouraged to reflect on their developed ideas by looking at their requirements; including how their designs meet the design specification. Part of this work will then feed into the development of a manufacturing specification providing sufficient accurate information for third party manufacture, using a range of appropriate methods, such as measured drawings, control programs, circuit diagrams, patterns, cutting or parts lists. Section C is taught after students have completed both sections A & B where students will research a need and write a brief and specification so they understand what their clients' needs are. Sections C and D are where students design a solution to their identified problem and then develop their idea. These sections will build on student's theory knowledge that they learn throughout Year 10 to help them to design and make a product that solves a contextual problem set by the exam board. These designing and development skills have been thoroughly taught throughout the KS3 curriculum so will be familiar to students. Students will then progress onto section E where they make the product that they have designed.
11		Autumn	2	NEA Section E- Realising Design Ideas- Students will work with a range of appropriate materials/components to produce prototypes that are accurate and within close tolerances. This will involve using specialist tools and equipment, which may include hand tools, machines or CAM/CNC. The prototypes will be constructed through a range of techniques, which may involve shaping, fabrication, construction and assembly. The prototypes will have suitable finish with functional and aesthetic qualities, where appropriate. Students will be awarded marks for the quality of their prototype(s) and how it addresses the design brief and design specification based on a contextual challenge. In this section students will make the product that they designed in section E&D utilising skills that they have been taught throughout the KS3 and Year 10 course. Students will then go onto section F where they will evaluate their product with their client.

		Spring	3	NEA Section E (continuation from Autumn HT2) NEA Section F-Analysing and Evaluating- Within this iterative design process students are expected to continuously analyse and evaluate their work, using their decisions to improve outcomes. This should include defining requirements, analysing the design brief and specifications along with the testing and evaluating of ideas produced during the generation and development stages. Their final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s). In this section students will finish making the product that they designed in section E&D utilising skills that they have been taught throughout the KS3 and Year 10 course. Students will then evaluate their product with their client and suggest further modifications which could be made to the product to improve its suitability. These skills taught in the NEA are all transferable to a wide range of HE and FE qualifications and general life skills, where students would need to utilise ICT facilities, problem solving, interpersonal skills, research gather and analysis, costing and budgeting and self-evaluation skills to realise a solution to a problem.
		Spring	4	Revision for external examinations
		Summer	5	Revision for external examinations

In addition to end of unit assessment, students will frequently carry out knowledge check short tests in class and in class and at home, create summaries and key terms glossaries to embed terms and concepts into their long-term memory.

They will have frequent practice on exam type questions which range from multiple choice to 9 and 12 mark questions which test all of the assessment objectives.

Internal Assessments;

Students are assessed at the end of each unit. This assessment is in the format of past examination questions that are tracked for each student and collated to provide an ongoing summary of progress for each student.

Final External Assessment:

Assessments

Paper 1:	NEA
What's assessed • Core technical principles • Specialist technical principles • Designing and making principles	**What's assessed** • Core technical principles • Specialist technical principles • Designing and making principles
How it's assessed • Written exam: 2 hours • 100 marks • 50 % ofGCSE	**How it's assessed** • Non-exam assessment (NEA): 30–35 hours approx • 100 marks • 50% of GCSE

Questions
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)
Several short answer questions (2–5 marks) and one extended response to assess a more in depth knowledge of technical principles.
Section C – Designing and making principles (50 marks)
A mixture of short answer and extended response questions.
	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
	  ○ 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

Further Curriculum Support

Text books & Revision Resources:

- AQA GCSE (9-1) Design & Technology, Michael Ross, PG Online, ISBN 9781910523100
- Grade 9-1 GCSE Design & Technology AQA Revision Guide, CGP, ISBN: 9781782947523
- New Grade 9-1 GCSE Design & Technology AQA Revision Question Cards, CGP, ISBN: 9781789084115

https://www.technologystudent.com/

http://www.mr-dt.com/

Enrichment activities:

Lunch time enrichment sessions available to all GCSE students 4 days a week.