

GCSE Design Technology - Materials

Curriculum Intent 2023-2024

Design and Technology is an inspiring, rigorous and practical subject that encourages children to learn to think and intervene creatively to solve problems, both as individuals and as members of a team.

At Brine Leas, we encourage children to use their creativity and imagination, to design and make products that solve real and relevant problems within a variety of contexts. We aim to, wherever possible, link work to other disciplines such as Mathematics, Science, Engineering, Computing and Art which gives the learning purpose and relevance to the children. The D&T GCSE places greater emphasis on understanding and applying iterative design processes. Our curriculum at Brine Leas strives to present a breadth and depth of knowledge and skills, alongside offering a range of challenging opportunities for students to develop their creativity and imagination to design. This is to develop practical and technical skills as they design and make prototypes and products that solve real life problems within a variety of contexts, considering both their own and others' needs, wants and values. We deliver life-long learning skills and personal development, incorporating a range of practical skills, engineering skills, health and safety, teamwork, facilitated learning, confidence, workshop skills, Computer Aided Design and Computer Aided Manufacture, management skills, working independently. We have fantastic facilities with design and technology machinery that mirrors industry. The core skills of English, Maths and Sciences are applied to problem solving, designing and building. We will encourage students to learn and motivate them to achieve their best, through taking risks in their design approaches and aim to develop resourceful, innovative and enterprising young learners who can go on to be the next generation of creative thinkers, designers and practitioners. Students will learn to make decisions, consider sustainability and combine skills with understanding in order to design and make quality products, exploring ways in which aesthetics, technical, economic, environmental, economic, environmental, ethical and social dimensions interact to shape designing and making. Students will develop an understanding of why analysing existing products will help produce practical solutions to needs, wants and opportunities, recognising their impact on quality of life. By understanding the design process students can then design and make products which reflect and influence cultures and societies and that have an impact on lifestyle.

Community Involvement: Visiting speakers are welcomed to discuss their companies' interest in PD, Photography and Graphics, this also links with other subject areas. Ex-students visit who are following either apprenticeships and/or university courses are also welcomed to discuss their pathway.

Courses based on this specification encourages the students to, demonstrate their understanding that all design and technological activity takes place within contexts that influence the outcomes of design practice. To develop realistic design proposals as a result of the exploration of design opportunities and users' needs, wants and values. To use their own imagination, experimental abilities and combine ideas when designing. To develop the skills to critique and refine their own ideas whilst designing and making. To effectively communicate their design ideas and decisions using different media and techniques, as appropriate for different audiences at key points in their designing. To be able to develop decision making skills, including the planning and organisation of time and resources when managing their own project work. To develop a broad knowledge of materials, components and technologies and practical skills to develop high quality, imaginative inspirational functional prototypes. To be ambitious and open to explore and take design risks in order to stretch the development of design proposals,

avoiding clichéd or stereotypical responses. To consider the costs, commercial viability and marketing of products. To demonstrate safe working practices in design and technology. To use key design and technology terminology including those related to: designing, innovation and communication; materials and technologies; making, manufacture and production; critiquing, values and ethics.

Our GCSE Design and Technology specification sets out the knowledge, understanding and skills required to undertake the iterative design process of exploring, creating and evaluating. The majority of the specification should be delivered through the practical application of this knowledge and understanding.

The subject content has been split into three sections as follows:

- **3.1 Core technical principles**
- **3.2 Specialist technical principles**
- **3.3 Designing and making principles**

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Core technical principles covers core technical principles and all content must be taught. **Specialist technical principles** covers specialist technical principles where students will go into greater depth. Each principle should be taught through at least **one** material category or system. **Designing and making principles** covers design and making principles and all content in this section must be taught. Students must also demonstrate mathematical and scientific knowledge and understanding, in relation to design and technology.

Fieldwork

Possible visits to local industry. E.g. Bentley, Gateway.
Ex-student talks.

Assessment

Please see website for internal assessment record.

This specification is designed to be taken over two years.

This is a linear qualification. In order to achieve the award, students must complete all assessments at the end of the course and in the same series.

GCSE exams and certification for this specification are available for the first time in May/June 2019 and then every May/June for the life of the specification.

Our GCSE exams in Design and Technology include questions that allow students to demonstrate their ability to:

- recall information
- draw together information from different areas of the specification
- apply their knowledge and understanding in practical and theoretical contexts.

Assessment objectives (AOs) are set by Ofqual and are the same across all GCSE Design and Technology specifications and all exam boards. The exams and non-exam assessment will measure how students have achieved the following assessment objectives.

- AO1: Identify, investigate and outline design possibilities to address needs and wants.

- AO2: Design and make prototypes that are fit for purpose.
- AO3: Analyse and evaluate: design decisions and outcomes, including for prototypes made by themselves and others; wider issues in design and technology.
- AO4: Demonstrate and apply knowledge and understanding of: technical principles; designing and making principles.

Homework

Homework is set when required. The theoretical content that is taught will be backed up by homework tasks that will embed knowledge and understanding of:

- 3.1 Core technical principles
- 3.2 Specialist technical principles
- 3.3 Designing and making principles

Students will have the opportunity to enhance their NEA work by preparing the required work before producing the final work through self-study.

Clubs and/or intervention

Catch up NEA sessions will be held at lunch times and after school. Timings TBC annually and will be found on the school website

Parental/Carer support

Attendance to parents evening.

Support your son/daughter by purchasing an A3 portfolio and the supporting textbook/revision guides.

Allow your child to attend catch up sessions, especially when producing the NEA.

Helpful sources of information

The course specification can be found here:

<https://www.aqa.org.uk/subjects/design-and-technology/gcse/design-and-technology-8552>

Recommended text book:

My Revision Notes: AQA GCSE (9-1) Design and Technology: All Material Categories and Systems. ISBN 9781510432314

Recommended Revision Guides:

- New Grade 9-1 GCSE Design & Technology AQA Revision Guide. ISBN 9781782947523. DayDream Education
- Design & Technology GCSE Revision Guide: Pocket Posters

Websites:

<http://www.technologystudent.com/>

<https://www.bbc.com/bitesize/subjects/zvg4d2p>

Connections to future pathways

Careers: Designer, Manufacturing, Craft, Engineering, CAD technician. Clothing/textile technologist, Colour technologist, Exhibition designer, Furniture designer, Interior and spatial designer, Product designer, Architect

- Future learning: A level PD, Graphics, Engineering, Art, Textiles. Engineering, Employment, Apprenticeship

Year 10 Overview

Term	Knowledge	Assessment	Connections to learning
	<p>By studying design and technology, students will be able to build up their creativity, problem solving, planning, and evaluation skills. Since many projects are produced via group work, students will also gain communication and teamwork skills.</p> <p>Pupils will demonstrate safe working practices in DT</p> <p>They will also demonstrate their understanding that all design and technological activity takes place within contexts that influence the outcome of design practice, personally, socially and moral.</p> <p>The spatula project is a small version of the NEA designed to prepare students for the real GCSE NEA.</p> <p>Provides sound progression from Key Stage 3 • Offers relevant and interesting content for study • Focuses on the production of a prototype</p> <ul style="list-style-type: none"> • Students have the opportunity to work with a wide range of materials 		
Autumn 1	<p>AO1 Investigation techniques.</p> <p>Understand user centred needs/wants</p> <ul style="list-style-type: none"> ➤ How to write a design Brief ➤ Using primary and secondary data to understand client and/or user needs. ➤ Market research, interviews, human factors & cultural development by realising our desired future- investigate ethically sourced material ➤ How to write a specification <p>AO2 Design skills-</p> <ul style="list-style-type: none"> ➤ Creativity 	<p><i>All content will be assessed with feedback against the GCSE NEA criteria.</i></p> <p>Investigation –</p> <ul style="list-style-type: none"> • Task analysis/Spider Diagram • Moodboard/existing product research • Product Analysis/disassembly • User requirements/ questionnaire/client research • Material investigation/material research-completed via internet research <p><i>ALL DONE VIA POWERPOINT</i></p> <p><i>Students will be assessed against the GCSE NEA marking criteria for AO1</i></p> <p>Designing –</p> <ul style="list-style-type: none"> • Initial shapes sheet, looking at creativity • Sketching, hand drawn design ideas 	<ul style="list-style-type: none"> ➤ Prior learning KS3 Mood boards Basic product analysis ➤ Designing skills from KS3 projects ➤ Card modelling is done throughout KS3 in a variety of projects CAD is taught in all years at KS3 <p>1. Personal development 2. Social development 5. Moral development</p>

	<ul style="list-style-type: none"> ➤ Isometric drawing ➤ Design strategies <p>AO3 Develop the iterative design processes</p> <ul style="list-style-type: none"> ➤ Communication of design ideas 	<p><i>THIS WILL BE COMPLETED VIA A VARIETY OF CAD AND HAND DRAWN SKETCHES</i></p> <p><i>Students will be assessed against the GCSE NEA marking criteria for AO2</i></p> <p>Development –</p> <ul style="list-style-type: none"> • Card templates- showing development and iterative design • Modelling- showing development and iterative design • CAD- giving different views of the product • Sizes (working/orthographic drawing) • Exploded drawings <p><i>THIS CAN BE DONE VIA A VARIETY OF PRESENTATION TECHNIQUES< HAND DRAWN/ CAD/ PHOTOGRAPHS AND PYHSICAL MODELLING</i></p> <p><i>Students will be assessed against the GCSE NEA marking criteria for AO2</i></p>	
<p>As above this project continues through both halves of the term</p>			
<p>Autumn 2</p>	<p>AO3 Manufacturing/workshop techniques – skills. Knowledge of machines, tools and processes. Personal Development</p> <p>AO4 Analysing and Evaluating</p>	<p>Manufacturing-</p> <ul style="list-style-type: none"> • Final piece quality and skill <p><i>Students will be assessed against the GCSE NEA marking criteria for AO2</i></p> <p>Evaluation –</p> <ul style="list-style-type: none"> • Review Specification/brief- self evaluation • Test the use- evaluating the product in use • User feedback- client feedback 	<p>1- Personal development</p>

	<p>➤ How to produce an Evaluation</p>	<p><i>THIS WILL BE COMPLETED IN A VARIETY OF PRESENTATION TECHNIQUES- POWERPOINT /IMAGES/ CLIENT WRITTEN FEEDBACK ETC</i></p> <p><i>Students will be assessed against the GCSE NEA marking criteria for AO3</i></p>	
<p>Improve knowledge in all areas in preparation for the NEA. To be able to design for a set client with a real problem. Looking at a specific client base, not only helps pupils to be aware of issue different clients face but also helps pupils think more widely about their product.</p> <p>To design for a set client gives a product real purpose.</p> <p>Pupils will design realistic proposals as a result of their exploration of a chosen client and their wants and needs. Pupils will use their imagination and develop skills to help them critique their own work and will be ambitious to explore and take design risks to stretch the development of their design proposal.</p> <ul style="list-style-type: none"> • Provides sound progression from Key Stage 3 and from the spatula project- building on learning <ul style="list-style-type: none"> • Offers relevant and interesting content for study • Focuses on iterative design and covers a wide range of materials, letting students specialise. 			
<p>Spring 1</p>	<p>AO1 Investigation techniques</p> <p>➤ Identify, investigate and outline design possibilities to address needs and wants</p> <p>AO2 Design and make prototypes that are fit for purpose</p> <p>➤ Analyse and evaluate:</p> <p>➤ design decisions and outcomes, including for prototypes made by themselves and others</p>	<p><i>All content will be assessed with feedback against the GCSE NEA criteria.</i></p> <p>Investigation –</p> <ul style="list-style-type: none"> • Spider Diagram/task analysis • Moodboard/product research • Product Analysis and/or disassembly • User requirements/client research • Material investigation-done via internet research looking at material properties • Specification- using ACCESSFM <p><i>Students will be assessed against the GCSE NEA marking criteria for AO1</i></p> <p><i>Identifying and investigating design possibilities (10 marks)</i></p>	<p>➤ In many KS3 project, brainstorming are taught/completed as a good way to start the thinking in a project</p> <p>➤ 2D design is taught in all years at KS3 , other CAD has also already been taught</p> <p>➤ 3D CAD software is taught (Sketchup/solid works)</p> <p>➤ Card templates are used as iterative design in many KS3 projects. CAD is also used throughout KS3</p>

	<ul style="list-style-type: none"> ➤ Wider issues in design technology-cultural development by realising our desired future- investigate ethically sourced material ➤ ➤ Demonstrate and apply knowledge and understanding of: ➤ Technical principles ➤ Design and making principles. 	<p><i>Producing a design brief and specification (10 marks)</i></p> <p>Designing –</p> <ul style="list-style-type: none"> • Sketching using a variety of 2D and 3D- CAD where possible <p><i>Generating design ideas (20 marks)</i></p> <p>Development –</p> <ul style="list-style-type: none"> • Card templates- demonstrating development and iterative design • Modelling- demonstrating development and iterative design • CAD- showing different views and finishes of the product • Sizes (orthographic drawing) done via CAD or HANDDRAWN DESIGNS <p><i>All content will be assessed with feedback against the GCSE NEA criteria AO2.</i></p> <p><i>Developing design ideas (20 marks)</i></p>	<p>1. Personal development 2. Social development 5. Moral development</p>
<p>AS ABOVE this project continues through both halves of the term</p>			
<p>Spring 2</p>	<p>AO2 Manufacturing/workshop techniques – skills.</p> <ul style="list-style-type: none"> ➤ Knowledge of machines, tools and processes. <p>AO3 Analysing and evaluating</p>	<p>Manufacturing-</p> <ul style="list-style-type: none"> • Final piece quality and skill <p><i>All content will be assessed with feedback against the GCSE NEA criteria AO2</i></p> <p><i>Realising design ideas (20 marks)</i></p> <p>Evaluation –</p>	<p>Manufacturing skills follow on from all KS3 projects</p> <p>Most KS3 projects include some form of evaluation</p>

	<ul style="list-style-type: none"> ➤ How to produce an Evaluation 	<ul style="list-style-type: none"> • Review Specification • Test the use • User feedback <p><i>All content will be assessed with feedback against the GCSE NEA criteria AO3</i></p> <p><i>Analysing and evaluating (20 marks)</i></p>	
<p>GCSE exam prep, to prepare pupils in readiness for the GCSE exam this term will be spent revising through Focused Practical tasks (where possible)</p> <p>Revision session, discussion and self study</p> <ul style="list-style-type: none"> ➤ Small individual tasks will be completed to gain knowledge and understanding of the core principals, specialist principles and design and making principles. Environmental, social and economic challenge. <p>Pupils will develop a broader knowledge of materials, components, tools, and technological and practical skills through FPTs</p> <p>Revision through making and doing (where possible) stickability tasks.</p>			
<p>Summer 1</p>	<ul style="list-style-type: none"> ➤ Revision in preparation for the GCSE exam. Individual one off lessons: <ul style="list-style-type: none"> • 3.3.1 Core technical principles • 3.3.2 Specialist technical principles • 3.3.3 Designing and making principles ➤ 3.1.5 Mechanical devices- levers revision session, lever class ➤ 3.1.6 Materials and their working properties <ul style="list-style-type: none"> ➤ 3.1.6.1 Materials categories ➤ 3.1.6.2 Material properties 	<ul style="list-style-type: none"> ➤ Questions- mini tests Mock paper(s) Question and answers covering the following different question styles: <p>Section A – Core technical principles (20 marks) A mixture of multiple choice and short answer questions assessing a breadth of technical knowledge and understanding.</p> <p>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.</p> <p>Section C – Designing and making principles (50 marks)</p>	<ul style="list-style-type: none"> ➤ Materials are taught at KS3 ➤ Area and calculations in maths ➤ Previous understanding of the 6R's ➤ Keywords will have been discussed at KS3 in all making sections ➤ Calculating area and quantities- maths focus ➤ Scaled drawings

	<ul style="list-style-type: none"> ➤ 3.2.1 Selection of materials or components ➤ 3.2.2 Forces and stresses- motion ➤ 3.2.3 Ecology and social footprint- where materials come from and the negative effects of this on the environment. Social & moral impact. ➤ 3.2.4 Sources and origins=- product life cycle ➤ 3.2.5 Using and working with materials Physical properties and working properties. ➤ 3.2.7 Scales of production One off through to JIT ➤ 3.2.8 specialist techniques and processes Brazing, welding,soldering Joining woods/ lap/dowel/finger joint ➤ 3.2.9 Surface treatments and finishes In relation to all materials Paint, stain, wax, powder coating, undercoat ➤ 3.3.1 Investigation, primary and secondary data 	<p>A mixture of short answer and extended response questions</p> <ul style="list-style-type: none"> ➤ Worksheet – levers and homework on motion ➤ Key names of materials and their properties, theory and knowledge is built through notes and revision packs ➤ Discussion of materials past exam questions ➤ Samples to explain, woods, metals, plastics, paper card and textiles ➤ Calculating material cost- maths based questions. ➤ 6R's- worksheet ➤ Social Moral Environmental considerations notes ➤ Worksheet on motion, link to revision guide ➤ Raw materials and production of materials, worksheet ➤ 6R's exam questions ➤ Choose a commercial process – draw and label it. ➤ Product life cycle, past exam questions ➤ Notes from demonstrations ➤ Revision notes and worksheets ➤ FPT ➤ Discussion of tolerances 	<ul style="list-style-type: none"> ➤ KS3 knowledge via engineering SOW ➤ Pupils will have used paints, dip coating, polish, wax at KS3 ➤ Spatula gcse project covers this widely ➤ Some is covered through PHSCE at KS3 ➤ Tessellation- maths knowledge ➤ Marking out and cutting tolerances are taught through KS3 projects ➤ KS3 projects are designed to give the basic knowledge of a range of tools and processes. <p>1.Personal development 2.Social development 5.Moral development</p>
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	<p>Anthropometrics and ergonomics</p> <ul style="list-style-type: none"> ➤ 3.3.2 Environmental, social and economic challenge Deforestation -Fairtrade ➤ 3.3.8 Tolerances Accuracy, QC, tessellation ➤ 3.3.9 Material management ➤ 3.2.6 Stock forms, types and sizes Sheet, plank, moulding, dowel. Bar/rod, square section. ➤ 3.3.10 Specialist tools and equipment ➤ 3.3.11 Specialist techniques and processes. 	<ul style="list-style-type: none"> ➤ QC and QA revision notes ➤ Use of questioning to revisit injection moulding- diagrams used to record process ➤ Discussion based around commercial methods used to manufacture paper and board. ➤ Identify QC checks on set product- label diagrams and use past exam Q's ➤ Revision notes ➤ Past exam questions ➤ Exam questions- looking at essay based ones ➤ Analyse data from clients points of view. ➤ Product analysis – using ACCESS FM and previous exam questions ➤ Exam questions ➤ Exam questions based on logos ➤ FPT ➤ Looking at past exam questions ➤ Safety questions from past exams ➤ Spot questions in lessons ➤ Discussions in lessons 	
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<p>Summer 2 – End of Spring 1.</p>	<p>Set by exam board- final GCSE TOPIC The non-exam assessment (NEA) for this specification is made up of a single design and make task (50% of final grade)</p> <p>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.</p> <p>Our 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.</p> <p>Introduction to the NEA. Set tasks are provided by AQA on 1st June. This will be introduced ASAP following the release of the contexts</p>		
<p>NEA will start Summer 2 and be completed by end of Spring 1</p>	<p>Substantial design and make task Assessment criteria:</p> <ul style="list-style-type: none"> ➤ 3.1.1, 3.3.1 Identifying and investigating design possibilities – <ul style="list-style-type: none"> • Use primary and secondary data to understand client and/or user needs • Carry out investigations in order to identify problems and needs ➤ 3.3.2 Producing a design brief and specification <ul style="list-style-type: none"> • Carry out investigations in order to identify problems and needs ➤ 3.3.4 3.3.5 Generating design ideas <ul style="list-style-type: none"> • Generate imaginative and creative design ideas using a 	<ul style="list-style-type: none"> ➤ A single portfolio and prototype product(s) that meet the assessment criteria set by the exam board in the specification. ➤ Work will be marked by teachers and moderated by AQA ➤ Students are free to revise and redraft a piece of work before submitting the final piece for assessment. Teachers can review draft work and provide generic feedback to ensure that the work is appropriately focused. ➤ In providing generic feedback Teachers can: <ul style="list-style-type: none"> • provide feedback in oral and/or written form • explain syntax in general terms • advise on resources that could be used • remind students of the key sections that should be included in their final folder. ➤ In providing generic feedback Teachers cannot: <ul style="list-style-type: none"> • correct a student’s work • provide templates, model answers or writing frames 	<ul style="list-style-type: none"> ➤ Learning from all previous DT work throughout KS3 and year 10 – ‘The Design Process’ and ‘Iterative Design Process’ ➤ Literacy Keywords will have been discussed at KS3 in all making section ➤ Science – 6R’s Material properties, Sustainability Issues, Material enhancement (finishes) ➤ PSHCE Ethical, Moral, social issues ➤ Maths – measure ,marking out, cutting lists Tessellation of shapes – economical use of materials. Calculating area and quantities- maths focus

	<p>range of different design strategies</p> <ul style="list-style-type: none"> • Explore and develop their own ideas • Freehand sketching, isometric and perspective • 2D and 3D drawings • Annotated drawings that explain detailed development or the conceptual stages of designing <p>➤ 3.3.5, 3.3.6 Developing design ideas</p> <ul style="list-style-type: none"> • Annotated drawings that explain detailed development or the conceptual stages of designing • Modelling: working directly with materials and components <p>➤ 3.1.6, 3.1.6.2, 3.2.1, 3.2.5, 3.2.8, 3.2.9, 3.3.7, 3.3.8, 3.3.9, 3.3.10 Realising design ideas</p> <ul style="list-style-type: none"> • satisfy the requirements of the brief • respond to client wants and needs • demonstrate innovation • are functional • consider aesthetics • are potentially marketable 	<ul style="list-style-type: none"> • provide specific guidance • provide specific feedback to students on how to improve their projects to meet the requirements of the marking criteria • give examples of how to implement • provide feedback where a student has produced an incomplete stage and this is sufficient to allow progression to the next stage. <p>➤ A clear distinction must be drawn between providing feedback to students as part of work in progress and reviewing work once it has been submitted by the student for final assessment.</p> <p>➤ Once work is submitted for final assessment it cannot be revised. It is not acceptable for teachers to give, either to individual students or to groups, feedback and suggestions as to how the work may be improved in order to meet the marking criteria</p> <p>➤ All practical work that is submitted for assessment must be completed under direct supervision. If a student needs to undertake some work that cannot be completed in school/college no credit can be given for the work undertaken off site. You must ensure that you are familiar with the prototype before it is taken off site and also verify it after any off site work has been completed to ensure that the only work that has been completed off site is what has been discussed beforehand.</p> <p>➤ Students must have sufficient direct supervision for the written element to ensure that the work submitted can be confidently authenticated as their own. If a student receives additional assistance and this is acceptable within the guidelines for this specification, you should award a mark that represents the student's unaided</p>	<ol style="list-style-type: none"> 1. Personal development 2. Social development 3. Moral development
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	<ul style="list-style-type: none"> • Cut materials efficiently and minimise waste • Use appropriate marking out methods, data points and coordinates • How to select and use specialist tools and equipment, including hand tools, machinery, digital design and manufacture, appropriate for the material and/or task to complete quality outcomes. • Select and use specialist techniques and processes appropriate for the material and/or task and use them to the required level of accuracy in order to complete quality outcomes • Surface treatments and finishes <p>➤ Analysing & evaluating</p> <ul style="list-style-type: none"> • 3rd party evaluation • Specification and brief review • Manufacture for industry • Testing strategies – performance 	<p>achievement. Please make a note of the support the student received on the CRF and sign the authentication statement. If the statement is not signed, we cannot accept the student's work for assessment.</p>	
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Term	Knowledge	Assessment	Connections to learning
Spring 2	<p>Prepare students to attack the D&T GCSE exam (50% of the final grade) with confidence. They should be aware of the types of questions that may come up in the exam, including theory content, how and what the wording means and how to answer the questions with the correct type of response. Students will enhance any previously taught/learnt content to apply their knowledge and understanding of the course and use specific technical language.</p> <p>To be fully aware of the 3 areas of assessment: 3.1 Core technical principles, 3.2 Specialist technical principles, 3.3 Designing and making principles.</p>		
	<p>3.1.1</p> <ul style="list-style-type: none"> ➤ New and Emerging technologies <ul style="list-style-type: none"> • Industry • Enterprise • Sustainability • People • Culture • Society • Environment • Production Techniques and systems • Obsolesces (planned and maintenance) <p>3.1.2</p> <ul style="list-style-type: none"> ➤ Energy generation and storage <ul style="list-style-type: none"> • Fossil fuels • Nuclear power • Renewable energy • Storage (battery) <p>3.1.3</p> <ul style="list-style-type: none"> ➤ Developments in new materials <ul style="list-style-type: none"> • Modern materials • Smart materials • Composite materials • Technical Textiles <p>3.1.4</p>	<ul style="list-style-type: none"> ➤ Product analysis ➤ Exam style questioning and past/specimen papers ➤ Case studies – both practical and theory write up. ➤ QC and QA revision notes ➤ Materials testing and experiment investigation – practical and theory ➤ Processes testing and experiment investigation – practical and theory ➤ Presentations of research and findings. ➤ Note taking skills employed to broaden knowledge of a range of designers and companies. ➤ Key words – knowledge tests/games 	<ul style="list-style-type: none"> ➤ All relevant prior knowledge built up in the NEA <p>Other areas previous learnt in:</p> <ul style="list-style-type: none"> ➤ Science Material properties. Movement/forces and levers. Fossil fuels and renewable energy. Smart materials Material extraction Metals and polymers make up and physical properties. Temperature treatment to materials. Oil into plastics Ore into metals Trees into woods – natural materials (biology) ➤ RE/PSHCE – society and culture. Energy consumption. ➤ Geography – sustainability/fossil fuels. Timbers and working properties ➤ Maths – Sizes and shapes of parts. Addition and ratios.

	<ul style="list-style-type: none"> ➤ Systems approach to designing <ul style="list-style-type: none"> • Inputs • Processes • Outputs <p>3.1.5</p> <ul style="list-style-type: none"> ➤ Mechanical Devices <ul style="list-style-type: none"> • Movements • direction/forces <p>3.1.6</p> <ul style="list-style-type: none"> ➤ Materials and their properties <ul style="list-style-type: none"> • Categories • Natural and manufactured timbers • Metals and alloys • Polymers • Textiles • Paper and card <p>3.1.6.2</p> <ul style="list-style-type: none"> ➤ Material Properties <ul style="list-style-type: none"> • absorbency (resistance to moisture) • density • fusibility • electrical and thermal conductivity • strength • hardness • toughness • malleability • ductility and elasticity. 		<ul style="list-style-type: none"> ➤ IT Input, process, output systems ➤ Literacy Keywords will have been discussed at KS3 in all making section Technical vocab – tools/ equipment/machines/ processes/Materials. <ol style="list-style-type: none"> 1. Personal development 2. Social development 3. Moral development
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Summer
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Prepare students to attack the D&T GCSE exam (50% of the final grade) with confidence. They should be aware of the types of questions that may come up in the exam, including theory content, how and what the wording means and how to answer the questions with the correct type of response. Students will enhance any previously taught/learnt content to apply their knowledge and understanding of the course and use specific technical language.

To be fully aware of the 3 areas of assessment: 3.1 Core technical principles, 3.2 Specialist technical principles, 3.3 Designing and making principles. Plus the type of questions they may appear on the examination paper and wording used by the exam body (AQA). How to fully answer and justify answers in relation to the marks available. Fully understand the format of the paper they will be sitting.

3.2.1

- Selection of materials or components
 - ACCESSFMM
 - Ethical factors

3.2.2

- Forces and stresses
 - Materials and objects and be manipulated
 - Materials can be enhanced

3.2.3 3.3.2

- Ecological and social footprint
 - Ecological issues in the manufacture of products
 - The 6R's
 - Social issues on the design and manufacture of products
- Environmental, social and economic challenge
 - Deforestation
 - possible increase in carbon dioxide levels leading to potential global warming
 - the need for fair trade.

3.2.4

- Sources and origins

➤ Exam style questions

➤ Case study

➤ Revision sheets

➤ Works sheets

➤ Q&A sessions

➤ **Science -**

- Sustainability 6R's
- Extraction of raw materials
- Material transition from raw into usable state
- Users needs and wants
- Life cycle analysis of materials and products.
- Forces and stresses on materials

➤ **RE/PSHCE –**

- Moral, social, environmental, cultural and religious issues surround materials their extraction and the harm on environments and people, especially in developing countries.
- Exploitation/fair trade
- Pollution

➤ **Geography –**

- sustainability/fossil fuels.
- Timber/ deforestation
- Population of developing countries
- Sources of raw materials across the world.
- Pollution

	<ul style="list-style-type: none"> • Primary sources of materials and the main process in converting into workable forms (trees into woods) <p>3.2.5</p> <ul style="list-style-type: none"> ➤ Using and working with materials <ul style="list-style-type: none"> • Properties of materials • The modification of properties for specific purposes • How to shape and form using cutting, abrasion and addition <p>3.2.6</p> <ul style="list-style-type: none"> ➤ Stock forms, types and sizes <ul style="list-style-type: none"> • In relation to at least one material category, you should know and understand the different stock forms types and sizes in order to calculate and determine the quantity of materials or components required. <p>3.2.7</p> <ul style="list-style-type: none"> ➤ Scales of production <ul style="list-style-type: none"> • Prototype • Batch • Mass • Continuous <p>3.2.8</p> <ul style="list-style-type: none"> ➤ Specialist techniques and processes <ul style="list-style-type: none"> • The use of production aids • Tools, equipment • How materials are cut, shaped and formed. • Commercial processes (CAD/CAM) • Quality Control 		<p>1. Personal development – building knowledge and understanding supported by a range of practical experiences to establish life skills.</p> <p>2. Social development- the evolution of design and its effect on its users and the environment. Linking to environmental and sustainability particularly with plastic and the future of material development</p> <p>3. Moral development—understanding of the effect of manufacturing processes and production on both users and the environment.</p> <p>6. Cultural development – understanding how manufacturing has evolved through time and how this has impacted and directed the design and manufacturing processes which we see today, and the predictions made for future design.</p>
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	<p>3.2.9</p> <ul style="list-style-type: none"> ➤ Surface treatments and finishes <ul style="list-style-type: none"> • The preparation and application of treatments and finishes to enhance functional and aesthetic properties 		
	<p>3.3.3</p> <p>The work of others: Specifically we will study 2 of the following:</p> <ul style="list-style-type: none"> • Aldo Rossi • Charles Rennie Macintosh • Gerrit Rietveld • Marcel Breuer • Norman Forster • Philippe Starck • Sir Alec Issigonis • Dieter Rams <p>And 2 companies from:</p> <ul style="list-style-type: none"> • Alessi • Apple • Braun • Dyson 	<ul style="list-style-type: none"> ➤ Case studies Homework/home learning tasks 	<ul style="list-style-type: none"> ➤ History – <ul style="list-style-type: none"> • Impact of society since world war 1 ➤ Science - <ul style="list-style-type: none"> • Human factors - Ergonomics ➤ Design Technology <ul style="list-style-type: none"> • Home learning project in KS3 • Aesthetics • Design movement homework • Marketing
	<ul style="list-style-type: none"> ➤ Science and Maths links that ‘should’ be taught through core subject Lessons at BLS in KS3 and KS4. 	<ul style="list-style-type: none"> ➤ Practise papers and questions ➤ NEA ➤ Worksheets 	<ul style="list-style-type: none"> ➤ Maths links- <ul style="list-style-type: none"> • Recognise and use expressions in decimal and standard form. • Use ratios, fractions and percentages. • Calculate surface area and volume. • Presentation of data, diagrams, bar charts and histograms

			<ul style="list-style-type: none">• Plot, draw and interpret appropriate graphs.• Translate information between graphical and numeric form• Use angular measures in degrees.• Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects• Calculate areas of triangles and rectangles, surface areas and volumes of cubes. <p>➤ Science links</p> <ul style="list-style-type: none">• Quantities, units and symbols• SI units (eg kg, g, mg; km, m, mm; kJ, J), prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).• Metals and non-metals and the differences between them, on the basis of their characteristic physical and chemical properties.• The basic principles in carrying out a lifecycle assessment of a material or product.• The conditions which cause corrosion and the process of corrosion and oxidation.• The composition of some important alloys in relation to their properties and uses.• The physical properties of [materials], how the properties of
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			<p>materials are selected related to their uses.</p> <ul style="list-style-type: none"> • The main energy sources available for use on Earth (including fossil fuels, nuclear fuel, bio-fuel, wind, hydro-electricity, the tides and the Sun), the ways in which they are used and the distinction between renewable and non- renewable sources. • The action of forces and how levers and gears transmit and transform the effects of forces.
<p>Summer 2</p>	<p>Prepare students to attack the D&T GCSE exam (50% of the final grade) with confidence. They should be aware of the types of questions that may come up in the exam, including theory content, how and what the wording means and how to answer the questions with the correct type of response. Students will enhance any previously taught/learnt content to apply their knowledge and understanding of the course and use specific technical language.</p> <p>To be fully aware of the 3 areas of assessment: 3.1 Core technical principles, 3.2 Specialist technical principles, 3.3 Designing and making principles. Plus the type of questions they may appear on the examination paper and wording used by the exam body (AQA). How to fully answer and justify answers in relation to the marks available. Fully understand the format of the paper they will be sitting.</p>		
	<ul style="list-style-type: none"> ➤ Exam technique ➤ Key words / vocab ➤ Recap on drawing/presentation ➤ Plus any areas that students feel the need to 'go over' again. 	<ul style="list-style-type: none"> ➤ Practise papers and questions ➤ Q&A sessions 	<ul style="list-style-type: none"> ➤ All prior learning has led to this point