Woldgate School departmental curriculum overview
Design & Technology

Importance of D&T

1. Key concepts of Design and technology key stage 3	2. Key processes of Design and technology key stage 3	3. Range and content of Design and technology key stage 3	4. Curriculum opportunities of Design and technology key stage 3
There are a number of key concepts that underpin the study of design and technology. Pupils need to understand these concepts in order to deepen and broaden their knowledge, skills and understanding. **1.1 Designing and making** a. Understanding that designing and making has aesthetic, environmental, technical, economic, ethical and social dimensions and impacts on the world. b. Applying knowledge of materials and production processes to design products and produce practical solutions that are relevant and fit for purpose. c. Understanding that products and systems have an impact on quality of life. d. Exploring how products have been designed and made in the past, how they are currently designed and made, and how they may develop in the future. **1.2 Cultural understanding** a. Understanding how products evolve according to users' and designers' needs, beliefs, ethics and values and how they are influenced by local customs and traditions and available materials. b. Exploring how products contribute to lifestyle and consumer choices. **1.3 Creativity** a. Making links between principles of good design, existing solutions and technological knowledge to develop innovative products and processes. b. Reinterpreting and applying learning in new design contexts and communicating ideas in new or unexpected ways. c. Exploring and experimenting with ideas, materials, technologies and techniques. **1.4 Critical evaluation** a. Analysing existing products and solutions to inform designing and making. b. Evaluating the needs of users and the context in which products are used to inform designing and making. c. Exploring the impact of ideas, design decisions and technological advances and how these provide opportunities for new design solutions.	These are the essential skills and processes in design and technology that pupils need to learn to make progress. Pupils should be able to: a. Generate, develop, model and communicate ideas in a range of ways, using appropriate strategies b. Respond creatively to briefs, developing their own proposals and producing specifications for products c. Apply their knowledge and understanding of a range of materials, ingredients and technologies to design and make their products d. Use their understanding of others' designing to inform their own e. Plan and organise activities and then shape, form, mix, assemble and finish materials, components or ingredients f. Evaluate which hand and machine tools, equipment and computer-aided design/manufacture (CAD/CAM) facilities are the most appropriate to use g. Solve technical problems h. Reflect critically when evaluating and modifying their ideas and proposals to improve products throughout their development and manufacture.	This section outlines the breadth of the subject on which teachers should draw when teaching the key concepts and key processes. In each product area the study of **designing** should include understanding of: b. Users' needs and the problems arising from them. c. The criteria used to judge the quality of products, including fitness for purpose, the extent to which they meet a clear need and whether resources have been used appropriately. d. The impact of products beyond meeting their original purpose and how to assess products in terms of sustainability. e. Aesthetic, technical, constructional and relevant wider issues that may influence designing, selection of materials, making and product development. The study of making in **resistant materials** and **textiles** should include: j. A broad range of techniques, including handcraft skills and CAD/CAM, and how to use them to ensure consistency and precision when making single and multiple products. k. The behaviour of structural elements in a variety of materials. l. How to use materials, smart materials, technology and aesthetic qualities to design and make products of worth. m. How to prepare and assemble components to achieve functional results. The study of making in **systems** and **control** should include: n. The practical application of systems and control in design proposals. o. Electrical, electronic, mechanical, microprocessor and computer control systems and how to use them effectively. p. Using systems and control to assemble subsystems into more complex systems. q. Feedback and how a variety of inputs can give rise to a variety of outputs.	During the key stage pupils should be offered the following opportunities that are integral to their learning and enhance their engagement with the concepts, processes and content of the subject. In ways appropriate to the product area, the curriculum should provide opportunities for pupils to: a. Analyse products to learn how they function b. Undertake focused tasks that develop knowledge, skills and understanding in relation to design and make assignments c. Engage in design and make assignments in different and progressively more complex contexts, including for purposes and uses beyond the classroom d. Work individually and in teams, taking on different roles and responsibilities e. Work with designers and makers where possible to develop an understanding of the product design process f. Use ICT as appropriate for image capture and generation; data acquisition, capture and handling; controlling; and product realisation g. Make links between design and technology and other subjects and areas of the curriculum.

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Assessing design and technology
Assessment is an essential part of teaching and learning in all subjects. It can take many forms and be used for a range of purposes.
To be effective assessment must be 'fit for purpose'; being clear about what you want the assessment to achieve will help you decide what form the assessment should take.
This map gives planning assessment in design and technology. Further support on gathering evidence, integrating assessment and different types of assessment (periodic, day-to-day and peer assessment) is available in the assessment section. Exemplification of standards materials are also available.
When planning assessment opportunities consider the following:

Purpose – What is the assessment for and how will it be used?
Does it form part of ongoing assessment for learning to provide individual feedback or targets so that the pupil knows what to do next? Is it to provide an overall judgement about how the pupil is progressing against national curriculum levels? Related to this is the need to consider how the purpose of the assessment affects the frequency of assessment. For example, there should be sufficient time between level-related judgements to allow a pupil to show progress, whereas to be effective the assessment of ongoing work should be embedded in day-to-day teaching and learning.

Evidence – What are the best ways to gather the evidence needed to support the purpose of the assessment?
Assessment shouldn't be limited to a narrow range of evidence. Any meaningful judgement of progress or attainment should be based on a range of activities, outcomes and contexts This could include assessing the learning as it's happening through observation, discussion or focused questioning; involving pupils in the process through peer or self-assessment; or sampling a range of work over a period of time. If there are areas where you don't have sufficient evidence you could either adjust your planning or use a more focused task to fill the gap. The gathering of evidence also needs to be manageable. With care, the same evidence may be used for a variety of purposes.

Outcome – What form will the assessment outcome take and how will it be used?
Depending on the purpose of the assessment the outcome could be a level judgement of progress over time or a specific and measurable improvement target for the pupil. Effective use of the assessment outcome results in actions, such as providing an instant response or planning for the longer term. The best means of communicating assessment outcomes should be considered. For example, it might be through written feedback or a discussion. The outcome may also provide you with valuable information for your future planning, by identifying areas that need to be revisited by a class or individuals to secure understanding, or by revealing gaps in curriculum coverage where there is no evidence of achievement in a particular area to assess.

Design and Technology at Woldgate School
Design and technology develops confident individuals who become increasingly independent and able to take the initiative as they plan and organise activities, and then shape, form, assemble and finish materials and components. Design and technology enables pupils to try new things and to make the most of opportunities relating to the made world. Pupils can recognise their talent as they visualise alternative solutions when designing and making products and systems. Exploring their own and others' ideas and values, pupils respond resourcefully as they anticipate and overcome difficulties when implementing their ideas. All this increases their confidence in their own abilities and opinions, enhances their feelings of self-worth and prepares them to live safe, healthy and fulfilling lives. A range of technology is available to students which have broadened the scope of design at Woldgate School – Laser Cutting, CNC engraving and Routing, CAD/CAM, Cutter Plotters, 3D printing, thermoforming and metal fabrication.

Assessment
During each project a range of skills are assessed. These include: researching the task, developing ideas, making high quality accurate products using a range of tools, equipment and processes. Other areas that are also assessed include: quality of presentation and finish, effort, planning and evaluation. Homework is set using extended tasks, based around a particular theme or topic related to the project being worked on. These are graded together with the complete project.

Marking and Grading
Work is marked using the following scales:
- National Curriculum levels (NC) are awarded at the end of each project. NC Levels are used for attainment with student having access to what the levels mean and how they can improve.
- Grades are awarded on a scale of 1 to 9
- Effort is marked in accordance with the whole school policy
- Comments alongside each grade, it is usual for the teacher to add comments to inform the pupils about their work might be improved.

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Key Subject Skills

AO1	AO2	AO3	AO4
Design •use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools	**Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties	**Evaluate** • analyse the work of past and present professionals and others to develop and broaden their understanding • investigate new and emerging technologies • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists	**Technical knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • understand how more advanced mechanical systems used in their products enable changes in movement and force • understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] • apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers]

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Year	Autumn				Spring				Summer			
	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links
7	Boardgame Project To Include – How to create Mood boards Importance of mind maps How to generate Initial Ideas How to draw nets & recognise different nets Understanding the meaning and use of CAD Understand the use and design of Logos Use of a Craft knife & following H & S	Baseline Test at start of Y7 Homework pieces Design & Make Task End of Topic Test AO's: **AO1 Design** • use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools **AO2 Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties **AO3 Evaluate** • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **AO4 Technical Knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions	AO1 AO2 AO3 AO4	Links to prior learning: Students have previously studied Design and Make tasks at KS2 How does this prepare students for future learning? Students can generate and use collages for inspiration, draw specific measured design ideas, use of CAD/CAM and follow safe working practices.	LED Torch Project To Include - Using a Moodboard to produce outline shapes for designing How to generate Initial Ideas within a given tolerance How to draw using 2D Design Apply the use of CAD for manufacture - CAM Use of a Laser Cutter Use of simple workshop cutting and finishing tools Following H & S	Level from previous project as starting point Homework pieces Design & Make Task End of Topic Test AO's: **AO1 Design** • use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools • use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses **AO2 Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties **AO3 Evaluate** • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **AO4 Technical Knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] • apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable	AO1 AO2 AO3 AO4	Links to prior learning Students have previously studied a Design and make task in the previous Y7 term, which covered Mood boards Importance of mind maps How to generate Initial Ideas How to draw nets & recognise different nets Understanding the meaning and use of CAD Understand the use and design of Logos Use of a Craft knife & following H & S How does this prepare students for future learning? Students can Look at products that exist to use as inspiration and analyse them, create a profile for a user, use different drawing techniques for presenting ideas, use of CAD/CAM for designing and making, use net/template making and use workshop tools and equipment as and where necessary	Toy In A Tin Project To Include - Analysing Existing Products Creating a Profile of a User Generating design ideas Drawing a 3rd Angle Orthographic Projection Use of CAD/CAM as and where appropriate Use of workshop hand tools and machinery as appropriate to TIAT design	Level from previous project as starting point Homework pieces Design & Make Task Level from end of Y7 End of Topic Test AO's: **AO1 Design** • use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools • use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses **AO2 Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties **AO3 Evaluate** •Investigate new and emerging technologies • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **AO4 Technical Knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions	AO1 AO2 AO3 AO4	Links to prior learning Students have previously studied several Design and make tasks in the previous Y7 terms, which covered Mood boards and use of them Importance of mind maps How to generate Initial Ideas and ideas drawn to a tolerance How to draw nets & recognise different nets and use of templates Understanding the meaning and use of CAD Understand the use and design of Logos and branding Use of a Craft knife, workshop tools and equipment & following H & S How does this prepare students for future learning? Students can create and use moodboards in several ways to help produce creative design ideas, Look at products that exist to use as inspiration and analyse them, create a profile for a user, interview users, use different drawing techniques for presenting ideas, use of CAD/CAM for designing and making, use net/template making and use workshop tools and equipment as and where necessary. Skilled in the Design Process for Y8.

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						components [for example, microcontrollers]						
8	Designer Bedroom Project To Include - Understanding the use of Task Analysis How to create a profile of a Target Market Creating 2dimensional Floor Plans to be understood in industry Drawing in isometric Analysing Design Ideas against Design Criteria Use of a Craft knife & following H & S Using a range of materials, skills & tools to create a scaled model	Baseline Test at start of Y8 Level from End Of Y7 Homework pieces Design & Make Task End of Topic Test AO's: **AO1 Design** • use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools **AO2 Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties **AO3 Evaluate** • analyse the work of past and present professionals and others to develop and broaden their understanding • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **AO4 Technical Knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions	AO1 AO2 AO3 AO4	Links to prior learning Students previously worked their way fully through design and make tasks covering all AO'1-4 through a broad range of activities in Y7. Further compounding of this throughout Y8. Students can create and use moodboards in several ways to help produce creative design ideas, Look at products and designers/artists that exist to use as inspiration and analyse them, create a profile for a user, interview users, use different drawing techniques for presenting ideas, use of CAD/CAM for designing and making, use net/template making and use workshop tools and equipment as and where necessary. Skilled in the Design Process for Y8. How does this prepare students for future learning? Students can Look at products that exist to use as inspiration and analyse them, create a profile for a user, use different drawing techniques for presenting ideas, use of CAD/CAM for designing and making, use net/template making and use workshop tools and equipment	Clock Project To Include – Analysing Existing Products to use as inspiration Generating a Moodboard to generate creative designs by using a 'window' technique Compiling a Design Criteria Analysing Design Ideas against Design Criteria Drawing a 3rd Angle Orthographic Projection Using a range of materials, skills & tools to create a working prototype Use of a workshop tools/equipment as appropriate & safe, following H& S	Level from previous project as starting point Homework pieces Design & Make Task End of Topic Test AO's: **AO1 Design** • use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools • use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses **AO2 Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, considering their properties **AO3 Evaluate** • test, evaluate and refine their ideas and products against a specification, considering the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **AO4 Technical Knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]	AO1 AO2 AO3 AO4	Links to prior learning Students have previously studied all material areas and this combines and brings together all material areas, fully following the design and make process. How does this prepare students for future learning? Students are fully equipped in their knowledge of material areas and in the design and make process to be able to undertake their final project in Y8, which brings together full use of Y7 & 8 skills and knowledge.	Desk Lamp Project To Include - Analysing Products from a Modernism/ Post Modernism theme to use as an inspiration source Compiling a clear & specific Design Criteria using ACCESS FM fully 1- & 2-point perspective drawings Development of an idea & modelling through appropriate materials Packaging Using a range of materials, skills & tools to create Desk Lamp Use of a workshop tools/equipment as appropriate & safe, following H& S	Level from previous project as starting point Homework pieces Design & Make Task Level from end of Y8 End of Topic Test AO's: **AO1 Design** • use research and exploration, such as the study of different cultures, to identify and understand user needs •identify and solve their own design problems and understand how to reformulate problems given to them • develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations • develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools • use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses **AO2 Make** • select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture • select from and use a wider, more complex range of materials, components and ingredients, considering their properties **AO3 Evaluate** • analyse the work of past and present professionals and others to develop and broaden their understanding •Investigate new and emerging technologies • test, evaluate and refine their ideas and products against a specification, considering the views of intended users and other interested groups • understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists **AO4 Technical Knowledge** • understand and use the properties of materials and the performance of structural elements to achieve functioning solutions • understand how more advanced mechanical systems used in their products enable changes in movement and force • understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] • apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example,	AO1 AO2 AO3 AO4	Links to prior learning Students have previously studied all material areas and this combines and brings together all material areas, fully following the design and make process, in order to prepare students for their GCSE subject. How does this prepare students for future learning? Students are fully equipped in their knowledge of material areas and in the design and make process to be able to undertake their three-year GCSE in Y9.

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				as and where necessary.						actuators], using programmable components [for example, microcontrollers]		
9			AO1 AO2 AO3	Links to prior learning			AO1 AO2 AO3	Links to prior learning			AO1 AO2 AO3	Links to prior learning
			AO4 AO5 AO6	How does this prepare students for future learning?			AO4 AO5 AO6	How does this prepare students for future learning?			AO4 AO5 AO6	How does this prepare students for future learning?
10			AO1 AO2 AO3	Links to prior learning			AO1 AO2 AO3	Links to prior learning			AO1 AO2 AO3	Links to prior learning
			AO4 AO5 AO6 AO5 AO6	How does this prepare students for future learning?			AO4 AO5 AO6 AO5 AO6	How does this prepare students for future learning?			AO4 AO5 AO6 AO5 AO6	How does this prepare students for future learning?

	Autumn				Spring				Summer			
Year	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links
9	**Cube Calendar**	**AO1** **A** Identifying design possibilities – client profile **B** Producing a design brief & specification **AO2** **E** realising design ideas – Timber **A03** **F** Analyse & evaluate existing products AO1: Identify, investigate and outline design possibilities to address needs and wants. • AO2: Design and make prototypes	**AO1** **AO2** **AO3** AO4 AO5 AO6	Client profiles completed in KS3 Projects. Theoretical practise: Retrieval work on the Iterative Design Process. Designing for a specific client. ***Materials and Their Working Properties – Link to the Core Technical Principles of DT at GCSE.*** Practical skills building & safe working practise using timber materials prepares	**Interior design/ In the style of**	AO2 C Design ideas D development E Realising design ideas - paper & card	**AO1** **AO2** AO3 AO4 AO5 AO6	Links to prior learning Practical skills building & safe working practice using paper & card prepares students for NEA	**MP3 amplifier**	AO2 C Design ideas D development E Realising design ideas -polymers electronics	AO1 AO2 AO3 AO4 AO5 AO6	Links to prior learning How does this prepare students for future learning?

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		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.		students for subsequent projects & NEA. Timber theory foundation for exam knowledge								
10	**Inclusive Design**	AO1 A Identifying & investigating B Producing a design brief & spec AO2 C Generating design ideas AO3 F Analysing & evaluating	**AO1** **AO2** **AO3** AO4 AO5 AO6 AO5 AO6	Links to prior learning Greater autonomy in choice of design problem prepares students for individual NEA project	**Wooden Box**		AO1 AO2 **AO3** AO4 AO5 AO6 AO5 AO6	Practising & refining making skills acquired in previous practical projects Practical exercises designed to equip students with higher levels of skill & confidence in NEA project	**Theory** **NEA 1 individual GCSE project**	AO4 Regular topic tests to assess learning Elements to be completed this term AO1 AB AO2 C	**AO1** **AO2** AO3 **AO4** AO5 AO6 AO5 AO6	Links to prior learning AO4 preparation for exam AO1/2 Basis for making element of NEA

Year	Autumn				Spring				Summer			
	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links
	Core Technical Principles of Design Technology	• Worksheets • Quizzes • End of Unit Topic Test	AO4		Core Technical Principles of Design Technology	• Worksheets • Quizzes • End of Unit Topic Test	AO4		Core Technical Principles of Design Technology	• Worksheets • Quizzes • End of Unit Topic Test	AO4	

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11	Development in New Materials Energy Generation and Storage Materials and Their Working Properties	• Composite Materials • Modern Materials • Smart Materials • Technical Textiles • Development in New Materials End of Topic Test • Energy Storage Systems • Fossil Fuels • Nuclear Power • Renewable Energy • Energy Generation and Storage End of Topic Test • Materials Properties • Metals and Alloys • Natural and Manufactured Timbers Mock Examination Past Paper Previous Summer Series	AO4	Links to prior learning How does this prepare students for future learning? Core Technical Principles of Design Technology. 1 x 2-hour final GCSE examination. 3.1 Core Technical Principles. All the following must be covered and relates to Section A of the examination paper. • Development in New Materials. • Energy Generation and Storage • Materials and Their Working Properties. • Mechanical Devices. • New and Emerging	Materials and Their Working Properties Mechanical Devices New and Emerging Technologies	• Paper and Boards • Polymers • Textiles • Materials and Their Working Properties End of Topic Test • Rotary Systems • Types of Movement • Levers and Linkages • Mechanical Devices End of Topic Test • Critical Evaluation • Industry and Enterprise • People, Culture and Society • Production Techniques • Sustainability and the Environment • New and Emerging Technologies End of Topic Test	AO4	Links to prior learning How does this prepare students for future learning? Core Technical Principles of Design Technology. 1 x 2-hour final GCSE examination. 3.1 Core Technical Principles. All the following must be covered and relates to Section A of the examination paper. • Development in New Materials. • Energy Generation and Storage • Materials and Their Working Properties. • Mechanical Devices. • New and Emerging Technologies. • Systems Approach to Designing.	Systems Approach to Designing	• Input and Output Devices • Processes and Programming Microcontrollers • Systems Approach to Designing End of Topic Test	A O4	Links to prior learning How does this prepare students for future learning? Core Technical Principles of Design Technology. 1 x 2-hour final GCSE examination. 3.1 Core Technical Principles. All the following must be covered and relates to Section A of the examination paper. • Development in New Materials. • Energy Generation and Storage • Materials and Their Working Properties. • Mechanical Devices. • New and Emerging Technologies. • Systems Approach to Designing.

				• Technologies. • Systems Approach to Designing. 3.2 Specialist Technical Principles. The important thing is to cover all of the principles. You have flexibility as to which material(s) or system you deliver each principle through but each must be delivered through at least one. This forms Section B of the paper. • Selection of materia				3.2 Specialist Technical Principles. The important thing is to cover all of the principles. You have flexibility as to which material(s) or system you deliver each principle through but each must be delivered through at least one. This forms Section B of the paper. • Selection of materials or components. • Forces and stresses on				3.2 Specialist Technical Principles. The important thing is to cover all of the principles. You have flexibility as to which material(s) or system you deliver each principle through but each must be delivered through at least one. This forms Section B of the paper. • Selection of materials or components. • Forces and stresses on

				ls or components. • Forces and stresses on materials. • Ecological and social footprint. • Scales of production. • Sources and origins. • Physical and working properties. • Stock forms, types and sizes. • Specialist techniques				materials. • Ecological and social footprint. • Scales of production. • Sources and origins. • Physical and working properties. • Stock forms, types and sizes. • Specialist techniques (including quality control). • Surface treatments and finishes. 3.3 Design and Making Principles.				materials. • Ecological and social footprint. • Scales of production. • Sources and origins. • Physical and working properties. • Stock forms, types and sizes. • Specialist techniques (including quality control). • Surface treatments and finishes. 3.3 Design and Making Principles.

				(including quality control). • Surface treatments and finishes. 3.3 Design and Making Principles. These are common design principles and should apply regardless of which material(s) you are working with. This forms Section C of the paper. • Primary and secondary data.				These are common design principles and should apply regardless of which material(s) you are working with. This forms Section C of the paper. • Primary and secondary data. • Needs and wants. • Investigation. • Environmental, social and economic challenge. • Idea development.			These are common design principles and should apply regardless of which material(s) you are working with. This forms Section C of the paper. • Primary and secondary data. • Needs and wants. • Investigation. • Environmental, social and economic challenge. • Idea development.

				• Needs and wants. • Investigation. • Environmental, social and economic challenge. • Idea development. • The work of others. • Design strategies. • Communication of design ideas. • Prototype development. • Selection of materials and components.				• The work of others. • Design strategies. • Communication of design ideas. • Prototype development. • Selection of materials and components. • Tolerances. • Material management. • Tools and equipment. Techniques and processes.				• The work of others. • Design strategies. • Communication of design ideas. • Prototype development. • Selection of materials and components. • Tolerances. • Material management. • Tools and equipment. Techniques and processes.

				components. • Tolerances. • Material management. • Tools and equipment. Techniques and processes.								
10/11	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links	Topic	Assessment	Skills tested	Links
									Non-Examined Assessment Iterative Design Process Based on the Contextual Challenges from AQA which are renewed annually on 1st June. **Investigating and Identifying Design**	Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive	AO1AO1A Identify, investigate and outline design	By analysing the contextual challenge students will identify design possibilities, investigate client needs and wants and factors including economic and social challenges.

									Possibilities. • Three contextual challenges will be set annually. • Contexts will not carry over. • Different approaches, either multi-mat	investigation of their needs and wants, with a clear explanation and justification of all aspects of these. Comprehensive investigation into the work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including; economic and social effects. Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified. 10 Marks	possibilities.	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

									erial or through limited material or technologies, specialist strategies are equally valid. • To be completed in approximately 30–35 guid			inform decisions.

									• ed lear ning hou rs. • Pro duc e a prot otyp e and port folio of evid enc e (ma xim um 20 pag es). • Port folio s may be pap er bas ed or elec tron			

									ic for mat. 50% of the student's overall grade.			
	Transition from Year 10 into Year 11 – Continuation of the Non-Examined Assessment											
11	**CONTINUATION OF…** Non-Examined Assessment Iterative Design Process Based on the Contextual Challenges from AQA which are renewed annually on 1st June. **Investigating and Identifying Design Possibilities.** • Three contextual challenges will be	Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these. Comprehensive investigation into the	AO 1 AO 1A Identify, investigate and outline 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	Finalising… Developing Design Ideas	Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements. Fully appropriate materials/components selected with extensive research into their working properties and availability. Fully detailed manufacturing specification is produced with	AO 2 AO 2D 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)	Core Technical Principles of Design Technology. 1 x 2-hour final GCSE examination. 3.1 Core Technical Principles. All the following must be covered and relates to Section A of the examination paper. • Development in New Materials. • Energy Generation and	• It is a Department of Education requirement that the use of mathematical skill and scientific understanding be included in all GCSE Design and technology examinations. • 15% of the paper is mathematical skill used in an application which is Design and Technology relevant. The examination paper is 50% of the marks – allow sufficient learning time. The paper is divided into three parts. There is no pre-release or design question	AO1 AO2 AO3 AO4	Mathematics: • Arithmetic and numerical computation. • Handling data • Graphs. • Geometry & trigonometry. Science: • Use scientific vocabulary, terminology and definitions.

	set annually. • Contexts will not carry over. • Different approaches, either multi-material or through limited material or technologies, specialist strategies are	work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including; economic and social effects. Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified. 10 Marks		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.		comprehensive justification to inform manufacture. 20 Marks		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	• Storage • Materials and Their Working Properties. • Mechanical Devices. • New and Emerging Technologies. • Systems Approach to Designing. 3.2 Specialist Technical Principles. The important thing is to cover all of the principles. You have flexibility as to	which allows additional revision time.		• Life cycle assessment and recycling. • Using materials. • Corrosion and oxidisation Alloys. • Energy sources. • Forces, levers and gears.

	equally valid. • To be completed in approximately 30–35 guided learning hours. • Produce a prototype and portfolio of evidence (maximum 20 pages). • Portfolios may							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.	which material (s) or system you deliver each principle through but each must be delivered through at least one. This forms Section B of the paper. • Selection of materials or components. • Forces			

	be paper based or electronic format. 50% of the student's overall grade.								and stresses on materials. • Ecological and social footprint. • Scales of production. • Sources and origins. • Physical and working properties.			

									• Stock forms, types and sizes. • Specialist techniques (including quality control). • Surface treatments and finishes. 3.3 Design and Making Principles. These are			

									common design principles and should apply regardless of which material(s) you are working with. This forms Section C of the paper. • Primary and secondary data. • Needs and wants. • Investig			

									atio n. • Envi ron men tal, soci al and eco nom ic chall eng e. • Idea dev elop men t. • The wor k of othe rs. • Desi gn strat egie s. • Com mun icati on of desi			

									gn idea s. • Prot otyp e dev elop men t. • Sele ctio n of mat erial s and com pon ents . • Tole ranc es. • Mat erial man age men t. • Tool s and equi pme nt.			

									• Techniques and processes			
11	**Producing a Design Brief and Specification.**	Comprehensive design brief which clearly justifies how they have considered their user/client's needs and wants and links directly to the context selected. Comprehensive design specification with very high level of justification linking to the needs and wants of the client/user. Fully informs subsequent design stages. 10 Marks	AO1 AO 1B Producing a design brief & specification.	Based on conclusions from their investigation's students will outline design possibilities by producing a design brief and design specification. Students should review both throughout the project.	Realising Design Ideas	The correct tools, materials and equipment (including CAM where appropriate) have been consistently used or operated safely with an exceptionally high level of skill. A high level of quality control is evident to ensure the prototype is accurate by consistently applying very close tolerances. Prototype shows an exceptionally high level of making/finishing skills that are fully consistent and appropriate to the desired outcome. An exceptionally high-quality prototype that has the potential to be commercially viable has been produced	AO 2 AO 2E 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,				

						and fully meets the needs of the client/user.		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.			
	Generating Design Ideas	Imaginative, creative and innovative ideas have been	AO2 AO 2C	Students should explore a	Analysing and Evaluating	Extensive evidence that various iterations are as a direct result	AO 3 AO 3F Anal ysing	Within this iterative design			

		generated, fully avoiding design fixation and with full consideration of functionality, aesthetics and innovation. Ideas have been generated, that take full account of on-going investigation that is both fully relevant and focused. Extensive experimentation and excellent communication is evident, using a wide range of techniques. Imaginative use of different design strategies for different purposes and as part of a fully integrated approach to designing. 20 Marks	Generating Design Ideas.	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		of considerations linked to testing, analysis and evaluation of the prototype, including well considered feedback from third parties. Comprehensive testing of all aspects of the final prototype against the design brief and specification. Fully detailed and justified reference is made to any modifications both proposed and undertaken. Excellent ongoing analysis and evaluation evident throughout the project that clearly influences the design brief and the design and manufacturing specifications.	and evaluating.	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				

				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				which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s).				

				different to the work of the majority of their peers or demonstrate new ways of improving existing solutions.								
	Developing Design Ideas	Very detailed development work is evident, using a wide range of 2D/3D techniques (including CAD where appropriate) in order to develop a prototype. Excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements. Fully appropriate materials/components selected with extensive research into their working properties and availability. Fully detailed manufacturing	AO 2 AO 2D 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		• Look at the criteria carefully when making assessments. • Don't mark as a linear portfolio e.g. credit any investigation work wherever it appears provided it is appropriate. • Fully annotate the Candidate Record Form to show where you have awarded marks. Include a wide range of pictures to show the final prototype.						

		specification is produced with comprehensive justification to inform manufacture. 20 Marks		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 requiremen								

				ts; 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.								