



DESIGN TECHNOLOGY

Why is the study of Design and Technology important?

Design and Technology is a practical and valuable subject. It enables students to actively contribute to the creativity, culture, wealth and well-being of themselves, their community and their nation. It teaches how to take risks and so become more resourceful, innovative, enterprising and capable. Students develop a critical understanding of the impact of design and technology on daily life and the wider world. Additionally, it provides excellent opportunities for students to develop and apply value judgments of an aesthetic, economic, moral, social, and technical nature both in their own designing and when evaluating the work of others.

What students will know and understand from their study.

Across the four-year curriculum the aims of the Design and Technology curriculum is to include the development of capability within the subject, along with broad general skills. Below details the skills and knowledge that will be gained across the five years, and this list, whilst not exhaustive, also includes skills and knowledge gained in Year 7 and 8.

What skills will the study of Design and Technology teach you?

Design and Technology use knowledge, skills and understanding from within the subject itself and also a wide range of other sources, especially but not exclusively science and mathematics. Design and Technology will teach you to:

- Develop resilience by not being afraid of challenges when solving problems, but to break them down and keep trying.
- Be creative in developing solutions to real world problems.
- Use modeling and annotated sketches to develop and communicate ideas.
- How to act responsibly within a practical environment thinking of the safety of yourself and others.

- Identify how to competently use a range of practical techniques across a range of disciplines.
- Apply and use CAD equipment to design and manufacture a range of products and components considering scale of production and precision.
- Work independently and part of a team to solve complex problems.
- Construct reasoned arguments to ethical, social and moral problems that have arisen due to technology and communicate these in an effective way.
- Identify links between different materials and contextual references.
- Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups.
- Understand and apply the principles of nutrition and health.
- Cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet.
- Become competent in a range of cooking techniques (for example, selecting and preparing ingredients: using utensils and electrical equipment, applying heat in different ways: using awareness of taste, texture and smell to decide how to season dishes and combine ingredients, adapting and using their recipes).
- Understand the source, seasonality and characteristics of a broad range of ingredients.

What will you know and understand from your study of Design and Technology?

- How to classify materials including smart materials and discuss their physical properties.
- How to manufacture products with reference to their materials physical properties.
- Students will learn to use and adjust equipment and machinery dependent on tasks.
- Use learning from science and mathematics to help design and manufacture components and products.
- Students will learn to consider the influence of a range of lifestyle factors and consumer choices when designing and analysing products.
- Students will know and understand additional factors to consider such as ergonomics, anthropometrics or dietary needs.
- Students will be able to evaluate their work against an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their product to their own designing and making.
- Students will be able to evaluate products through disassembly to determine how they are constructed and function and consider the life cycle analysis.
- How to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment.

Curriculum Planning

It is recognised schools are teaching a wide range of KS4 specifications, the themes and subject content have been identified from the following sources:

- The Design and Technology programmes of study for Key Stage 3
- GCSE subject content for Food Preparation and Nutrition
- WJEC Level 1/2 in Hospitality and Catering.
- WJEC Vocational Award in Construction and the Built Environment.

Curriculum content only covers core knowledge common to all KS4 specifications.



Context – Subject Curriculum Progression Overview

DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW OUTWOOD ACADEMY BRUMBY				
	Year 7 - Resistant Materials	Year 7 - Graphics	Year 8 - Resistant Materials	Year 8 Graphics & Construction
Autumn Term 1	<p>Health and Safety and Induction</p> <p>Measuring and Marking Out</p> <p>Workshop Machines, Pillar Drill and Sander</p> <p>Tool Taboo, Workshop Machines and Tools</p> <p>Booklet Completion</p> <p>Prepare for Peer Teaching (reinforcement of H&S Knowledge and Skills)</p> <p>Assessment Week - Peer Teaching of H&S Guidelines for equipment.</p>	<p>I POINT PERSPECTIVE</p> <ul style="list-style-type: none"> • Introducing technical drawing • Vanishing point • Horizon line • Perspective lines • Letters and name in 1-point perspective • Buildings and rooms in 1-point perspective • Street scene(s) in 1-point perspective • Assessment <p>CAD</p> <ul style="list-style-type: none"> • Create Floor Plan • Create Elevations • Create Rooms • Render rooms and Assessment 	<p>Sustainability Project - Environmental concerns</p> <p>6 R's Part 1</p> <p>6 R's Part 2</p> <p>Social and Cultural</p> <p>Laws and Standards Assessment</p> <p>Intro to 2D Design</p> <p>8Design 1, 2, 3, 5, 6</p> <p>8Making 1,2, 3, 5, 6, 7,</p> <p>8Evaluate 1, 2,</p> <p>8Technical knowledge 1, 2, 7, 8, 9</p>	<p>CAD</p> <ul style="list-style-type: none"> • What is CAD including the Design Brief? • Creating accounts with CAD software • Developing CAD - Creating a kitchen • Developing CAD - Creating a living room • Developing and modifying CAD with bathroom, bedroom, and Hallway • Demonstrating CAD skills and assessment <p>INFOGRAPHICS</p> <ul style="list-style-type: none"> • Intro and Design Brief to infographics • Creating account with Google and CANVA

	<p>The focus of the project is to introduce the students to Design Technology and health and safety in the workshop. The project gives the students the opportunity to use the workshop machines and a range of workshop tools such as the belt sander, pillar drill, tenon saw, coping saw and a number of marking out tools.</p> <p>Knowledge covers the work of other designers.</p> <p>Health and safety in a workshop including risk assessments. Manufactured boards and their source and different types. Basic lever systems.</p> <p>7Design 1, 2, 3, 5, 6.</p> <p>7Making 1,2, 3, 5, 6, 7, 8.</p> <p>7Evaluate 1, 2,</p> <p>7Technical knowledge 1, 2, 7, 8, 9</p>	<p>ISOMETRIC DRAWING</p> <ul style="list-style-type: none"> ● Introduction ● Isometric drawing ● Isometric drawing and assessment 		<ul style="list-style-type: none"> ● Developing skills in infographics with CANVA ● Demonstrating skills in infographics and assessment <p>VECTOR GRAPHICS</p> <ul style="list-style-type: none"> ● Introduction to Inkscape and Design Brief for product - logo ● Learning and developing skills in vector graphics ● Demonstrating skills and assessment in vector graphics
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<p>Autumn Term 2</p>	<p>Headphone Holder Project</p> <p>"Headphone Holder: introduce student to biomimicry using PP students to fill in ""what is Biomimicry"" so examples of headphone holders talk about social/moral/cultural issues that there could be student to start completing their mood boards"</p> <p>"introduce students to what a Specification is talk to students about how to do freehand drawing and use their mood board to create design ideas</p> <p>modify/change/improve designs so that it fits the Specification"</p>	<p>Class rotation</p>	<p>Mood Light Project - Laser Cutter H&S and Demo and Idea Creation</p> <p>2D Design Skills Development. (Practice).</p> <p>Update Glossary, Practical Line Bend Base, Complete 2D Design Ideas - Recap Printing and 2D Work Pg4. Model final idea and annotate Pg5. Practical nesting final design for laser cutting. Cutting tops.</p> <p>Review Homework. Demo Soldering - Process and placement. Practicals- Review nesting files and laser cutting. Soldering and laser cutting tops. Assembly. Review Targets.</p> <p>Complete Isometric Drawing. Continue Practical. Record Safety in DT Pg10. Glossary Update.</p>	<p>Class rotation</p>

	<p>demo how to create design using 2D design students to complete their design students to print out their designs and stick into folder MUST GET WORK SAVED, NAMED AND COLOUR IDENTIFIED</p> <p>after your mid project mark all students will be able to improve their work - make sure this is done in a different coloured pen (if writing) complete extension work if necessary</p> <p>demonstrate how to complete one-point perspective drawing step-by-step with students to have a go themselves demonstrate how to complete two-point perspective drawing step-by-step with students to have a go themselves</p> <p>before your final project mark all students will be able to improve their work - make sure this is done in a different coloured pen (if</p>		<p>Complete Practicals.</p> <p>Update Glossary and complete outstanding booklet work. Catch-up practical. Evaluation - complete an evaluation Pg9.Review Targets. Record New and Improved Skills Pg10.</p>	
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	<p>writing) complete extension work if necessary</p> <p>7Design 1, 2, 5, 6.</p> <p>7Making 1,2, 3, 5, 6, 7, 8.</p> <p>7Evaluate 1, 2, 7</p> <p>7Technical knowledge 1, 2, 7, 9</p>			
Spring I	<p>SAY NO! TO I CAN'T DRAW! - Intro to isometric sketching</p> <p>IsoSketch skills practice 1 - 3D Birdbox/Dice/Mug/Toaster</p> <p>IsoSketch skills practice 2 - Design a Tent / Cube Avatar</p> <p>IsoSketch skills practice 3 - Use IsoSketch to draw simple objects from life.</p> <p>Drawing in Exploded View - http://www.technologystudio.com</p>	Class rotation	<p>Business Card Project 1</p> <p>Business Card Project 2</p> <p>Business Card project 3</p> <p>Business Card Project 4</p> <p>Shop Front</p> <p>Shop Front</p> <p>Shop Front</p> <p>8Design 1, 2, 3, 5, 6.</p> <p>8Making 1,2, 3, 5, 6, 7, 8.</p> <p>8Evaluate 1, 2,</p>	Class rotation

	<p>udent.com/designpro/drawtec1.htm</p> <p>Drawing - Rendering: Colouring and Shading: http://www.technologystudent.com/designpro/drawtec1.htm</p> <p>Assessment Week - Drawing Task (Provide an engineered object to draw and render. EXT: Create an exploded drawing to go alongside it.</p> <p>7Design 1, 2, 3, 5, 6.</p> <p>7Making 1,2, 3, 5, 6, 7, 8.</p> <p>7Evaluate 1, 2,</p> <p>7Technical knowledge 1, 2, 7, 8, 9</p>		<p>8Technical knowledge 1, 2, 3, 7, 8, 9</p>	
Spring 2		<p>Class rotation</p>	<p>Shop Front</p> <p>Olympics drinks label</p> <p>Olympics drinks label</p>	<p>CONSTRUCTION Introduction and induction to Construction</p> <p>ELECTRICAL</p> <ul style="list-style-type: none"> ● Introduction on how to wire a plug ● Wiring a plug ● Wiring a socket

			<p>Olympics drinks label</p> <p>Olympics drinks label</p> <p>Catch-up week of three mini-projects</p> <p>Assessment and feedback week.</p>	<ul style="list-style-type: none"> • Wiring a plug/socket assessment • Evaluation
Summer 1	Food Preparation and Nutrition	Class rotation	Food Preparation and Nutrition	<p>CONSTRUCTION</p> <p>BUILDING STRUCTURES</p> <ul style="list-style-type: none"> • Building a cellular construction • Building a rectangular construction • Completion of rectangular and cellular construction • Assessment on structures
Summer 2	Food Preparation and Nutrition	Class rotation	Food Preparation and Nutrition	Class rotation

5 YEAR DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW

	Year 9 - Resistant Materials	Year 9 Graphics & Construction
Autumn Term 1		CAD <ul style="list-style-type: none"> • Introduction to Floor plan and Design Brief • Creating a floor plan • Adding dimensions to floor plan • Adding detail to floor plan • Rendering light to design • Capturing designs • Demonstration and Assessment
Autumn Term 2		2D DESIGN <ul style="list-style-type: none"> • Using 2D Tools • Assessment - Draw Tractor • Using Text, Fill, Background Tools and Step and Grid Lock • Isometric & Assessment • Vectorise and text - Assessment
Spring 1		Class rotation
Spring 2	Throughout this term, students will either revisit Unit 2/Unit 3 or prepare for a resit if they failed to achieve a warrantable mark.	Class rotation

Summer 1		CONSTRUCTION <ul style="list-style-type: none">● Health & Safety Induction● Wood joint(s)● Plumbing● Electrical● Brickwork● Roofing <i>Assessment will take place at various stages depending upon the student's progress.</i>
Summer 2		CONSTRUCTION <ul style="list-style-type: none">● Health & Safety Induction● Wood joint(s)● Plumbing● Electrical● Brickwork● Roofing <i>Assessment will take place at various stages depending upon the student's progress.</i>

5 YEAR DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW

	Year 10 - Construction	Year 11 - Construction
Autumn Term 1	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades: Carpentry/Joinery Bricklaying Electrical Roofing Plumbing Centre Assessment</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades: Carpentry/Joinery Bricklaying Electrical Roofing Plumbing Centre Assessment</p>

<p>Autumn Term 2</p> <p>Core Knowledge and principals</p> <p>11. Polymers 12. Textiles</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>
<p>Spring 1</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>

<p>Spring 2</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>
<p>Summer I</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>

<p>Summer 2</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Centre Assessment</p>	<p>1.1 The sector 1.2 The built environment life cycle 1.3 Types of building and structure 1.4 Technologies and materials 1.5 Building structures and forms 1.6 Sustainable construction methods 1.7 Trades, employment and careers 1.8 Health and safety</p> <p>Running concurrently with the above, students will undertake practical tasks from the following construction trades:</p> <ul style="list-style-type: none"> ● Carpentry/Joinery ● Bricklaying ● Electrical ● Roofing ● Plumbing <p>Terminal Assessment</p>
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Assessment

Assessment Objectives Design and Technology in line with WJEC Vocational Award in Construction and the Built Environment

	AO1 Demonstrate knowledge and understanding from across the specification.	AO2 Apply skills (including practical skills), knowledge and understanding in a variety of contexts and in planning and carrying out investigations and tasks.	AO3 Analyse and evaluate information, making reasoned judgements and presenting conclusions.	Technical Knowledge
Y10	<p>1.1 The sector</p> <p>1. Demonstrate knowledge and understanding of the following areas in construction and the built environment sector:</p> <ul style="list-style-type: none"> ● buildings and structures ● infrastructure and civil engineering products ● building services engineering ● professional and managerial roles and responsibilities associated with the built environment sector. 	<p>1.1 The sector</p> <p>1. Apply knowledge and understanding of the following areas in construction and the built environment sector:</p> <ul style="list-style-type: none"> ● buildings and structures ● infrastructure and civil engineering products ● building services engineering ● professional and managerial roles and responsibilities associated with the built environment sector. purposes 	<p>1.1 The sector</p> <p>1. Analyse and evaluate knowledge and understanding of the following areas in construction and the built environment sector:</p> <ul style="list-style-type: none"> ● buildings and structures ● infrastructure and civil engineering products ● building services engineering ● professional and managerial roles and responsibilities associated with the 	<p>1. Understand the impact of new and emerging technologies on industry, enterprise, sustainability, people, culture, society and the environment, production techniques and systems.</p> <p>2. Know how energy is generated and stored in order to choose and use appropriate sources to make products and to power systems.</p> <p>3. Understand developments in modern and smart materials, composite materials and technical textiles.</p> <p>4. Understand how electronic systems provide functionality</p>

	<p>1.2 The Built Environment life cycle</p> <p>Demonstrate knowledge and understanding of the built environment life cycle, specifically:</p> <ul style="list-style-type: none"> • raw material extraction • manufacturing • construction • operation and maintenance • demolition • disposal, reuse or recycling. <p>1.2 The Built Environment life cycle</p> <p>Demonstrate knowledge and understanding of the built environment life cycle, specifically:</p>	<p>1.2 The Built Environment life cycle</p> <p>Apply knowledge and understanding of the built environment life cycle, specifically:</p> <ul style="list-style-type: none"> • raw material extraction • manufacturing • construction • operation and maintenance • demolition • disposal, reuse or recycling. <p>1.2 The Built Environment life cycle</p>	<p>built environment sector.</p> <p>1.2 The Built Environment life cycle</p> <p>Analyse and evaluate knowledge and understanding of the built environment life cycle, specifically:</p> <ul style="list-style-type: none"> • raw material extraction • manufacturing • construction • operation and maintenance • demolition • disposal, reuse or recycling. <p>1.2 The Built Environment life cycle</p> <p>Analyse and evaluate knowledge and understanding of the built environment life cycle, specifically:</p> <ul style="list-style-type: none"> • raw material extraction • manufacturing 	<p>to products and processes, including sensors and control devices to respond to a variety of inputs, and devices to produce a range of outputs</p> <p>5. Understand how the use of programmable components are used to embed functionality into products in order to enhance and customise their operation</p> <p>6. Understand the functions of mechanical devices, to produce different sorts of movement, changing the magnitude and direction of forces:</p> <p>7. Know how to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines.</p> <p>8. Use learning from science and maths to help design and make products that work.</p>
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	<ul style="list-style-type: none"> • raw material extraction • manufacturing • construction • operation and maintenance • demolition • disposal, reuse or recycling. <p>1.3 Types of building and structure</p> <p>Demonstrate knowledge and understanding of the features and characteristics of:</p> <ul style="list-style-type: none"> • different forms of infrastructure construction • low-rise: • residential dwellings • commercial buildings • industrial buildings • agricultural buildings 	<p>Apply knowledge and understanding of the built environment life cycle, specifically:</p> <ul style="list-style-type: none"> • raw material extraction • manufacturing • construction • operation and maintenance • demolition • disposal, reuse or recycling. <p>1.3 Types of building and structure</p> <p>Apply knowledge and understanding of the features and characteristics of:</p> <ul style="list-style-type: none"> • different forms of infrastructure construction • low-rise: • residential dwellings • commercial buildings • industrial buildings 	<ul style="list-style-type: none"> • construction • operation and maintenance • demolition • disposal, reuse or recycling. <p>1.3 Types of building and structure</p> <p>Analyse and evaluate knowledge and understanding of the features and characteristics of:</p> <ul style="list-style-type: none"> • different forms of infrastructure construction • low-rise: • residential dwellings • commercial buildings • industrial buildings • agricultural buildings • community buildings • religious buildings 	
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	<ul style="list-style-type: none"> • community buildings • religious buildings • recreational buildings. <p>I.4 Technologies and materials</p> <p>Demonstrate knowledge and understanding of tools, technologies and materials</p> <p>used in the construction and built environment sector:</p> <ul style="list-style-type: none"> • main elements and components of low-rise buildings • main materials involved in constructing walls, installing building services, fitting roofs and finishing interiors • renewable technologies and materials, including heat pumps, wind turbines and solar panels. 	<ul style="list-style-type: none"> • agricultural buildings • community buildings • religious buildings • recreational buildings. <p>I.4 Technologies and materials</p> <p>Apply knowledge and understanding of tools, technologies and materials</p> <p>used in the construction and built environment sector:</p> <ul style="list-style-type: none"> • main elements and components of low-rise buildings • main materials involved in constructing walls, installing building services, fitting roofs and finishing interiors • renewable technologies and materials, including heat pumps, wind turbines and solar panels. 	<ul style="list-style-type: none"> • recreational buildings. <p>I.4 Technologies and materials</p> <p>Analyse and evaluate knowledge and understanding of tools, technologies and materials</p> <p>used in the construction and built environment sector:</p> <ul style="list-style-type: none"> • main elements and components of low-rise buildings • main materials involved in constructing walls, installing building services, fitting roofs and finishing interiors • renewable technologies and materials, including heat pumps, wind turbines and solar panels. <p>I.5 Building structures and forms</p> <p>Analyse and evaluate knowledge and understanding</p>	
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	<p>1.5 Building structures and forms</p> <p>Demonstrate knowledge and understanding of the following building structures and forms:</p> <ul style="list-style-type: none"> • cellular constructions • rectangular frame constructions • portal frame constructions • heritage and traditional methods. <p>1.6 Sustainable construction methods</p> <p>Demonstrate knowledge and understanding of issues related to sustainable construction methods:</p> <ul style="list-style-type: none"> • the environmental, financial, cultural and social benefits of sustainable construction methods 	<p>1.5 Building structures and forms</p> <p>Apply knowledge and understanding of the following building structures and forms:</p> <ul style="list-style-type: none"> • cellular constructions • rectangular frame constructions • portal frame constructions • heritage and traditional methods. <p>1.6 Sustainable construction methods</p> <p>Apply knowledge and understanding of issues related to sustainable construction methods:</p>	<p>of the following building structures and forms:</p> <ul style="list-style-type: none"> • cellular constructions • rectangular frame constructions • portal frame constructions • heritage and traditional methods. <p>1.6 Sustainable construction methods</p> <p>Analyse and evaluate knowledge and understanding of issues related to sustainable construction methods:</p> <ul style="list-style-type: none"> • the environmental, financial, cultural and social benefits of sustainable construction methods • pollution and the preservation of the natural environment and natural habitats • sustainable materials used to create building frames, walls, roofs 	
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	<ul style="list-style-type: none"> • pollution and the preservation of the natural environment and natural habitats • sustainable materials used to create building frames, walls, roofs • waste disposal, re-use and recycling • planning permission, brownfield sites and greenfield sites. <p>I.7 Trades, employment and careers</p> <p>Demonstrate knowledge and understanding of the following:</p> <ul style="list-style-type: none"> • bricklaying • stonemasonry • plastering • carpentry and joinery • electrical installation • plumbing installation • painting and decorating • flooring and tiling. 	<ul style="list-style-type: none"> • the environmental, financial, cultural and social benefits of sustainable construction methods • pollution and the preservation of the natural environment and natural habitats • sustainable materials used to create building frames, walls, roofs • waste disposal, re-use and recycling sites • planning permission, brownfield sites and greenfield sites. <p>I.7 Trades, employment and careers</p> <p>Apply knowledge and understanding of the following:</p> <ul style="list-style-type: none"> • bricklaying • stonemasonry • plastering 	<ul style="list-style-type: none"> • waste disposal, re-use and recycling • planning permission, brownfield sites and greenfield sites. <p>I.7 Trades, employment and careers</p> <p>Analyse and evaluate knowledge and understanding of the following:</p> <ul style="list-style-type: none"> • bricklaying • stonemasonry • plastering • carpentry and joinery • electrical installation • plumbing installation • painting and decorating • flooring and tiling. 	
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	<p>I.8 Health and safety</p> <p>Demonstrate knowledge and understanding of health and safety in relation to:</p> <ul style="list-style-type: none"> • risks for employees, employers and the public during construction and the built environment <p>projects</p> <ul style="list-style-type: none"> • following procedures and carrying out risk assessments • relevant legislation, including Health and Safety at Work Act and Control of Substances <p>Hazardous to Health (COSHH) regulations</p> <ul style="list-style-type: none"> • using personal protective equipment (PPE) • safely working with gas, water and electricity • working at height and in enclosed spaces. 	<ul style="list-style-type: none"> • carpentry and joinery • electrical installation • plumbing installation • painting and decorating • flooring and tiling. <p>I.8 Health and safety</p> <p>Apply knowledge and understanding of health and safety in relation to:</p> <ul style="list-style-type: none"> • risks for employees, employers and the public during construction and the built environment <p>projects</p> <ul style="list-style-type: none"> • following procedures and carrying out risk assessments • relevant legislation, including Health and Safety at Work Act and Control of Substances 	<p>I.8 Health and safety</p> <p>Analyse and evaluate knowledge and understanding of health and safety in relation to:</p> <ul style="list-style-type: none"> • risks for employees, employers and the public during construction and the built environment <p>projects</p> <ul style="list-style-type: none"> • following procedures and carrying out risk assessments • relevant legislation, including Health and Safety at Work Act and Control of Substances <p>Hazardous to Health (COSHH) regulations</p> <ul style="list-style-type: none"> • using personal protective equipment (PPE) • safely working with gas, water and electricity • working at height and in enclosed spaces. 	
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		<p>Hazardous to Health (COSHH) regulations</p> <ul style="list-style-type: none"> • using personal protective equipment (PPE) • safely working with gas, water and electricity • working at height and in enclosed spaces. 		
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<p>Y 9</p>	<ol style="list-style-type: none"> 1. Work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacture etc. 2. Consider the influence of a range of lifestyle and consumer choices when designing products. 3. Take creative risks when making design decisions. 	<ol style="list-style-type: none"> 1. Produce graphic designs in CAD, 2D Design, construction products 2. Match and select suitable materials and their fitness for purpose. 3. Adapt materials to suit changing circumstances. 4. Recognise when it is necessary to develop a new skill or technique. 	<ol style="list-style-type: none"> 8. Evaluate the concept of CAD, 2D Design, and construction design. 9. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups. 10. Evaluate new and emerging technologies. 	<ol style="list-style-type: none"> 1. How to construct and use simple and compound gear trains to drive mechanical systems from a high revving motor. 2. How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. 3. Use learning from science and maths to help design and make products that work.
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	<p>4. Analyse where human values may conflict and compromise has to be achieved.</p> <p>5. Decide which design criteria clash and determine which should take priority.</p> <p>6. Consider additional factors such as contingencies.</p>	<p>5. Follow procedures for safety and understand the process of risk assessments.</p> <p>6. Make independent choices when selecting and using a broad range of manufacturing and construction techniques</p> <p>7. Apply a range of finishing techniques to a broad range of materials.</p>	<p>11. Evaluate an increasing range of graphic design and construction procedures</p>	<p>4. Understand the properties of materials, including smart materials, and how they can be used to advantage.</p>
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<p>Y 8</p>	<p>1. Work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacture etc.</p> <p>2. Consider the influence of a range of lifestyle and consumer choices when designing products.</p>	<p>1. Produce graphic designs in CAD, vector graphics, construction products</p> <p>2. Match and select suitable materials and their fitness for purpose.</p> <p>3. Adapt materials to suit changing circumstances.</p>	<p>8. Evaluate the concept of CAD, graphics, and construction design.</p> <p>9. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups.</p>	<p>1. How to construct and use simple and compound gear trains to drive mechanical systems from a high revving motor.</p> <p>2. How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines.</p>
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	<p>3. Take creative risks when making design decisions.</p> <p>4. Analyse where human values may conflict and compromise has to be achieved.</p> <p>5. Decide which design criteria clash and determine which should take priority.</p> <p>6. Consider additional factors such as contingencies.</p>	<p>4. Recognise when it is necessary to develop a new skill or technique.</p> <p>5. Follow procedures for safety and understand the process of risk assessments.</p> <p>6. Make independent choices when selecting and using a broad range of manufacturing and construction techniques</p> <p>7. Apply a range of finishing techniques to a broad range of materials.</p>	<p>10. Evaluate new and emerging technologies.</p> <p>11. Evaluate an increasing range of graphic design and construction procedures</p>	<p>3. Use learning from science and maths to help design and make products that work.</p> <p>4. Understand the properties of materials, including smart materials, and how they can be used to advantage.</p>
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<p>Y 7</p>	<ol style="list-style-type: none"> 1. Work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacture etc. 2. Consider the influence of a range of lifestyle and consumer choices when designing products. 3. Take creative risks when making design decisions. 4. Analyse where human values may conflict and compromise has to be achieved. 5. Decide which design criteria clash and determine which should take priority. 6. Consider additional factors such as contingencies. 	<ol style="list-style-type: none"> 1. Produce graphic designs in perspective, CAD, Isometrics 2. Match and select suitable materials and their fitness for purpose. 3. Adapt materials to suit changing circumstances. 4. Recognise when it is necessary to develop a new skill or technique. 5. Follow procedures for safety and understand the process of risk assessments. 6. Make independent choices when selecting and using a broad range of manufacturing and construction techniques 7. Apply a range of finishing techniques to a broad range of materials. 	<ol style="list-style-type: none"> 8. Evaluate the concept of CAD, perspective, and isometric design. 9. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups. 10. Evaluate new and emerging technologies. 11. Evaluate an increasing range of graphic design and construction procedures. 	<ol style="list-style-type: none"> 1. How to construct and use simple and compound gear trains to drive mechanical systems from a high revving motor. 2. How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. 3. Use learning from science and maths to help design and make products that work. 4. Understand the properties of materials, including smart materials, and how they can be used to advantage.
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Assessment Grids – Age Related Assessment Descriptors

Design and Technology

Scheme of Work	Design	Make	Evaluate	Technical Knowledge
<p>Excelling</p> <p><i>Working well above ARE</i></p> <p>(Trajectory for Grade 8 – 9)</p>	<p>I can explain how Engineers/ designers from different sectors contribute /generate a product.</p> <p>I can create imaginative, creative and innovative ideas, fully avoiding design fixation and with full consideration of design functionality, aesthetics and innovation.</p> <p>I can produce detailed annotation that clearly justifies how I have considered the user/client needs and links directly to the context selected.</p> <p>I can produce a complex investigation into the work of others and use this to inform my designs.</p>	<p>I can develop an improved final solution using CAD and modelling in relation to the brief.</p> <p>I have correctly used tools, equipment and materials (including CAM where appropriate) have been consistently used or operated safely with a high level of skill.</p> <p>I can produce a high quality prototype that has the potential to be commercially viable and has been made to meet the needs of the end user.</p> <p>I have evidenced a constant use of quality control to ensure a high quality, accurate prototype. I have clearly shown where I have adapted my work to include feedback from QC checks and/or users.</p>	<p>I can fully justify the development of an improved final solution and evaluate use of the design process, with reference to the brief and peer review.</p> <p>I have a comprehensive understanding of testing, analysing and evaluating existing products and ongoing work.</p> <p>I used judgements for independent and external feedback to inform and record modifications that I make.</p>	<p>I have knowledge and understanding of the impact of new and emerging technologies from a user, designer and manufacturers point of view.</p> <p>I can discuss and explain the impact of resource consumption on the planet and measures taken to improve this.</p> <p>I can implement a sensitive approach with design and evaluation, and avoid negative impact on individuals and groups. E.g. inclusive design/religious beliefs.</p> <p>I can identify and explain when/why and how various production techniques and systems are used in manufacture. For example, automation.</p>

<p>Exceeding</p> <p><i>Working beyond ARE</i></p> <p>(Trajectory for Grade 6 – 7)</p>	<p>I research and explore relevant information based on the user's needs.</p> <p>I know how to use social, moral and cultural information to understand the user more clearly.</p> <p>I can independently solve design problems and understand how to develop problems that are given to me.</p> <p>I have developed a specification that allows me to be innovative, functional, and create an appealing design that responds to the users' needs.</p> <p>I have used a variety of approaches, for example, biomimicry and user centred design which has generated creative ideas that avoid</p>	<p>I can select specialist tools in my practical and my choices are justified.</p> <p>I justify the reasons for my choice of materials, taking into consideration their properties.</p> <p>I justify the process that I choose to make my product.</p> <p>I can use CAM in my work.</p> <p>I am accurate and precise when I work.</p> <p>I can work very safely and can coach others to do it.</p>	<p>I can compare and contrast existing products, analysing them and explaining how this will influence my design.</p> <p>I understand and can explain developments in DT, for example use of robotics in manufacturing.</p> <p>I test, evaluate and refine my ideas and products against a specification. I always take into account the views of users/groups.</p> <p>I understand the responsibilities of designers and engineers and clearly show this in my work.</p> <p>This could include inclusive design, sustainability etc.</p> <p>I can evaluate the impact of my product on individuals, society and the environment.</p>	<p>I understand and use the properties of materials and the performance of structural elements to achieve functioning solutions.</p> <p>I understand how more advanced mechanical systems are used in my products and enable changes in movement and force.</p> <p>I understand how more advanced electrical and electronic systems can be powered and used in my product.</p> <p>I apply computing and use electronics to embed intelligence in my product that responds to inputs, and control output, using programmable components.</p>
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	<p>stereotypical response to the brief.</p>			
<p>Achieving <i>Working at ARE</i> (Trajectory for Grade 4 – 5)</p>	<p>I use research to state and describe the user's needs.</p> <p>I can generate at least three different ideas, listing the constraints and develop them so they're improved following user/specification analysis.</p> <p>I analyse research to write a full specification which includes users views/needs.</p> <p>I can select different methods to develop and improve ideas e.g. CAD/Modelling in response to the specification.</p> <p>I annotate ideas in response to the specification and clearly</p>	<p>I can describe the tools and equipment I use.</p> <p>I can describe a range of materials that I use.</p> <p>I can describe the processes that I use.</p> <p>My work is generally accurate and I pay attention to the quality of finish.</p> <p>I always work safely adhering to workshop safety rules.</p>	<p>I analyse existing products on the market that are relevant and use these to inform my ideas.</p> <p>I can test and evaluate my product against the specification and improve my product as a result.</p> <p>I understand what my responsibilities are as a designer including reference to positive and negative impacts that products may have on the wider world.</p>	<p>I can understand the properties of materials and select them to improve functioning solutions.</p> <p>I understand how electrical and electronic systems can be powered and used in their products.</p> <p>I apply computing and use electronics in my product that respond to input and control outputs.</p> <p>I understand how mechanical systems are used in my product</p>

	<p>show how/why the design has been improved.</p>		<p>I can describe new technologies and smart materials and describe how they can help the environment and end product.</p>	<p>to enable changes in movement and force.</p> <p>I can independently select and use CAD/in design and manufacture of my product (identify between 2D and 3D).</p>
<p>Developing</p> <p><i>Working towards ARE</i></p> <p>(Trajectory for Grade 2 – 3)</p>	<p>I use research to identify the user's needs.</p> <p>I can generate at least three different ideas and develop them so they're improved.</p> <p>I use research to write a basic specification.</p> <p>I use different methods to develop and improve ideas e.g. CAD.</p> <p>I annotate ideas so they're clear to others.</p>	<p>I can name the tools and equipment I use.</p> <p>I can name a range of materials that I use.</p> <p>I can list the processes that I use.</p> <p>My work is mostly accurate.</p> <p>I work safely adhering to workshop safety rules.</p>	<p>I look at existing products on the market that are relevant and use these to inform my ideas.</p> <p>I can test and evaluate my product against the specification.</p> <p>I understand what my responsibilities are as a designer and show this in my work.</p> <p>I know about new technologies and smart materials and know how they can help the user.</p>	<p>I can recall the properties of materials.</p> <p>I understand systems and control and know what an input and output is.</p> <p>I understand mechanical systems.</p> <p>I can select how CAD can be used in manufacture (identify between 2D and 3D).</p>

<p>Emerging Working below ARE (Trajectory for Grade U – 1)</p>	<p>I can outline how the product meets my own needs. I know what a specification is and can work from one. My ideas are sketched and labelled with basic notes.</p>	<p>I can prepare myself for practicals. I can name some of the tools I use. I can use equipment safely. Practical work is reasonably accurate.</p>	<p>I look at products to help me with my ideas. I can outline what I designed and what I made and state improvements needed. I know what some of my responsibilities are as a designer. I know a bit about new technologies and smart materials and how they can help the user.</p>	<p>I can identify the properties of some materials. I understand a little about systems and control and know what an input and output is. I understand basic mechanical systems. I know how CAD can be used in manufacturing.</p>
<p>Assessment Objective</p>	<p>Design AO1</p>	<p>Make (Include H&S) AO2</p>	<p>Evaluate AO3</p>	<p>Technical Knowledge AO4</p>

(Assessment Objectives refer to Design and Technology Programmes of Study)

Wider Subject Curriculum – enrichment, homework programs, quizzing, awards, trips, visits, reading / vocabulary lists, competition etc.

Resources

Glossary of key terms, rules and formula - to be spelt / used correctly

Key Terms

Vocabulary	Description
Sustainability	Working in a way that will ensure a continued supply of resources and energy for future generations (renewable/non-renewable/finite).
Environmental	Concerned with the impact or change in the environment.
Aesthetic	Our perception of beauty including sight, sound, smell, touch (mainly visual for Product Design).
Texture	The feel, appearance or consistency of a surface, substance or fabric.
Durability	The ability of a material to be hard-wearing.
Hardwoods	Come from deciduous or broadleaf trees. They are generally slow growing, hard, sold by cubic metre then rough sawn to size or mould (dowel).

Softwoods	Come from coniferous trees with needles instead of leaves. They are generally faster growing, softer, and easier to work with. Supplied in standard sizes that are either rough sawn or planed smooth (PSE).
One-off	Only one product is made at a particular time (usually high quality/unique).
Batch	A series of identical products are made together, in small or large numbers (usually for a specific event).
Mass production	Products made on a production line with each worker responsible for a particular stage. Products are made in larger numbers to reduce the cost of each item.
Prototype	An accurate or working representation of what the product will do.
Quality control	Guarantees the accuracy of a product (size, material quality/ visual features).
Quality Assurance	Checks the machines, systems and staff within an organisation that make the products.
Risk assessment	The likelihood of safety problems arising from an activity (in designing and making a product).

CAD	Computer aided design is a drawn product or part of a product on a software package that can then be exported to a CAM machine (Increases accuracy and ease of repeat cuts).
Thermoplastics	These soften when heated and can be reshaped.
Thermosetting plastics	Heated and moulded into shape these plastics cannot be reshaped with heat because the polymer chains have been interlinked.