Curriculum Progression Pathway

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 five-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 whilst this list is not exhaustive it also includes skills and knowledge gained in Year 7, 8 and 9.

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 modelling 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/CAM 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 use simple electronic circuits incorporating inputs and outputs.
- 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.
- How to use a variety of approaches, for example biomimicry and user-centred design to generate creative ideas and avoid stereotypical responses.
- 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
- AQA GCSE Design and Technology
- WJEC Level 1/2 in Hospitality and Catering

Curriculum content only covers core knowledge common to all KS4 specifications. It is expected, schools will include additional content from their chosen specification into their planning.

In Year 7, Year 8 and Year 9 students will rotate through a number of Technology discipline areas, including Design Technology (Resistant Materials focus), Electronics, Textiles and Food. All KS3 students will study all of the above on a carousel. Students will alternate each term until they have studied each of the specialisms within Design and Technology. From this, they will be able to select their area of discipline to study in more depth through KS4, Year 10 and Year 11.

Context – Subject Curriculum Progression Overview

DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW OUTWOOD ACADEMY FOXHILLS			
	Year 7	**Year 8**	**Year 9**
Design and Technology - Resistant Materials	**<u>Project: Blockheads</u>** **Design and Make - Learning the Basics** **Project: Block Head Sculpture** ● Analyse existing products ● Safe working practices; workshop HandS ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● **Using measurement and marking out** to create an accurate prototype. ● Test, evaluate and refine prototypes, suggest modifications to improve them Students will also have an additional lesson a week. This is to cover the core principles of Design and Technology, such as:	**<u>Project: Steady Hand Game</u>** **Developing Skills and Learning New Ones** **Project: Steady Hand Game** ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● Using measurement and marking out to create an accurate prototype. ● Test, evaluate and refine prototypes, suggest modifications to improve them ● **Introduction to electronics - component names, input, output, processors**	**<u>Project: Mood Light Box</u>** **Developing Skills and Learning New Ones** **Project: Mood Light Box** ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● Using measurement and marking out to create an accurate prototype. ● Test, evaluate and refine prototypes, suggest modifications to improve them ● **Introduction to electronics - component names, input, output, processors**

Design and Technology - Resistant Materials	● Core materials across all specialisms ● Sustainability ● Energy sources and renewable energy sources ● Social impacts of material choice ● Pressure and forces		

Hospitality and Catering (Food)	**Developing Basic Practical Skills and Techniques** This introduces students to the practice of Food Technology and health and safety within the food room. Students are familiarised with the layout of the food room and how to set themselves up for practical lessons. Students are given the opportunity to use basic kitchen equipment including hob and oven, develop manipulative skills, create an awareness of different methods of food preparation and cooking techniques which are used during practical making of both sweet and savoury dishes. **Knowledge covers** - hygiene, safety, equipment recognition and tool control, Healthy Eating, Eatwell Plate, food groups, basic nutrients, basic rubbing-in method, melting method, all-in-one method, sauté and simmering, sauce making, baking, bridge and claw technique, sensory analysis, evaluation, multi-cultural and food choice awareness, primary and secondary processing, recipe portfolio of basic recipes. **Skills cover -** Rubbing:- ● Shortcrust Pastry	**Improving Practical Skills and Techniques** Students are reminded about health and safety, the layout of the food room and how to set themselves up for practical lessons. Embedding previous knowledge and building on the skills developed in the previous year encourages students to become confident and independent within the kitchen environment - allows students to develop competency within the decision making aspect required for Y8 Food. **Knowledge Covers** - food storage and safety, functions of ingredients, diet and special diets, food choices, pastry making, pastry decorative techniques, garnishes, food decoration, rubbing-in, creaming and yeast dough methods, experimental work, sensory analysis, flow diagram, recipe adaptation and development, functions of ingredients, evaluation, multi-cultural and food choice awareness, recipe portfolio of intermediate recipes. **Skills cover -** Sugar Work:- ● Honey Comb Whisking:- ● Cream Melting:-	**Refining Practical Skills and Techniques** Students are reminded about health and safety, the layout of the food room and how to set themselves up for practical lessons. Embedding previous knowledge and building on the skills developed in the previous year encourages students to become confident and independent within the kitchen environment - allows students to develop competency within the decision making aspect required for Y8 Food. Students will begin to cover the basics of the Hospitality and Catering industry and the working of hotels and restaurants. **Knowledge Covers** - food storage and safety, functions of ingredients, diet and special diets, food choices, pastry making, pastry decorative techniques, garnishes, food decoration, rubbing-in, creaming and yeast dough methods, experimental work, sensory analysis, flow diagram, recipe adaptation and development, functions of ingredients, evaluation, multi-cultural and food choice awareness, recipe portfolio of intermediate recipes. **Skills cover -** Whisking:- ● Cream

Hospitality and Catering (Food)	Knife Skills:- ● Knife Cutting Whisking:- ● Cream ● Batters Melting:- ● Chocolate ● Flapjacks Bread Making:- ● Pizza Dough All students will design and make an assessment cook. This will be a combination of all the skills they have learnt over the past year. Students have the opportunity to push themselves and try additional techniques during this assessment period.	● Chocolate ● Honey Comb Rubbing:- ● Scones Knife Skills:- ● Knife Cutting All students will design and make an assessment cook. This will be a combination of all the skills they have learnt over the past year. Students have the opportunity to push themselves and try additional techniques during this assessment period.	Melting:- ● Chocolate ● Caramel Rubbing:- ● Pastry Knife Skills:- ● Knife Cutting Bread Making:- ● Plaited Bread Pasta Making:- ● Homemade Pasta All students will design and make an assessment cook. This will be a combination of all the skills they have learnt over the past year. Students have the opportunity to push themselves and try additional techniques during this assessment period.

Design and Technology - Textiles	**<u>Project: Bean Bags and Wall Hanging</u>** **Design and Make - Learning the Basics** **Project: Bean Bags** ● Analyse existing products ● Safe working practices; workshop HandS ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● **Using measurement and marking out** to create an accurate final outcome ● Test, evaluate and refine prototypes, suggest modifications to improve them Students will also have an additional lesson a week. This is to cover the core principles of Design and Technology, such as: ● Core materials across all specialisms ● Sustainability ● Energy sources and renewable energy sources	**<u>Project: Monster Dolls</u>** **Developing Skills and Learning New Ones** **Project: Monster Doll** ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● Using measurement and marking out to create an accurate prototype. ● Test, evaluate and refine prototypes, suggest modifications to improve them ● **Introduction to more advanced techniques such as mola applique and bleaching**	**<u>Project: Groovy Bucket Hat</u>** **Developing Skills and Learning New Ones** **Project: Bucket Hat** ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● Using measurement and marking out to create an accurate prototype. ● Test, evaluate and refine prototypes, suggest modifications to improve them ● **Introduction to higher level techniques and construction methods. Higher level of outcome is expected at this point in KS3**

	● Social impacts of material choice ● Pressure and forces		

DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW		
	Year 10	**Year 11**
Autumn Term 1	**Design Ventura NEA:** ● Introduction to context and brief ● Research into a designer and company. ● Identify user/client ● Design Brief/Specification ● Generating imaginative and creative designs ● Research techniques ● How to present information Theory: Market pull and technology push Consumer choices People, society and culture Design strategies 3.3.4 Communication of design ideas 3.3.5 New and emerging technologies 3.1.1 A01, A02, A04	**NEA: Producing Brief and Specification, Generating Design Ideas** ● Further research ● Specification ● Investigate, analyse and evaluate the work of others ● Discuss iterative design approach ● Draw initial design ideas ● Annotate and discuss initial design ideas ● Development of ideas Design strategies 3.3.4 Communication of design ideas 3.3.5 A01, A02, A03, A04

Autumn Term 2 **Core Knowledge and Principles**	**Continuation of Design Ventura NEA** **Writing a specification - linked research** Explore and develop ideas using sketching and modelling techniques. Theory: *Ergonomics Anthropometrics* *Ethical Responsibilities* *Understand how to develop, communicate, record and justify design ideas* *Develop an understanding of a range of techniques to support clear communication of design ideas* Design Strategies 3.3.4 Communication of design ideas 3.3.5 A01, A02, A03, A04	**NEA Generating Design Ideas, Developing Design Ideas** ● Generate imaginative and creative ideas ● Communication of design ideas (Freehand sketching, 2D, 3D, annotated drawings) ● Modelling prototypes ● Development of ideas using CAD/CAM ● Test, evaluate and refine prototypes, suggest modifications to improve them A02, A03
Spring 1 **Core Knowledge and Principles**	**<u>Project: Mini NEA - Storage</u>** Industry The impact of new and emerging technologies on: - Work Place (Automation) - Tools and Equipment - Lean manufacturing and JIT - CAD/CAM: Advantages and disadvantages Theory: *Explain how new and emerging technologies have changed the way we live and how they continue to shape the modern world* *Examine how computers and automation have impacted on the design and organisation of the workplace through the use of robotics* New and emerging technologies 3.1.1	**NEA: Realising Design Ideas** ● Select and use tools and equipment safely to protect themselves and others from harm ● Use a range of tools to shape and fabricate materials ● Select materials appropriate to the task ● Know and understand different properties of materials ● Using measurement and marking out to create an accurate prototype. ● Test, evaluate and refine prototypes, suggest modifications to improve them ● Application and use of quality checks. A01, A02, A03

Spring 2 **Core Knowledge and Principles**	**<u>Continuation: Mini NEA - Storage</u>** ● Common Input and Output Components. ● The use of Input components, light sensors, temperature sensors, pressure sensors and switches. ● The use of Output components, LED, lamp, buzzer, speaker 3.1.4 Systems Approach to Designing A01, A02, A03, A04	NEA: Analysing and Evaluating ● Comprehensive testing ● Final product undergo a number of tests ● market testing ● Detailed analysis ● Recording of evidence ● Third party feedback A03
Summer 1 **Core Knowledge and Principles**	3.1.2 Energy Generation Students should understand how energy is generated and stored and how this is used as the basis for the selection of products and power systems. 3.1.5 Mechanical Devices Understand the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements Understand how mechanisms can be used to change magnitude and direction of force, including levers, linkages and rotary systems	**Exam Prep and Revision**
Summer 2 **Core Knowledge and Principles**	3.2.2 Forces and Stresses Recognise and characterise tension, compression, bending, torsion and shear forces and stresses Understand the impact of different forces and stresses on materials JUNE: Launch of NEA Identifying and Investigating Design Possibilities Primary and secondary research ● Analyse the task ● Identifying and investigating design possibilities ● Consider needs, wants and interests of others ● Design Brief	

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

Assessment Objectives Design and Technology

	Design	Make	Evaluate	Technical Knowledge

Y10	1. Understand that all design and technological practice takes place within contexts which inform outcomes 2. Investigate and analyse the work of past and present professionals and companies in the area of design and technology in order to help inform their own ideas 3. Use different design strategies, such as collaboration, user-centred design and systems thinking, to generate initial ideas and avoid design fixation. 4. Design and develop at least one prototype that responds to needs and/or wants and is fit for purpose, demonstrating functionality, aesthetics, marketability and consideration of innovation 5. Consider additional factors such as ergonomics and anthropometrics.	1. Develop and apply in-depth knowledge by selecting and working with appropriate materials and components in order to produce a prototype 2. Apply in depth knowledge using appropriate and accurate marking out methods including measuring and use of reference points, lines and surfaces; use templates, jigs and/or patterns; work within tolerances; understand efficient cutting and how to minimise waste. 3. Follow procedures for safety and write risk assessments. 4. Use specialist techniques and processes to shape, fabricate, construct and assemble a high quality prototype, including techniques such as wastage, addition, deforming and reforming, as appropriate to the materials and/or components being used 5. Use appropriate surface treatments and finishes for functional and aesthetic purposes	1. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups. 2. Critically evaluate new and emerging technologies to inform design decisions; considering contemporary and potential future scenarios from different perspectives, such as ethics and the environment. 3. Evaluate an increasing range of designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.	1. Understand the impact of new and emerging technologies on industry, enterprise, sustainability, people, culture, society and the environment, production techniques and systems. 2. Know how energy is generated and stored in order to choose and use appropriate sources to make products and to power systems. 3. Understand developments in modern and smart materials, composite materials and technical textiles. 4. Understand how electronic systems provide functionality to products and processes, including sensors and control devices to respond to a variety of inputs, and devices to produce a range of outputs 5. Understand how the use of programmable components are used to embed functionality into products in order to enhance and customise their operation 6. Understand the functions of mechanical devices, to produce different sorts of movement, changing the magnitude and direction of forces: 7. Know how to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. 8. Use learning from science and maths to help design and make products that work.
Y9	1. Work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacture etc.	1. Produce costings spreadsheets for products they design and make. 2. Match and select suitable materials and their fitness for purpose.	8. Evaluate the concept of circular economy approaches in relation to product development and consumption.	1. How to construct and use simple and compound gear trains to drive mechanical systems from a high revving motor.

	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 ergonomics and anthropometrics.	3. Adapt their method of manufacture to 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 techniques including hand craft skills and machinery to manufacture products precisely. 7. Apply a range of finishing techniques to a broad range of materials.	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 designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.	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.

Y8	1. Use research and **begin exploration**, such as the study of different cultures, to identify and **begin to understand** user needs. 2. To identify and solve issues within a design development task. 3. Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of uses. 4. Use a variety of influences, to generate creative ideas and avoid stereotypical responses. 5. Use 2D and 3D to model and develop their ideas. 6. Use CAD software to validate their designs in advance of manufacture. 7. Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools. 8. Consider additional factors such as ergonomics and anthropometrics.	1. Select from a wider, more complex range of materials and components, taking into account their properties. 2. Make simple use of planning tools, for instance Gantt charts, and communicate their plans clearly so that others can implement them. 3. Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives. 4. Make independent choices when selecting and using CAD/CAM to manufacture products/components and apply surface finishing techniques to increase the standard of quality. 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 techniques including hand craft skills and machinery to manufacture products precisely. 7. Apply a range of finishing techniques to a broad range of materials.	1. Select appropriate methods to evaluate their products in use and modify them to improve performance. 2. Produce short reports making suggestions for improvements. 3. Evaluate products that they are less familiar with using themselves. 4. Evaluate products considering life cycle analysis. 5. Evaluate how products can be developed considering the concept of cradle to grave. 6. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups. 7. Evaluate new and emerging technologies. 8. Evaluate an increasing range of designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.	1. How to apply computing and use electronics to embed intelligence in products that respond to inputs. 2. How to control outputs such as actuators and motors. 3. How to use software and hardware to develop programmes and transfer these programmable components for example, microcontrollers. 4. How to make use of microcontrollers in products they design and manufacture themselves. 5. How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. 6. Use learning from science and maths to help design and make products that work. Understand the properties of materials, including smart materials, and how they can be used to advantage.
Y7	1. Use research, such as the study of different cultures, to identify user needs. 2. Be able to outline a simple specification to inform design ideas and guide their thinking. 3. Use 2D packages to model their ideas.	1. Produce ordered sequences and schedules for manufacturing products they design detailing resources required. 2. Make use of specialist equipment to mark out materials. 3. Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives.	1. Evaluate their products against their original specification and identify ways to improve them. 2. Actively involve others in the testing of their products. 3. Evaluate products through disassembly to determine how they are constructed and function.	1. How to classify materials by structure e.g hard words, soft wood, ferrous and non-ferrous, thermoplastics and thermosetting plastics. 2. Consider the physical properties of materials. e.g. brittleness and malleability. 3. How to use simple electronic circuits incorporating inputs and outputs.

	4. Produce models of their ideas using CAM to test ideas. 5. Be able to independently generate creative ideas informed by stimulus using annotations to explain key features relating to brief/specification. 6. Consider additional factors such as ergonomics and anthropometrics.	4. Select and use CAD/CAM to manufacture products/components and apply surface finishing techniques to increase the standard of quality. 5 .Investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials. 6. Follow procedures for safety and understand the process of risk assessments. 7. Select and use a broad range of manufacturing techniques including hand craft skills and machinery to manufacture products precisely. 8.Apply a range of finishing techniques to a broad range of materials.	4. Evaluate the positive and negative impact that products can have in the wider world. 5. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups. 6. Evaluate new and emerging technologies. 7.Evaluate an increasing range of designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.	4. Consider textile fibre sources e.g. natural and synthetic. 5. How materials can be cast in moulds. 6. Make use of sensors to detect heat, light etc. such as thermistors and light dependent resistors. 7. How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. 8.Use learning from science and maths to help design and make products that work. 9.Understand the properties of materials, including smart materials, and how they can be used to advantage.

Assessment Grids – Age Related Assessment Descriptors

Design and Technology

Scheme of Work	Design	Make	Evaluate	Technical Knowledge
Excelling *Working well above ARE* (Trajectory for Grade 8 – 9)	I can explain how Engineers/ designers from different sectors contribute /generate a product. I can create imaginative, creative and innovative ideas, fully avoiding design fixation and with full consideration of design functionality, aesthetics and innovation. I can produce detailed annotation that clearly justifies how I have considered the user/client needs and links directly to the context selected. I can produce a complex investigation into the work of others and use this to inform my designs.	I can develop an improved final solution using CAD and modelling in relation to the brief. 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. 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. 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.	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. I have a comprehensive understanding of testing, analysing and evaluating existing products and ongoing work. I used judgements for independent and external feedback to inform and record modifications that I make.	I have knowledge and understanding of the impact of new and emerging technologies from a user, designer and manufacturers point of view. I can discuss and explain the impact of resource consumption on the planet and measures taken to improve this. I can implement a sensitive approach with design and evaluation, and avoid negative impact on individuals and groups. E.g inclusive design/religious beliefs. I can identify and explain when/why and how various production techniques and systems are used in manufacture. For example, automation, JIT.

Exceeding *Working beyond ARE* (Trajectory for Grade 6 – 7)	I research and explore relevant information based on the user's needs. I know how to use social, moral and cultural information to understand the user more clearly. I can independently solve design problems and understand how to develop problems that are given to me. I have developed a specification that allows me to be innovative, functional, and create an appealing design that responds to the users needs. I have used a variety of approaches, for example, biomimicry and user centred design which has generated creative ideas that avoid stereotypical response to the brief.	I can select specialist tools in my practical and my choices are justified. I justify the reasons for my choice of materials, taking into consideration their properties. I justify the process that I choose to make my product. I can use CAM in my work. I am accurate and precise when I work. I can work very safely and can coach others to do.	I can compare and contrast existing products, analysing them and explaining how this will influence my design. I understand and can explain developments in DT, for example use of robotics in manufacturing. I test, evaluate and refine my ideas and products against a specification. I always take into account the views of users/groups. I understand the responsibilities of designers and engineers and clearly show this in my work. This could include inclusive design, sustainability etc. I can evaluate the impact of my product on individuals, society and the environment.	I understand and use the properties of materials and the performance of structural elements to achieve functioning solutions. I understand how more advanced mechanical systems are used in my products and enable changes in movement and force. I understand how more advanced electrical and electronic systems can be powered and used in my product. I apply computing and use electronics to embed intelligence in my product that responds to inputs, and controls output, using programmable components.

Achieving *Working at ARE* (Trajectory for Grade 4 – 5)	I use research to state and describe the user's needs. I can generate at least three different ideas, listing the constraints and develop them so they're improved following user/specification analysis. I analyse research to write a full specification which includes users views/needs. I can select different methods to develop and improve ideas e.g. CAD/Modelling in response to the specification. I annotate ideas in response to the specification and clearly show how/why the design has been improved.	I can describe the tools and equipment I use. I can describe a range of materials that I use. I can describe the processes that I use. My work is generally accurate and I pay attention to quality of finish. I always work safely adhering to workshop safety rules.	I analyse existing products on the market that are relevant and use these to inform my ideas. I can test and evaluate my product against the specification and improve my product as a result. I understand what my responsibilities are as a designer including reference to positive and negative impacts that products may have on the wider world. I can describe new technologies and smart materials and describe how they can help the environment and end product.	I can understand the properties of materials and select them to improve functioning solutions. I understand how electrical and electronic systems can be powered and used in their products. I apply computing and use electronics in my product that respond to input and control outputs. I understand how mechanical systems are used in my product to enable changes in movement and force. I can independently select and use CAD/CAM in design and manufacture of my product (identify between 2D and 3D).
Developing *Working towards ARE* (Trajectory for Grade 2 – 3)	I use research to identify the user's needs. I can generate at least three different ideas and develop them so they're improved. I use research to write a basic specification. I use different methods to develop and improve ideas e.g. CAD/Modelling. I annotate ideas so they're clear to others.	I can name the tools and equipment I use. I can name a range of materials that I use. I can list the processes that I use. My work is mostly accurate. I work safely adhering to workshop safety rules.	I look at existing products on the market that are relevant and use these to inform my ideas. I can test and evaluate my product against the specification. I understand what my responsibilities are as a designer and show this in my work. I know about new technologies and smart materials and know how they can help the user.	I can recall the properties of materials. I understand systems and control and know what an input and output is. I understand mechanical systems. I can select how CAD/CAM can be used in manufacture (identify between 2D and 3D).

Emerging *Working below ARE* (Trajectory for Grade U – 1)	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.	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.	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.	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/CAM can be used in manufacturing.
Assessment Objective	**Design** **AO1**	**Make** **AO2**	**Evaluate** **AO3**	**Technical Knowledge** **AO4**

(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 meter then rough sawn to size or mould (dowel).
Softwoods	Come from coniferous trees with needles instead of leaves. They are generally faster growing, softer, 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 and CAM machine (Increases accuracy and ease of repeat cuts).
CAM	Computer aided manufacture, a machine that turns a digital drawing into numerical code that plots a path for an item to be cut/drilled/milled out of a section of material.
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.