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 valued 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 four 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 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 KS3
- BTEC Level ½ Tech Award in Health & Social Care
- VTCT Level ½ Tech Award in Hair & Beauty Studies
- WJEC Level 1/2 in Hospitality and Catering.
- WJEC Technical Award Engineering

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.

Context – 4 Subject Curriculum Progression Overview

DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW OUTWOOD ACADEMY DANUM		
	Year 7	**Year 8**
20 week rotation alternating with Food Technology	**Block Bot** 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. Knowledge covers the work of other designers. Health and safety in a workshop including risk assessments. Manufactured boards and their source and different types. Basic lever systems. Use research, such as the study of different cultures, to identify user needs. Be able to outline a simple specification to inform design ideas and guide their thinking. Use 2D packages to model their ideas. Produce models of their ideas using CAM to test ideas. Be able to independently generate creative ideas informed by stimulus using annotations to explain key features relating to brief/specification. Produce ordered sequences and schedules for manufacturing products they design detailing resources required. Make use of specialist equipment to mark out materials.	**Sweet dispenser** The focus of this project is to introduce students to a different type of resistant material. The students can work in metals. The student will also get the opportunity to join metal by using heat in the form of the brazing hearth. This will provide students with a greater knowledge of the properties of metals and understand the material is different in many ways to woods. They also get the opportunity to develop their designing skills by producing designs for the toy which will be a fully functioning product. Knowledge covers the types of metals and the range of properties of materials. They will also look at existing balancing toys and analyse the products and look at the pros and cons. Use research and begin to explore, such as the study of differencultures, to identify and **begin to understand** user needs. To identify and solve issues within a design development task. Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of uses. Use a variety of influences, to generate creative ideas and avoid stereotypical responses. Use 2D and 3D to model and develop their ideas. Use CAD software to validate their designs in advance of

	Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives. Select and use CAD/CAM to manufacture products/components and apply surface finishing techniques to increase the standard of quality. Investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials. Follow procedures for safety and understand the process of risk assessments. Evaluate their products against their original specification and identify ways to improve them. How to classify materials by structure e.g. hard words, soft wood, ferrous and non-ferrous, thermoplastics and thermosetting plastics. Consider the physical properties of materials. E.g. brittleness malleability. How to make adjustments to the settings of equipment and machinery such as drilling machines. Use learning from science and maths to help design and make products that work. **7 Design 1, 2, 5, 6.** **7 Making 1,2, 3, 5, 6, 7, 8.** **7 Evaluate 1, 2, 7** **7 Technical knowledge 1, 2, 7, 9**	manufacture. Select from a wider, more complex range of materials and components, taking into account their properties. Make simple use of planning tools for instance Gantt charts, communicate their plans clearly so that others can implement them. Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives. Follow procedures for safety and understand the process of risk assessments. Make independent choices when selecting and using a broad range of manufacturing techniques including hand craft skills and machinery to manufacture products precisely. Select appropriate methods to evaluate their products in use and modify them to improve performance. Produce short reports making suggestions for improvements. How to apply computing and use electronics to embed intelligence in products that respond to inputs. How to control outputs such as actuators and motors How to make use of microcontrollers in products they design and manufacture themselves. How to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. Use learning from science and maths to help design and make products that work. **8 Design 1, 2, 3, 5, 6.** **8 Making 1,2, 3, 5, 6, 7, 8.**

		8 Evaluate 1, 2, **8 Technical knowledge 1, 2, 3, 7, 8,**
20 week rotation alternating with Engineering	**Food Technology** The focus of the project is to introduce the students to Food Technology and health and safety in the food room. The range of recipes gives the students the opportunity to use the kitchen tools and equipment whilst learning and practising preparation and cooking skills, cleaning and storage of utensils and equipment. Knowledge covers health and safety in a kitchen including risk assessments, understanding and applying the principles of nutrition and health, understanding the functions of the nutrients that make up a balanced diet, and knowing the Eatwell guide and 8 Tips. The source, seasonality and characteristics of a broad range of ingredients. Key factors relating to food choice-healthy choices in a varied diet and developing practical cooking skills in a range of cooking techniques: Weighing and measuring using a range of equipment including spoons, jugs and weighing scales; knife skills-bridge and claw holding techniques; peeling and segmenting; boiling and simmering; rubbing in and creaming methods, melting; folding and baking. Students participate in classroom activities investigating the main food groups and giving examples of foods for each group, how raw ingredients are processed in a range of methods. Learning of a range of social and environmental factors that determine food choices such as preferences linked to personal, family and religious beliefs. Understanding seasonality; foods that are available throughout the year.	**Food Technology** The focus of the project is to build on the skills students developed in Year 7 instilling health and safety in the food room. The range of recipes gives the students the opportunity to use a range of kitchen tools and equipment whilst learning and practising preparation and cooking skills, cleaning and storage of utensils and equipment. Knowledge covers health and safety in the kitchen including risk assessments. Learning how to identify risks such as food poisoning and cross contamination and how to minimise hazards in the cooking environment. Linking to the principles of safe storage, cooking and reheating of foods, understanding storage and hosting temperatures and their part in preventing hazards. Classroom activities include understanding how nutritional requirements differ for specific groups of people, learning the requirements through the life stages, allergies and intolerances. Students learn how the senses and food are linked and are able to describe and analyse the sensory ingredients in recipes. Learning, understanding and consideration for the range of cultural and ethical factors that determine food choices-Religion; Vegetarian/vegan; Fair trade and Animal welfare. Students build on their skills preparing and making dishes of increasing complexity using a wider range of ingredients; making and shaping doughs, sauce (mornay) making, blending, frying, whisking, seasoning and testing for readiness.

Year 9	Students build on the knowledge and skills developed in Year 7 & 8 developing depth and breadth in preparation for KS4. Half-termly topics include skills and introductory knowledge in hospitality & catering, engineering, health & social care and hair & beauty. HT1 - Nutrition. Knowledge covers the understanding and applying the principles of nutrition and health, understanding the functions of the nutrients that make up a balanced diet and the 14 listed allergens. leaving the Laws that ensure food safety. Learning food preservation methods and the importance of food labelling in making healthy food choices. Preparing and making a recipe that is nutritious, analysing the nutritional content. HT2 - Alternative diets Knowledge covers different foods around the world. Understanding human physical development through life stages and the nutritional requirements. Learning about sustainable materials and applying that knowledge to designing and making a 'street food' package. Preparing and making a green curry, introducing a range of ingredients and using the appropriate skills. HT3 - The effects of culture on diet Knowledge covers the effects of culture on diet, alcohol consumption, fasting and nutritional deficiencies. Investigating meat alternatives and their rise in popularity. Understanding that lifestyle factors and malnutrition affect human development, hair and skin. Investigating the wide range of careers in the Engineering sector i.e. food production and medical. Prepare and make ratatouille using and developing learned skills and nutritional knowledge. HT4 - Knowledge covers health factors; investigating food related causes of ill health and common causes of food poisoning. Identifying measurable and observable health indicators. Designing a box using net paper then developing into a 3D shape. Looking at a range of structures in design and human anatomy. Prepare and make spaghetti bolognese using and developing learned skills and nutritional knowledge. HT5 - Knowledge covers food seasonality and food miles, investigating the movement of food around the world and how buying foods in season reduces the need for transportation. Looking at the barriers to a healthy lifestyle. Learning about sustainability; reduce-reuse-recycle; packaging, investigating greener alternatives and production. Learn how the UV light from the sun affects the body both in a positive and negative way and how to be safe in the sun, with particular attention to the SPF ingredients used in sunscreens to protect the skin. Prepare and make a tomato and basil tart using and developing learned skills and nutritional knowledge. HT6-Knowledge covers dietary needs across life stages, identifying the 14 known allergies and symptoms. Learning about food intolerance and food alternatives to maintain a healthy diet. Learning how animal testing is used for human safety in the medicine and cosmetic industry and the new technologies in engineering that are reducing the need for animal testing. Prepare and make cheese and onion triangles using and developing learned skills and nutritional knowledge.

DESIGN AND TECHNOLOGY CURRICULUM PROGRESSION OVERVIEW		
	Year 10	**Year 11**
Autumn Term 1 **Core knowledge and principles**	**WJEC Engineering** Introduction to Engineering Manufacture – Skills building for engineering workshop processes and interpretation of engineering information. Understanding how Engineering Drawings are used in manufacturing. Presenting Key information tasks. Planning manufacturing stages. Engineering drawings to BS8888. **WJEC Hospitality and Catering** Introduction to course content HACCAP forms and food related ill health. Food labelling laws, food safety legislation and food hygiene. Practical skills in how to prepare and make dishes. Preparation techniques, developing knives skills and cooking techniques.	**WJEC Engineering** Complete Unit 1 manufacturing task Review functional characteristics of Unit 1 design. Unit 3 Focus – Materials and properties of materials in products (mobile phones, security alarms, bicycles & children's play areas). Focus on calculations and mathematical techniques as detailed in course specification. Introduction to Unit 2 task. **WJEC Hospitality and Catering** Health and safety in hospitality and catering provision of the kitchen and front of house. Reviewing food safety; sSymptoms and signs of food-induced ill health and preventive control measures of food-induced ill health. the role of tThe Environmental Health Officer (EHO) Practical skill building in preparation and making skills.

	Demonstrating food safety practices. Understanding the importance of nutrition and how cooking methods can impact on nutritional value	Controlled assessment task.
Spring 1 **Core knowledge and principles**	**WJEC Engineering** Unit 3 focused investigation – Structural Design (Bicycles). Testing – Learners gain familiarity with simple testing techniques. Unit 2 mock design task – Focus on designing Engineered Solutions for addressing the Unit 2 Brief. Focus on: Sketching, iterative process, manufacturing specifications and CAD/traditional Engineering drawing skills. **WJEC Hospitality and Catering** Symptoms and signs of food-induced ill health and preventive control measures of food-induced ill health. Unit 2 Mock controlled assessment task. Factors affecting menu planning; how to plan production, presentation techniques. and food Safety practices. Building preparation and cooking skills. SAMs mock Controlled Assessment Task. Health and safety in hospitality and catering provision.	**WJEC Engineering** Learners undertake Unit 2 Task Delivery of Unit 2 task interspaced with learners looking at methods of presenting information and developing analytical skills. Preparation for exam **WJEC Hospitality and Catering** Controlled assessment task The operation of the front and back of house, hospitality and catering providers. Working in the hospitality and catering industry and working conditions in the hospitality and catering industry looking at contributing factors to the success of hospitality and catering provision. Preparation for exam.

Summer 1 **Core knowledge and principles**	**WJEC Engineering** Unit 3 focused investigation – Mechanical design (theme parks) & Electronic Design (Mobile phone & Smart technology). Focused Unit 1 Mock Task – Learners manufacture an outcome from a given set of engineering drawings and technical data. Focus on extracting engineering information, planning, manufacturing and safety. Evaluation techniques to review manufactured outcomes. Learners undertake Unit 1 Task (Analysis & Planning) **WJEC Hospitality and Catering** Practical skills: How to prepare and make dishes and presentation techniques Reviewing dishes and of my own performance. Building Preparation and cooking skills and learning through practice.	**WJEC Engineering** Focus on Unit 3 examination preparation Material developments including Smart materials and their application in Engineering Design. The impact of the development in electronics and how they have impacted on engineered products. Learners undertake small workshop tasks to enforce understanding of manufacturing processes. Understanding and applying risk assessment#. Understanding common engineering drawing standards Preparation for exam **WJEC Hospitality and Catering** **May:** Controlled assessment submission. Review of content in preparation for exam.

Assessment

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,	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	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

	aesthetics, marketability and consideration of innovation 5. Consider additional factors such as ergonomics and anthropometrics.	5. Use appropriate surface treatments and finishes for functional and aesthetic purposes		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. 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.	1. Produce costings spreadsheets for products they design and make. 2. Match and select suitable materials and their fitness for purpose. 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.	1. Evaluate the concept of circular economy approaches in relation to product development and consumption. 2. Test, evaluate and refine their ideas and products against the specification taking into account the views of intended users and other interested groups. 3. Evaluate new and emerging technologies. 4. 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 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.

Y8	1. Use research and begin to explore, 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,	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, 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.	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.	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. 7. Understand the properties of materials, including smart

	oral and digital presentations and computer-based tools. 8. Consider additional factors such as ergonomics and anthropometrics.	7. Apply a range of finishing techniques to a broad range of materials.	8. Evaluate an increasing range of designers, engineers, technologists and manufacturers and be able to relate their products to their own designing and making.	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. 4. Produce models of their ideas using CAM to test ideas. 5. Be able to independently generate creative ideas informed by stimulus using	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. 4. Select and use CAD/CAM to manufacture products/components and apply surface finishing techniques to increase the standard of quality.	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. 4. Evaluate the positive and negative impact that	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. Consider textile fibre sources e.g. natural and synthetic.

	annotations to explain key features relating to brief/specification. 6. Consider additional factors such as ergonomics and anthropometrics.	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.	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.	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 user.	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 users 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 it.	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 users 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 pays 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 users 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 manufacture.

(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 a 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.