



DESIGN TECHNOLOGY

Why is the study of Design and Technology important?

Sheffield is known as the 'steel city' and has long been synonymous with high quality engineering, innovation and production. Skilled manufacturers work here that produce a wide range of often ground-breaking products and materials including stainless steel, artificial hips, aircraft parts, F1 cars, specialist sports equipment, mobile phone technology, and the list is endless. This world class engineering and design is embedded throughout the Design and Technology curriculum.

However, Design and Technology is about much more than just engineering, product design and catering. The subject complements and helps to cement the core learning of other subject areas such as Science, Technology and Maths through practical application of these skills and principles. Students have the opportunity to develop their ability to problem solve and apply valuable judgments of an aesthetic, economic, moral, social, and technical nature. Through a creative and engaging curriculum that is broad and balanced; Design and Technology also helps to develop industrious and innovative learners with integrity. We encourage our students to become lifelong learners helping them to build key foundations in preparation for life after Outwood Academy City.

What students will know and understand from their study

The aim of the key stage 3 Design and Technology curriculum is to provide our students with a broad and ambitious programme of study where they gain lifelong skills that will make them internationally competitive and become valuable members of society. They will study core skills in catering, engineering, design, technology and manufacture.

We will ensure that every student is able to cook a nutritionally balanced set of meals and understand how to keep themselves healthy and safe in the kitchen. The national diet can sometimes lack this nutritional balance. It is thanks to initiatives by celebrities like Jamie Oliver, Tom Kerridge and Marcus Rashford that the inequality in healthy living in the UK is being challenged. It is for this reason that a primary aim of the curriculum is to support a healthy diet and lifestyle by promoting healthy food choices and ensuring they have the knowledge and understanding required about nutrition. By introducing students to a range of core catering skills, and basic horticultural knowledge all students will learn the core skills that will increase their choices and allow them to create low cost, varied, healthy and nutritious meals, hygienically and safely.

In the broader Technology curriculum we know that in Sheffield in particular engineering, design and manufacture are important and rapidly developing sectors, we recognise this and realise that our students may be competing for jobs that simply do not exist today. Therefore, we start by teaching our students core skills in manufacture and design using a wide range of materials. We explore traditional methods of manufacture as well as more modern manufacturing techniques. Alongside our academic and vocational provision, we support all students in developing the transferable skills required to be successful in the workplace.

Students will be given the opportunity to further develop the core skills that they have learnt at key stage three in one of two pathways at key stage four. Students will be able to study either Hospitality and Catering, or Engineering Design.

Hospitality and Catering are two of the largest service industries and employers in the world, and here in Sheffield there are real opportunities for our students to have a successful and fulfilling career within this sector. Outwood Academy City students will be able to choose to take the core catering skills learnt at key stage 3 further at key stage 4, where they can study a more comprehensive catering course. This course is split into both a coursework and an examined unit. Students will study a broad range of catering techniques and food theory. Alongside this we also aim to provide students with the opportunity to visit other catering establishments helping them to prepare for life after Outwood Academy City. This course will provide a solid foundation for students to secure future learning and career opportunities within this sector.

Engineering is another one of the world's largest sectors and Sheffield is at its heart. In and around the Sheffield area there are numerous career opportunities and pathways associated with engineering. In recognition of this, Outwood Academy City students have the opportunity to study Engineering at KS4. This course gives students an opportunity to learn more about the engineering sector, teaching them about the design and manufacture of common engineering products. It aims to give them relevant experience of traditional engineering practise, techniques and theories as well as more modern CNC and rapid prototyping manufacturing techniques. This will allow them to build a fundamental understanding of what engineering is all about. As we realise that there are many routes into engineering, we aim to offer students experiences outside of the academy where they can see the next stages in their chosen pathway, meet potential employers and engage with other engineering professionals.

An overview of specific skills learnt within Design and Technology can be seen below in the subject curriculum progression overview.

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

Design and Technology use knowledge 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

- Understand and apply the principles of nutrition and health
- Cook a range of 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

All students will study Design and Technology for three years. In years seven and eight students will study Design and Technology for two hours a week. In this time they will complete six project blocks, these consist of:

- Two Food Technology blocks, one in the winter term and one in the summer term, this helps students to understand seasonality and will help them to develop a wider range of food preparation and cooking skills.
- Four Technology blocks, these will focus on core manufacturing and designing skills that will steadily become more challenging enabling students to work more independently.

An example of how this looks for a class can be seen below:

Year 7	6/9/21 - 11/10/21	18/10/21 - 29/11/21	6/12/21 - 24/1/21	31/1/22 - 14/3/22	21/3/22 - 9/5/22	16/5/22 - 27/6/22
Class 1	Food 1	Block Bot	Shaky hand game	Food 2	Herb garden	Pinball Machine

In year 9 students have the opportunity to choose to study from our key stage four (GCSE) subjects or they will continue to study core Design and Technology for one hour a week. This will consist of:

- One Food Technology block. This aims to help students work more independently in the kitchen to produce more complex dishes. The aim of this unit is to give students the skills to follow recipes and know about the functionality of some key ingredients.
- Two Technology blocks. Students will undertake a longer project that continues to build upon the skills learnt in years seven and eight, enabling them to work more independently.

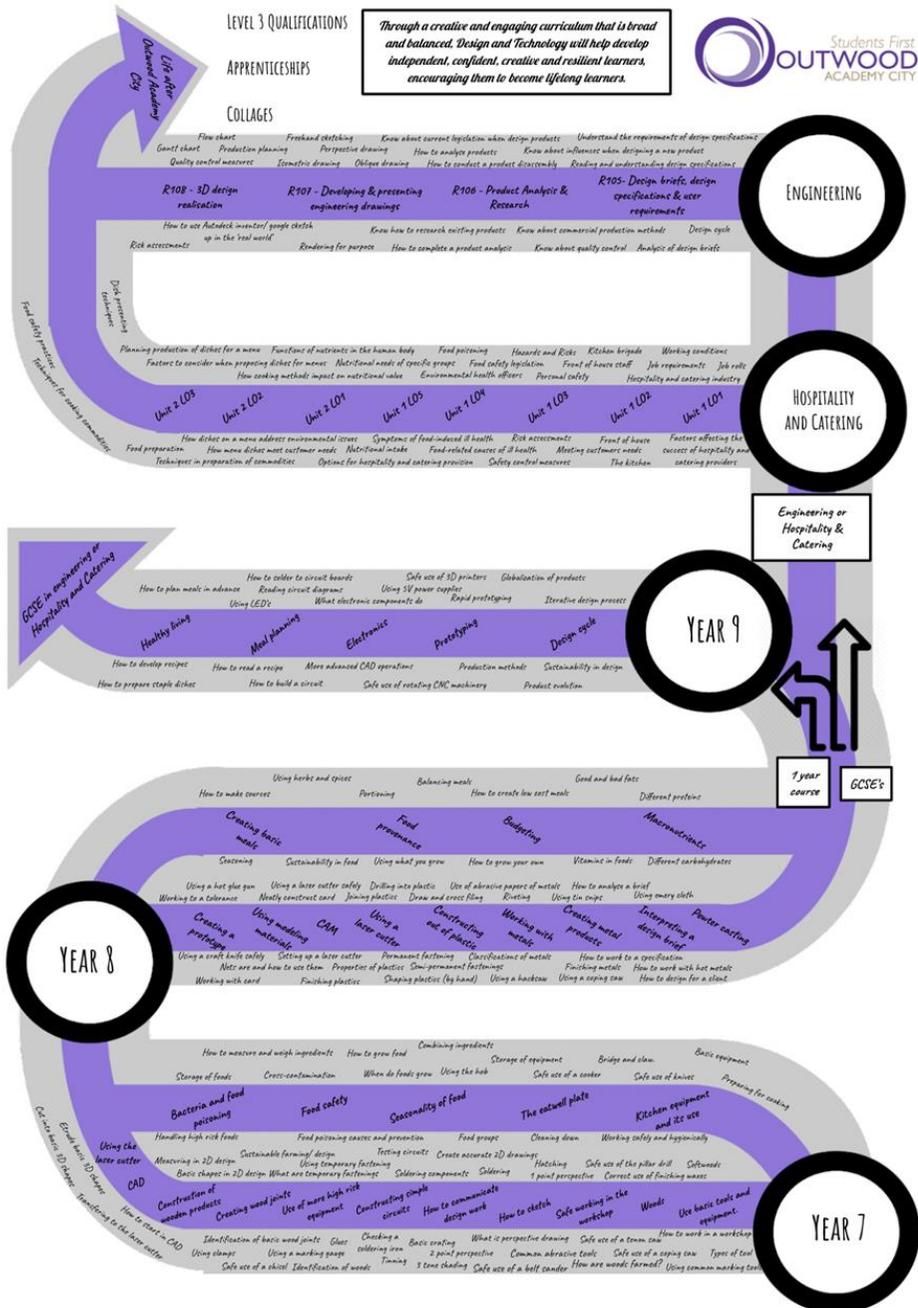
An example of how this looks for a class can be seen below.

Year 9	6/9/21 - 29/11/21	6/12/21 - 14/3/22	21/3/22 - 27/6/22
Class 1	Food 1	Anglepoise light frame	Electronics and building circuits

At key stage four, students will be given the opportunity to study one of our GCSE subjects; Hospitality and Catering, or Engineering Design. Students will study these for two years for three hours a week.

Context – Subject Curriculum Progression Overview

A visual representation of the entire Design and Technology curriculum can be seen here:



Further detail of the Design and Technology curriculum can be seen below.

Year 7

Project	Project Overview	Learning in the unit
1 - Block Bot	<p>Students will be taught how to use basic woodworking tools and equipment.</p> <p>They will learn how to work safely in a workshop, using a range of powered and manual tools.</p> <p>Students will also be introduced to different types and classifications of woods.</p>	<ul style="list-style-type: none"> ● How to work in DT workshop ● Types of tool ● Safe use of a tenon saw ● Safe use of a coping saw ● Accurate use of common marking tools ● Safe use of the pillar drill ● Safe use of a belt sander ● Safe use of common abrasive tools ● Correct use of finishing waxes ● How do we get wood ● What are softwoods
2 - Shaky hand game	<p>Within this project students will be taught the fundamentals of sketching and how to sketch in perspective. This will help them to be able to communicate their design work</p> <p>In this unit students will also learn how to construct simple circuits, look at soldering electronic components.</p>	<ul style="list-style-type: none"> ● Create accurate 2D drawings ● 2 point perspective drawing ● Hatching ● 3 tone shading ● Creating templates ● Using templates ● Soldering and tinning wire ● Identifying electronic components
3- Herb garden	<p>Students will build upon the skills and techniques they learnt in the first project to develop a product that contains wood joints and multiple pieces.</p>	<ul style="list-style-type: none"> ● Different glues and their uses ● What are temporary fastenings ● Using temporary fastening ● Identification of woods ● Using a marking gauge ● Safe use of a chisel ● Identification of basic wood joints ● Using clamps ● Sustainable farming/ design
4 - Card pinball machine	<p>Students will start to develop there CAD/ CAM skills in this unit and will have the opportunity to use CNC machines to develop a product.</p>	<ul style="list-style-type: none"> ● How to open, create and save new drawings ● How to draw basic shapes in 2D design ● How to measure accurately in 2D design

		<ul style="list-style-type: none"> ● How to transfer files to the laser cutter ● How to extrude basic 3D shapes ● How to cut into basic 3D shapes
<p>F1-(summer) 6 practical</p> <p>1-Fruit salad 2-Pizza Toast 3-Scones 4- Stir fry 5- Fresh tomato pasta 6- Fajitas</p>	<p>Students will make a range of dishes. They will learn about the eat well guide and how to use kitchen equipment safely.</p>	<ul style="list-style-type: none"> ● Preparing for cooking ● Safe use of knives ● Bridge and claw grips ● Use of basic equipment ● Safe use of a cooker ● How to maintain an hygienic work area ● Safe and correct storage of equipment ● Food groups
<p>F2 - (Winter) 6 practicals</p> <p>1-Carrot Soup 2-Apple Crumble 3-Chicken Goujons 4-Flapjack 5-Chickpea curry 6- Sponge pudding</p>	<p>Students will continue to build upon their knowledge and understanding from the first unit of work, and will create another range of dishes.</p> <p>They will also learn in this unit about seasonality of food, food safety and how to prevent and spot food poisoning.</p>	<ul style="list-style-type: none"> ● When do foods grow ● How to grow food ● Cross-contamination ● Food poisoning causes and prevention ● Storage of foods ● How to measure and weigh ingredients

Year 8

<p>1 - Iterative design prototype</p>	<p>In this unit students will look at the iterative design process, by working on a series of briefs to build predominantly card prototypes.</p>	<ul style="list-style-type: none"> ● Using a craft knife safely ● Working with card ● Working to a tolerance ● How to neatly construct card ● Using a hot glue gun ● What are nets are and how to use them
<p>2 - Wind chime</p>	<p>In this unit students start to look at metals and their uses.</p> <p>Students will be taught how to use basic metal working tools to create a product. This unit also gives students the opportunity to build upon skills learnt in previous units in year 7.</p>	<ul style="list-style-type: none"> ● Classifications of metals ● Using a hacksaw ● Draw and cross filing ● Use of abrasive papers of metals ● Finishing metals ● Using a coping saw
<p>3 - Light project</p>	<p>In this unit students will be introduced to plastics. They will be shown how to work with plastics. This will include the use of some basic hand tools as well as CNC manufacturing techniques.</p> <p>Within this unit we will also explore sustainability and upcycling in the creation of a product.</p>	<ul style="list-style-type: none"> ● Setting up a laser cutter ● Using a laser cutter safely ● Properties of plastics ● Finishing plastics ● Joining plastics ● Drilling into plastic ● Shaping plastics (by hand)
<p>4 - key fob</p>	<p>Within this unit students will learn about casting and the casting process. They will have the opportunity to build upon the skills of the previous units of work by using the resources provided to respond to a design brief.</p>	<ul style="list-style-type: none"> ● How to analyse a brief ● How to design for a client ● How to work to a specification ● How to work with hot metals ● Using emery cloth
<p>F1 - (Summer) 6 practicals 1-Blueberry Muffins</p>	<p>In this unit, students will start to learn more about the science behind ingredients, and introduce them to some key catering techniques and terms, to allow them to make informed</p>	<ul style="list-style-type: none"> ● Rubbing in ● Creaming method ● Seasoning ● Using herbs and spices ● Portioning

<p>2-Breaded Chicken Wrap 3- Fruit Pie 4-Spaghetti bolognese 5- Roasted chicken breast with tomato and asparagus 6- Cheesecake</p>	<p>decisions about recipes. Students will also look at food provenance and sustainability.</p>	<ul style="list-style-type: none"> ● Sustainability in food ● How to grow your own
<p>F2 - (Winter) 6 practicals</p> <p>1-Mixed bean chilli 2-Curry 3- Macaroni Cheese 4- Paella 5- Pasta Bake 6- Sweet & Sour vegetables with Egg Fried Rice</p>	<p>In this unit the skills of the previous three units of work are built upon and students will start to produce more complex dishes. Students will learn about micronutrients and the affects these have on the body.</p> <p>Budgeting for meals will also be introduced to students.</p>	<ul style="list-style-type: none"> ● Balancing meals ● How to create low cost meals ● Good and bad fats ● Different proteins ● Different carbohydrates ● Vitamins in foods

Year 9

<p>1 Anglepoise desk lamp</p>	<p>Students will again be introduced to the iterative design cycle and given the opportunity to build upon skills they have learnt in previous units to fulfil a design brief.</p>	<ul style="list-style-type: none"> ● Sustainability in design ● Iterative design process ● Globalization of products ● Production methods ● Model making ● Standardisation in products ● Quality control checking ● Forming accurate angles in woods ● Creating a joint at an angle ● Using varnish
<p>2 Anglepoise lamp lighting</p>	<p>In this unit students continue to develop the product from the last unit. They will learn more about electronics and electronic components. They will also have the opportunity to develop 3D CAD skills.</p>	<ul style="list-style-type: none"> ● Rapid prototyping ● Safe use of 3D printers ● More advanced CAD operations ● What electronic components do ● How to tin and solder ● How to build a circuit
<p>F1 - 6 practicals</p> <p>Spaghetti Carbonara <i>Make pasta W1 Make Sauce W2 (2 lessons)</i></p> <p>Sausage Plait <i>Make puff pastry W1 Make Filing W2 (2 lessons)</i></p> <p>Burgers <i>Make Bred W1 Make Burger W2 (2 lessons)</i></p>	<p>Building upon the work students will have completed in year 7 and 8 this unit helps students to build upon the skills they have developed, whilst at the same time giving them new skills in meal planning and maintaining a healthy lifestyle.</p>	<ul style="list-style-type: none"> ● How to plan meals in advance ● How to prepare staple dishes ● How to read a recipe ● How to develop recipes

Engineering

R105	<p>In this unit students will have a formal assessment that will take place in the form of a written exam.</p> <p>This unit covers engineering theory, looking at engineered products and engineering methods.</p>	<ul style="list-style-type: none"> ● Design cycle ● Analysis of design briefs ● Reading and understanding design specifications ● Understand the requirements of design specifications ● Know about influences when designing a new product
R106	<p>In this unit students will start to critically look at engineered products. They will look at how they work, the materials that they are made from and the manufacturing processes involved in their manufacture.</p>	<ul style="list-style-type: none"> ● Know about commercial production methods ● Know about quality control ● Know about current legislation when design products ● Know how to research existing products ● How to conduct a product disassembly ● How to analyse products ● How to complete a product analysis
R107	<p>In this unit students will learn how to communicate design work to customers and engineers. They will use a variety of 3D and 2D drawing techniques.</p> <p>They will use industry standard software to present final design ideas.</p>	<ul style="list-style-type: none"> ● Oblique drawing ● Perspective drawing ● Freehand sketching ● Isometric drawing ● Rendering for purpose ● How to use Autodesk inventor/ google sketch up in the 'real world'
R108	<p>In this unit students will use a range of tools and equipment including CNC equipment to complete a final working prototype of their product.</p>	<ul style="list-style-type: none"> ● Production planning ● Quality control measures ● Flow chart ● Gantt chart ● Risk assessments

Catering

Unit 1 LO1	In this unit students will develop an understanding of the environment in which hospitality and catering providers operate	<ul style="list-style-type: none"> ● Hospitality and catering industry ● Job rolls ● Job requirements ● Working conditions ● Factors affecting the success of hospitality and catering providers
Unit 1 LO2	In this unit students will develop an understanding of how hospitality and catering provision operates	<ul style="list-style-type: none"> ● The kitchen ● Front of house ● Kitchen brigade ● Front of house staff ● Meeting customers' needs
Unit 1 LO3	In this unit students will develop an understanding of how hospitality and catering meets health and safety requirements	<ul style="list-style-type: none"> ● Personal safety ● Hazards and Risks ● Safety control measures ● Risk assessments
Unit 1 LO4	In this unit students will learn how food can cause ill health	<ul style="list-style-type: none"> ● Food-related causes of ill health ● Environmental health officers ● Food safety legislation ● Food poisoning ● Symptoms of food-induced ill health
Unit 1 LO5	In this unit students will be able to propose a hospitality and catering provision to meet specific requirements	<ul style="list-style-type: none"> ● Options for hospitality and catering provision
Unit 2 LO1	In this unit students will develop an understanding of the importance of nutrition when planning menus	<ul style="list-style-type: none"> ● Functions of nutrients in the human body ● Nutritional needs of specific groups ● Nutritional intake ● How cooking methods impact on nutritional value
Unit 2 LO2	In this unit students will develop an understanding of menu planning	<ul style="list-style-type: none"> ● Factors to consider when proposing dishes for menus ● How dishes on a menu address environmental issues ● How menu dishes meet customer needs ● Planning production of dishes for a menu

Unit 2 LO3	In this unit students will develop the skills required to cook a range of challenging dishes.	<ul style="list-style-type: none">● Techniques in preparation of commodities● How to assure high quality commodities are used in food preparation● Techniques for cooking commodities● Dish presenting techniques● Food safety practices
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Assessment

The marking criteria for engineering as described in the subject progression overview table for engineering shown above.

Marking grid for unit R106

LO1: Know how commercial production methods, quality and legislation impact on the design of products and components		
MB1: 1 – 4 marks	MB2: 5 – 8 marks	MB3: 9 – 12 marks
<p>Demonstrates limited knowledge of how commercial production methods and manufacturing processes impact on product/component design.</p> <p>Basic description of how product end of life considerations can influence product/component design.</p> <p>Demonstrates a limited knowledge of the importance of conformity to legislation and standards</p>	<p>Demonstrates some knowledge of how commercial production methods and manufacturing processes impact on product/component design.</p> <p>Describes in some detail how product end of life considerations can influence product/component design.</p> <p>Demonstrates a sound knowledge of the importance of conformity to legislation and standards</p>	<p>Demonstrates detailed knowledge of how commercial production methods and manufacturing processes impact on product/component design.</p> <p>Comprehensively describes how product end of life considerations can influence product/component design.</p> <p>Demonstrates detailed knowledge of the importance of conformity to legislation and standards</p>
LO2: Be able to research existing products		
MB1: 1 – 6 marks	MB2: 7 – 12 marks	MB3: 13 – 18 marks
<p>Provides a basic description of strengths and weaknesses of existing products</p> <p>Uses few appropriate methods to provide a brief summary of research of existing products.</p>	<p>Provides an adequate description of strengths and weaknesses of existing products.</p> <p>Uses some appropriate methods to provide a detailed summary of research of existing products.</p>	<p>Provides a comprehensive description of strengths and weaknesses of existing products.</p> <p>Uses appropriate methods to provide a comprehensive and detailed summary of research of existing products.</p>
LO3: Be able to analyse an existing product through disassembly		
MB1: 1 – 6 marks	MB2: 7 – 12 marks	MB3: 13 – 18 marks

<p>Requires regular assistance to follow manufacturer's instructions/manual /disassembly procedure. Requires prompting to follow special instructions.</p> <p>With guidance uses tools and equipment safely and shows limited awareness of potential hazards and safety considerations.</p> <p>Draws upon limited skills/knowledge/understanding from other units in the specification (Unit R105).</p>	<p>Works competently with occasional assistance to follow manufacturer's instructions/manual/disassembly procedure, mostly adhering to special instructions.</p> <p>Uses tools and equipment effectively and shows some understanding of potential hazards and safety considerations.</p> <p>Draws upon some relevant skills/knowledge/understanding from other units in the specification (Unit R105).</p>	<p>Works independently and competently to follow manufacturer's instructions/manual /disassembly procedure, adhering to special instructions.</p> <p>Uses tools and equipment effectively and shows a well-developed understanding of potential hazards and safety considerations.</p> <p>Clearly draws upon relevant skills/knowledge/understanding from other units in the specification (Unit R105).</p>
MB1: 1 – 4 marks	MB2: 5 – 8 marks	MB3: 9 – 12 marks
<p>Carries out a limited analysis of an existing product showing a basic understanding of some components, assembly methods, materials, production methods and maintenance.</p>	<p>Carries out a detailed analysis of an existing product showing an adequate understanding of components, assembly methods, materials, production methods and maintenance.</p>	<p>Carries out a comprehensive analysis of an existing product showing a well-developed understanding of components, assembly methods, materials, production methods and maintenance.</p>

Marking grid for unit R107

LO1: Be able to generate design proposals using a range of techniques		
MB1: 1 – 4 marks	MB2: 5 – 8 marks	MB3: 9 – 12 marks
<p>Requires regular assistance to produce sketches in 2D and 3D. Sketches have limited accuracy. Designs include few details of shade, tone and texture.</p>	<p>Works competently with occasional assistance to produce sketches in 2D and 3D that are mostly accurate.</p> <p>Designs include a range of mostly appropriate rendering techniques using shade, tone and texture.</p>	<p>Works independently and competently to accurately produce sketches in 2D and 3D. Designs include a wide range of appropriate rendering techniques using shade, tone and texture.</p>

MB1: 1 – 6 marks	MB2: 7 – 12 marks	MB3: 13 – 18 marks
Demonstrates design ideas by using a limited range of annotation and labelling with basic detail. Uses IT software to produce and modify design proposals with limited detail. Draws upon limited skills/knowledge/understanding from other units in the specification.	Demonstrates design ideas by using a range of annotations and labelling with some detail. Uses IT software to produce, modify and enrich design proposals with some detail. Draws upon some relevant skills/knowledge/understanding from other units in the specification.	Demonstrates design ideas by using a wide range of detailed annotation and labelling. Uses IT software to produce, modify and enrich design proposals with appropriate detail. Clearly draws upon relevant skills/knowledge/understanding from other units in the specification.
LO2: Know how to develop designs using engineering drawing techniques and annotation		
MB1: 1 – 4 marks	MB2: 5 – 8 marks	MB3: 9 – 12 marks
Produces some superficial 2D and 3D engineering drawings, with limited use of labelling techniques and annotations.	Develops 2D and 3D engineering drawings with some detail and accuracy . Uses mostly appropriate labelling techniques and annotations.	Develops detailed and comprehensive 2D and 3D engineering drawings, accurately using appropriate labelling techniques and annotations.
LO3: Be able to use Computer Aided Design (CAD) software and techniques to produce and communicate design proposals		
MB1: 1 – 6 marks	MB2: 7 – 12 marks	MB3: 13 – 18 marks
Requires regular assistance to use CAD applications. Produces basic design proposals. Communication of design proposals is limited .	Works competently with occasional assistance to produce design proposals using CAD applications. Communicates design proposals with some effectiveness .	Works independently and competently to produce comprehensive design proposals using CAD applications. Effectively communicates design proposals.

Marking grid for unit R108

LO1: Know how to plan the making of a prototype		
MB1: 1 – 2 marks	MB2: 3 – 4 marks	MB3: 5 – 6 marks
Produces a limited interpretation of product specification.	Produces an appropriate interpretation of product specification.	Produces a detailed and appropriate interpretation of product specification.

MB1: 1 – 3 marks	MB2: 4 – 6 marks	MB3: 7 – 9 marks
Basically describes some planning stages to be used in the making of a prototype, demonstrating limited knowledge of key considerations.	Adequately describes most planning stages to be used in the making of a prototype, demonstrating some knowledge of key considerations.	Comprehensively describes each planning stage to be used in the making of a prototype, demonstrating thorough knowledge of key considerations.
LO2: Understand safe working practices used when making a prototype		
MB1: 1 – 5 marks	MB2: 6 – 9 marks	MB3: 10 – 15 marks
Shows limited understanding of safety considerations and requires regular assistance to produce and use a suitable risk assessment in relation to their production plan. Requires regular assistance to use a range of hand tools and machines safely and to apply their risk assessment to assess potential hazards and take appropriate precautions. Requires regular prompting to use PPE appropriately when working with tools, machines, material, chemicals, finishes and solvents. Draws upon limited skills/knowledge/understanding from other units in the specification.	Shows some understanding of safety considerations and requires occasional assistance to produce and use a suitable risk assessment in relation to their production plan. Requires occasional assistance to use a range of hand tools and machines safely and to apply their risk assessment to assess potential hazards and take appropriate precautions. Requires occasional prompting to use PPE appropriately when working with tools, machines, material, chemicals, finishes and solvents. Draws upon some relevant skills/knowledge/understanding from other units in the specification.	Shows thorough understanding of safety considerations and independently produces and uses a suitable risk assessment in relation to their production plan. Independently uses a range of hand tools and machines safely, applying their risk assessment to assess potential hazards and take appropriate precautions. Independently uses appropriate PPE when working with tools, machines, material, chemicals, finishes and solvents. Clearly draws upon relevant skills/knowledge/understanding from other units in the specification.

LO3: Be able to produce a prototype		
MB1: 1 – 6 marks	MB2: 7 – 12 marks	MB3: 13 – 18 marks
<p>Requires regular assistance to produce a prototype from a production plan.</p> <p>Selects few appropriate materials to produce the prototype.</p> <p>Uses tools and processes with limited effectiveness to produce and assemble an outcome that partly meets the production plan.</p> <p>Produces a limited record of the key stages of making the prototype.</p>	<p>Requires occasional assistance to produce a prototype from a production plan.</p> <p>Selects some appropriate materials to produce the prototype.</p> <p>Uses tools and processes with some effectiveness to produce and assemble an outcome that mostly meets the production plan.</p> <p>Uses appropriate methods to adequately record most of the key stages of making the prototype.</p>	<p>Independently produces a prototype from a production plan.</p> <p>Selects the most appropriate materials to produce the prototype.</p> <p>Uses tools and processes effectively to produce and assemble an outcome that fully meets the production plan.</p> <p>Uses appropriate methods to record in detail all of the key stages of making the prototype.</p>
LO4: Be able to evaluate the success of a prototype		
MB1: 1 – 4 marks	MB2: 5 – 8 marks	MB3: 9 – 12 marks
<p>Produces a limited evaluation of the production plan and prototype which compares the outcome against the product specification.</p> <p>Makes limited suggestions for potential improvements.</p> <p>Shows a limited understanding of strengths and weaknesses in their own performance.</p>	<p>Produces a detailed evaluation of the production plan and prototype which compares the outcome against the product specification.</p> <p>Considers some relevant potential improvements.</p> <p>Assesses own performance in realising the design, demonstrating some understanding of their own strengths and weaknesses.</p>	<p>Produces a detailed and comprehensive evaluation of the production plan and prototype which compares the outcome against the product specification.</p> <p>Fully considers potential improvements, justifying any suggestions made.</p> <p>Comprehensively assesses own performance in realising the design, demonstrating a clear understanding of their own strengths and weaknesses.</p>

Assessment Criteria	Performance Bands			
	Level 1 Pass	Level 2 Pass	Level 2 Merit	Level 2 Distinction
AC1.1 Describe functions of nutrients in the human body	Outlines the functions of a limited range of nutrients in the human body.	Describe functions of a range of nutrients in the human body.	Describe clearly functions of a range of nutrients in the human body.	
AC1.2 Compare nutritional needs of specific groups	Outlines nutritional needs of two specific groups. Comparison may be implied.	Compares nutritional needs of two specific groups giving some reasons for similarities and differences.	Compares nutritional needs of two specific groups giving clear reasons for similarity and differences.	Compares nutritional needs of two specific groups giving clear and in depth reasons for similarity and differences.
AC1.3 Explain characteristics of unsatisfactory nutritional intake	Outlines key characteristics of unsatisfactory nutritional intake. Evidence is mainly descriptive with limited reasoning.	Explains characteristics of unsatisfactory nutritional intake. There is evidence of reasoning and relating characteristics to specific groups.	Explains with clear reasoning characteristics of unsatisfactory intake of a range of nutrients. Explanations are related to specific groups.	
AC1.4 Explain how cooking methods impact on nutritional value	Outlines how cooking methods impact on nutritional value. Evidence is mainly descriptive with limited reasoning.	Explains how a range of food production methods impact on nutritional value. Reasoned statements are presented.		
AC2.1 Explain factors to consider when proposing dishes for menus	Outlines factors to consider when proposing dishes for menus. There may be some omissions.	Explains factors to consider when proposing dishes for menus. Explanation has some reasoning.	Explains factors to consider when proposing dishes for menus. Explanations are generally well reasoned.	

<p>AC2.2 Explain how dishes on a menu address environmental issues</p>	<p>Outlines how dishes on a menu address environmental issues. There may be some errors.</p>	<p>Explains how dishes on a menu address environmental issues. Explanation has some reasoning.</p>		
<p>AC2.3 Explain how menu dishes meet customer needs</p>	<p>Outlines how menu dishes meet customer needs in general terms. Evidence is mainly descriptive with limited reasoning.</p>	<p>Explains how menu dishes meet the needs of specified customers. Some evidence may be in general terms and descriptive. Explanation includes reasoned statements.</p>	<p>Explains how menu dishes meet the needs of specified customers. Explanations are comprehensive and credible.</p>	
<p>AC2.4 Plan production of dishes for a menu</p>	<p>Plan outlines key actions required with some omissions and errors that require amendment. There is limited consideration of contingencies.</p>	<p>Plan has some detail and is mainly appropriate but may have some omissions and errors that require amendment. There is some consideration of contingencies.</p>	<p>Plan has detail with some minor omissions. Plan does not require changes to achieve planned outcome, but would benefit from minor amendments. There are well considered contingencies.</p>	<p>Plan is comprehensive and detailed, incorporating well considered contingencies for most situations.</p>
<p>AC3.1 Use techniques in preparation of commodities</p>	<p>A number of techniques are used. Guidance may be required. Skill demonstrated may show limited precision and require additional time to meet minimum requirements. Some consideration is given to food safety.</p>	<p>A range of techniques are used. Limited guidance is required. Skill demonstrated may show limited precision and require additional time to meet minimum requirements. Consideration to food safety given throughout.</p>	<p>A range of techniques are used independently with speed and precision. Consideration to food safety given throughout.</p>	<p>A comprehensive range of techniques are used effectively and independently with speed and precision. Consideration to food safety given throughout.</p>
<p>AC3.2 Assure quality of commodities to be used in food preparation</p>	<p>A limited range of materials are checked for quality throughout preparation and issues identified and resolved with guidance.</p>	<p>A range of materials are independently checked for quality and issues identified throughout preparation. Some issues were resolved with guidance.</p>	<p>All materials are independently checked for quality and issues identified throughout preparation. Issues will be resolved independently with no guidance.</p>	

<p>AC3.3 Use techniques in cooking of commodities</p>	<p>A number of techniques are used. Guidance may be required. Skill demonstrated may show limited precision and require additional time to meet minimum requirements. Some consideration is given to food safety.</p>	<p>A range of techniques are used. Limited guidance is required. Skill demonstrated may show limited precision and require additional time to meet minimum requirements. Consideration to food safety given throughout.</p>	<p>A range of techniques are used with limited guidance. Skills demonstrated may show limited precision or require additional time to meet minimum requirements. Consideration to food safety given throughout.</p>	<p>A range of techniques are used independently with speed and precision. Consideration to food safety given throughout.</p>
<p>AC3.4 Complete dishes using presentation techniques</p>	<p>Dishes presented using some techniques. Quality of dishes meets minimum standards for appearance, smell and taste. Some guidance may be required. Some consideration given to food safety.</p>	<p>Dishes presented using a range of techniques with some precision. Quality of dishes exceeds some minimum standards for appearance, smell and taste. Limited guidance required. Consideration to food safety given throughout.</p>	<p>Dishes presented independently using a range of techniques with precision. Quality of dishes exceeds most minimum standards for appearance, smell and taste. Consideration to food safety given throughout.</p>	<p>Dishes presented independently using a range of techniques with precision. Quality of dishes exceeds minimum standards for appearance, smell and taste. Consideration to food safety given throughout.</p>
<p>AC3.5 Use food safety practices</p>	<p>Uses food safety practices in preparation, cooking and completing but may require intervention.</p>	<p>Uses food safety practices in preparation, cooking and completing with limited intervention.</p>	<p>Effectively uses food safety practices in preparation, cooking and completion. No intervention required.</p>	

Assessment Grids – Age Related Assessment Descriptors

Design and Technology

Scheme of Work	Design	Make	Evaluate	Technical Knowledge
<p>Excelling <i>Working well above ARE</i></p> <p>(Trajectory for Grade Distinction*)</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 use a wide range of drawing techniques to help communicate design work.</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) . I have been consistently used or operated safely with a high level of skill.</p> <p>I can produce high quality products and prototypes in a variety of media including in food.</p> <p>I have evidenced a constant use of quality control to ensure high quality, accurate products and prototypes.</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 judgments from independent and external feedback to inform modifications that I make, I will have recorded these where appropriate.</p> <p>I consistently use feedback to improve my work.</p>	<p>I have knowledge and understanding of the impact of new and emerging technologies.</p> <p>I can discuss and explain the impact of resource consumption on the planet and measures taken to improve this.</p> <p>I constantly apply technical knowledge and understanding to improve my final outcome.</p> <p>I use a wide range of technical language correctly when communicating with others.</p>

<p>Exceeding <i>Working beyond ARE</i></p> <p>(Trajectory for Grade Merit and Distinction)</p>	<p>I research and explore relevant information to inform design decisions.</p> <p>I can independently solve design problems and understand how to develop problems that are given to me.</p> <p>I can use a range of drawing techniques to help me develop design ideas.</p> <p>I have used a variety of approaches, to generate ideas in response to a design brief.</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, and ingredients 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 test, evaluate and refine my ideas and products against a specification. I always take into account the views of users/groups.</p> <p>I can effectively evaluate my prototypes and products.</p>	<p>I understand and use the properties of materials.</p> <p>I understand how more advanced mechanical systems are used.</p> <p>I understand how more advanced electrical and electronic systems can be used in my product.</p> <p>I can independently select and use CAD/CAM in design and manufacture of my product (identify between 2D and 3D).</p>
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<p>Achieving <i>Working at ARE</i> (Trajectory for Grade Pass)</p>	<p>I can generate and develop design ideas. I can select different methods to develop and improve ideas e.g. CAD/Modelling in response to the specification. I annotate ideas and clearly show how/why the design has been improved.</p>	<p>I can describe the tools and equipment I use. I can describe a range of materials and ingredients that I use. I can describe the processes that I use. My work is generally accurate and pay attention to quality of finish. I always work safely adhering to safety rules.</p>	<p>I can test and evaluate. I will then improve my product as a result. I can describe new technologies and smart materials and describe how they can help the end product.</p>	<p>I understand the properties of materials and ingredients, and select them to improve my solution. I understand how electrical and electronic systems can be powered and used in their products. I understand how mechanical systems are used in my product.</p>
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<p>Developing <i>Working towards ARE</i></p> <p>(Trajectory for Grades Level 1 merit and level 1 distinction)</p>	<p>I can generate design ideas I can use different methods to develop and improve ideas e.g. CAD/Modelling. I annotate ideas so they're clear to others.</p>	<p>I can name the tools and equipment I use. I can name a range of materials and ingredients that I use. I can list the processes that I use. My work is mostly accurate. I work safely adhering to safety rules.</p>	<p>I can test and evaluate my product. I know about new technologies can improve my product.</p>	<p>I can recall the properties of ingredients and materials. I show an understanding of mechanical systems. With some support, I can select how CAD/CAM can be used in manufacture (identify between 2D and 3D).</p>
<p>Emerging <i>Working below ARE</i></p> <p>(Trajectory for Grade level 1 pass)</p>	<p>My ideas are sketched and labelled with basic notes.</p>	<p>I can prepare myself for practical. I can name some of the tools I use. I can use equipment safely. Practical work is reasonably accurate.</p>	<p>I can outline what I designed and what I made and state improvements needed. I know a bit about new technologies.</p>	<p>I can identify the properties of some materials. I understand basic mechanical systems. I know how CAD/CAM can be used in manufacture.</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.

Design and Technology offer key stage four enrichment on Wednesday and Thursday evenings. When studying at key stage four you may be invited to attend an enrichment session. However, you can also choose to attend one of these sessions, please let your class teacher know if you wish to do so.

We will shortly be introducing exciting enrichment activities at key stage three, please continue to keep an eye on the website and social media for further updates.

Resources

All resources for Design and Technology lessons can be found on Google Classroom.

Glossary of key terms, rules & 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.
Additives	Natural or synthetic chemical substances added to food during manufacture or processing to improve the quality, flavour, colour, texture or stability of the product.
Bacteria	Pathogenic microscopic living organisms, usually single-celled, that can be found everywhere. They can be dangerous, such as when they cause infection, or beneficial, as in the process of fermentation (for wine).
Baking	Convection-conduction, cooking foods in a hot oven.
Balanced diet	A diet which provides all the necessary nutrients in the correct amount/proportions to meet the body's needs.
Claw grip	Tips of fingers and thumb tucked under to hold the ingredient before chopping.

Cook's knife	A large general purpose knife with a deep blade, used for cutting, chopping, slicing and dicing.
Danger zone	Range of temperatures between 5°C to 63°C at which bacteria begin to multiply rapidly.
Deficiencies	A state of lacking or incompleteness. For example, deficiencies in the consumption of certain vitamins can cause health issues.
Deglazing	To loosen the browned juices on the bottom of the pan by adding a liquid to the hot pan and stirring while the liquid is boiling.
'Eat well guide'	Informs individuals of the variety of food groups required for a healthy balanced diet.
Fairtrade	A partnership between producers and consumers; selling on Fairtrade terms provides farmers with a better deal and more income. This allows them the opportunity to improve their lives and plan for their future.
Free range	A method of farming husbandry where the animals, for at least part of the day, can roam freely outdoors.
Global warming	The heating up of the earth creating a greenhouse effect.
Grilling	Radiation cooking foods under intense heat.
Mix	To combine two or more ingredients together to become one.

Mise en place	Preparation before starting to cook.
Nutrients	The properties found in food and drinks that give nourishment – vital for growth and the maintenance of life. The main nutrients needed by the human body are carbohydrates, proteins, fats, vitamins and minerals.
Obesity	Diet-related disease where the body contains too much stored fat.
Organic	Food produced by methods that comply with the standards of organic farming. Standards vary worldwide, but organic farming in general features practices that strive to cycle resources, promote ecological balance, and conserve biodiversity.
Seasonal foods	Foods that are at the stage of their natural life cycle when they are ready for harvest or to be caught.
Stir-frying	A quick method of cooking where small pieces of food are fast-fried in a small amount of oil in a wok.
Vegan	People who do not eat flesh or any animal products. They can eat plant protein soya, TVP, tofu.
Vegetarian	A lacto-vegetarian diet includes dairy products and plants, and a lacto-ovo vegetarian diet includes eggs, dairy products and nuts.