Design Technology Curriculum Framework

Intent:

Our DT Curriculum aims to equip students with the knowledge, skills and attitudes they need to become successful, innovative young designers and makers.

By building on prior experience, students progressively develop technical skills and practical expertise. They are encouraged to think creatively, imaginatively and be ambitious in their design ideas. They are given opportunities to solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They learn to recognise the importance of design and technology in the real world and its relevance in everyday life. They are given opportunities to learn about and be inspired by designs and designers past and present who have impacted on life across the world.

Through the design, make, evaluate process, students are guided to develop skills of team work, communication, resilience and reflectiveness through problem solving. They learn to use knowledge and understanding from other curriculum areas including mathematical, scientific, computing and art skills, applying them in relevant and practical contexts. In this way, we aspire for our students to become articulate, dynamic thinkers able to approaching new challenges with confidence and enthusiasm

Inclusion: Our curriculum is ambitious for all and strives to address inclusion and disadvantage in its intent and implementation

Aims: Underpinning the intent are key **substantive and disciplinary concepts**

In order to recognise the different areas with DT, the document covers:

P3 Primary Product Design
P24 Primary Textiles
P27 Primary Food
P33 Secondary Design Technology (Product Design and Textiles)
P45 Secondary Art Textiles
P49 Secondary Food
P54 KS4 Hospitality & Catering
P60 KS5 Product Design

Primary Product Design

In planning and guiding what children learn, practitioners must reflect on the different rates at which children are developing and adjust their practice appropriately. The three Characteristics of Effective Teaching and Learning are **playing and exploring** - children investigate and experience things, and 'have a go'; **active learning** - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements; **creating and thinking critically** - children have and develop their own ideas, make links between ideas, and develop strategies for doing things. In addition, the prime areas of learning **(PSE, CL, PD)** underpin and are an integral part of children's learning in all areas.

Range 6: Physical Development: Uses simple tools to effect changes to materials; Handles tools, objects, construction and malleable materials safely and with increasing control and intention
Range 6: Expressive Arts and Design: Uses their increasing knowledge and understanding of tools and materials to explore their interests and enquiries and develop their thinking; Develops their own ideas through experimentation with diverse materials, e.g. light, projected image, loose parts, watercolours, powder paint, to express and communicate their discoveries and understanding
ELG: Physical Development: Fine Motor Skills: Use a range of small tools, including scissors, paintbrushes and cutlery.
ELG: Expressive Arts and Design: Creating with Materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function; Share their creations, explaining the process they have used.

EYFS DT Skills

Design	Make	Evaluate	Technical Knowledge
Opportunities for children to design things as part of provision or adult-led task.	Many opportunities in the EYFS classroom for making. Questioning by adults about the process.	Achieved through questioning by adults.	Quality interactions with adults in the classroom when making and the use of questioning and modelling.

First-hand experiences and pupil offer:

DT at Foundation Stage is introduced through some adult –led and some child-led activities. There are always opportunities for children to design and make through the continuous provision in the classroom. Some food-making activities are introduced through adult-led tasks.

The first-hand experiences children should be offered are:

- Opportunities for making within the provision – could be construction, junk-modelling, artwork, etc.
- Some adult set tasks centred around making and/or designing.
- Opportunities to make food for a purpose with an adult.
- Questioning by adults is focussed on the process children used to make, what they would do differently next time.

Year Group	Substantive Knowledge	Disciplinary Knowledge
EYFS	Designing Explore the sensory qualities of materials Begin to use the language of designing and making, e.g. join, build and shape. Making: To learn to construct with a purpose in mind. To learn how to use a range of tools, e.g. scissors, hole punch, stapler, woodworking tools, rolling pins, pastry cutters. Children have basic hygiene awareness. Analysing and Evaluating Learning about planning and adapting initial ideas to make them better. Begin to talk about changes made during the making process, e.g. making a decision to use a different joining method. Understanding the World	Designing Expressive arts and design – Being imaginative Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. They represent their own ideas, thoughts and feelings through design and technology. Making Expressive arts and design – Exploring media and materials Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form, and function; - Share their creations, explaining the process they have used Analysing and Evaluating Understanding the World https://content.twinkl.co.uk/resource/8b/d2/t-tp-2548814-learning-in-eyfs-what-dt-subject-leaders-need-to-know_ver_4.pdf?__token__=exp=1611657971~acl=%2Fresource%2F8b%2Fd2%2Ft-tp-2548814-learning-in-eyfs-what-dt-subject-leaders-need-to-know_ver_4.pdf%2A~hmac=8e440df37445db352b9ef95cfd9c5357520d0a3824209a521f62b03a71af69ce
	Substantive Knowledge	Disciplinary Knowledge
DESIGNING		
KS1	Technical Knowledge in Year 1: Learn about what healthy foods are and where some come from. Think of interesting ways to decorate food that I have made. Technical Knowledge in Year 2: Learn about what healthy foods are and where they come from.	Year 1: Pupils can be given an idea and know what to do. Describe my design using pictures. Follow a design criteria. Year 2: Children can think of their own ideas and explain what they want to do. Describe their design using pictures, model mock-ups and words. Make their own simple design criteria, using a simple design brief.

	Think of interesting ways to decorate food that I have made thinking of what would be best for the person eating it. <u>Understanding contexts, users and purposes</u> State what products they are designing and making Begin to understand the needs of users other than themselves. Generate and talk about ideas by handling materials and components – handling, investigating and disassembling. Learn to use and respond to simple design criteria to help develop their ideas. <u>Generating, developing, modelling and communicating ideas</u> Generate ideas by drawing on their own experiences Use knowledge of existing products to help come up with ideas Model ideas by exploring materials, components and construction kits and by making templates and mock-ups Use information and communication technology, where appropriate, to develop and communicate their ideas.	<u>Understanding contexts, users and purposes</u> Work confidently within a range of contexts, such as imaginary, story-based, home, school and gardens. Be able to say whether their products are for themselves or other users. Describe what their products are for. Be able to say how their products will work. Be able to say how they will make their products suitable for their intended users. <u>Generating, developing, modelling and communicating ideas</u> Develop and communicate ideas verbally and through labelled drawings.
	<u>MAKING</u>	
	Technical Knowledge in Year 1:	<u>Year 1:</u> Select appropriate tools and materials to use and why.

	Use and explore different levers and slides in my work. Demonstrate a range of cutting and shaping techniques; tearing/cutting/folding and curling. Understand the importance of food safety and hygiene; washing hands. Technical Knowledge in Year 2: Use and explore different mechanisms; levers and slides in my work. Demonstrate a range of cutting and shaping techniques; tearing/cutting/folding and curling. Understand the importance of food safety and hygiene; washing hands <u>Planning</u> Learn simple characteristics and properties of materials they will use in order to make informed choices. <u>Practical Skills and techniques</u> Learn how to keep themselves and other safe when using tools and materials such as holding scissors away from self and clothes, etc. Use a range of materials and components, including construction materials and kits and mechanical components. Measure, mark out, cut and shape soft materials. Shape paper and card by cutting with scissors. Assemble, join and combine materials and components with adhesives and tapes.	Use tools safely. <u>Year 2:</u> Select appropriate tools and materials to use and why. Use tools safely. <u>Planning</u> Plan by suggesting what to do next and how to progress as their ideas develop. Select from a range of tools and equipment, explaining their choices. Select from a limited range of tools and materials with help, e.g. hole punches, hand drills, sandpaper. <u>Practical Skills and techniques</u> Follow procedures for safety and hygiene. Choose materials and techniques to suit purpose and be able to explain reasons for their choices. Make an object with simple moving parts. Choose appropriately from simple finishing techniques, including those from art and design in order to enhance their products.

	Saw wood with a gents saw/backsaw. Use wood glue. Use a and drill or hole punch. Learn simple finishing techniques, including those from art and design. <u>Technical Knowledge</u> <u>Mechanisms and control</u> Use wheels and axles (pushed through) Use construction kits Identify how toys can be made to move (push, pull) Make moving joints using paper fasteners, wood, etc Use programmable toys (e.g. Roamer) Create pop-ups and sliders <u>Structures</u> Build structures, exploring how they can be made stronger, stiffer and more stable. Make box models, card and wood constructions Make joints which allow movement, e.g. axles Use construction kits	
	<u>ANALYSING AND EVALUATING</u>	
	Technical Knowledge in Year 1: Make more than one prototype and learn which works best. Technical Knowledge in Year 2: Think of interesting ways to decorate food that I have made thinking of what would be best for the person eating it.	<u>Year 1:</u> Talk about their own work identifying likes and dislikes of the design. Identify ways to improve my design. <u>Year 2:</u> Talk about their own work identifying likes and dislikes of the design. Identify ways to improve their design by reflecting on the design brief. <u>Own ideas and products</u>

	<u>Own ideas and products</u> Develop a technical vocabulary related to the products they are making. Use of design criteria to guide production process. <u>Existing products</u> Pupils should learn to explore and ask questions of products such as: What products are. Who products are for. What products are for. How products work. How products are used. Where products might be used. What materials products are made from. What they like and dislike about products.	Be able to talk about their ideas, saying what they like and dislike. Identify what they could have done differently to improve their work in the future. <u>Existing products</u> Pupils use their investigative skills to describe and analyse existing products relating their findings to their own ideas for products.

Possible Contexts	
EYFS	*Woodwork/construction:* Learn to use woodwork tools safely Learn to make a den Develop woodwork skills Making houses for 3 Little Pigs Junk modelling and construction *Cooking and nutrition:* Learn to make toast and discuss hygiene Make a healthy sandwich and discuss hygiene Make pancakes and discuss hygiene Cooking at forest school and discussing hygiene An enabling environment should provide: • Provide a range of materials and objects to play with that work in different ways for different purposes, for example, egg whisk, torch, other household implements, pulleys, construction kits and tape recorder. • Provide a range of programmable toys, as well as equipment involving ICT, such as computers.

	• Provide resources for joining things together and combining materials, demonstrating where appropriate. • Provide children with opportunities to use their skills and explore concepts and ideas through their representations. • Have a 'holding bay' where models and works can be retained for a period for children to enjoy, develop, or refer to. • Make materials accessible so that children are able to imagine and develop their projects and ideas while they are still fresh in their minds and important to them. Provide children with opportunities to use their skills and explore concepts and ideas through their representations.
KS1	Year 1: <u>Cooking and nutrition:</u> Design, make and evaluate a healthy super food vegetable smoothie (link to English book 'Super Tato') Design, make and evaluate ice lollies and ice cream. (link to Year 1 topic: Seaside Safari) <u>Construction/Structures/Woodwork:</u> Make a photo frame from natural materials – forest school. (link to Year 1 topic: Seasons Come, Seasons Go) Design, make and evaluate a bridge/boat inspired by Brunel. (link to Year 1 topic: Clever Construction) <u>Mechanisms:</u> Design a moving animal picture for the art auction. (link to Year 1 topic: Poles Apart) <u>Textiles:</u> Design, make and evaluate a tile for a Keynsham patchwork blanket. (link to Year 1 topic: Time Travellers) Year 2: *Cooking and nutrition:* Design, make and evaluate bread made for a 'Wild Thing' picnic feast. (link to Year 2 topic: Once Upon A Time …) Exploring and tasting world cuisine (link to Year 2 topic: Oh The Places You'll Go!) *Construction/Structures/Woodwork:* Design, make and evaluate houses 1666 – recreate the Great Fire of London. (link to Year 2 topic: Panic on Pudding Lane) Design, make and evaluate a mini-beast hotel. (link to Year 2 topic: No Place Like Home) Making a Den when role playing being stranded on an imaginary island. (link to Year 2 topic: Adventure is out there!) *Mechanisms:* Design, make and evaluate a moon buggy using wheels and axels. (link to Year 2 topic: Reach for the Stars) *Textiles:* Dream catchers/cultural art project as part of Year 2 leavers celebration preparations. (link to Year 2 topic: Oh The Places You'll Go!) Structures – Box models Mechanisms – Jumping Jack puppets, Pop up cards, wheeled vehicles with axles

LKS2	Substantive Knowledge	Disciplinary Knowledge
	DESIGNING	
	Understanding contexts, users and purposes Know how to gather information about the needs and wants of particular individuals and groups using surveys, questionnaires, etc Generate ideas by collecting and using information from a number of sources, including ICT based sources to generate design ideas. Disassemble and investigate everyday products to see how they fit their purpose. Work from a given design specification to guide their thinking. Generating, developing, modelling and communicating ideas Learn what a prototype is and use pre-made examples of prototypes and patterns Learn to create labelled and annotated sketches of their ideas. Learn an increasing range of correct technical vocabulary to use to enable them to explaining	Understanding contexts, users and purposes Work confidently within a range of contexts, such as the home, school and leisure. Indicate the design features of their products that will appeal to intended users Describe the purpose of their products and explain how particular parts of their products work Generating, developing, modelling and communicating ideas Use pre-given prototypes to discuss design ideas. Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas Generate realistic ideas, focusing on the needs of the user Make design decisions that take account of the availability of resources
	MAKING	
	Planning Know: • how to use learning from science to help design and make products that work • how to use learning from mathematics to help design and make products that work • that materials have both functional properties and aesthetic qualities	Planning Select tools and equipment suitable for the task Explain their choice of tools and equipment in relation to the skills and techniques they will be using. explain their choice of materials and components according to functional properties and aesthetic qualities

	• the correct technical vocabulary for the projects they are undertaking Know: • how mechanical systems such as levers and linkages or pneumatic systems create movement • how simple electrical circuits and components can be used to create functional products • how to program a computer to control products • how to make strong, stiff shell structures <u>Practical skills and techniques</u> Learn essential procedures for safety and hygiene when handling materials and tools safely. Learn skills needed to measure, mark, cut out and shape a range of materials. e.g. using saws and sand paper using cms to measure. Use a wider range of materials and components than KS1, including construction materials and kits, mechanical components and electrical components. Use tools independently with increasing accuracy, control and awareness of conservation e.g. bench hooks and mitre blocks, electric components (such as bulbs and buzzers), wire strippers, staplers, cardboard triangles etc. Learn to use a range of tools with accuracy including scissors, … what tools should we include for lks2 and uks2? Learn how finishing techniques can improve the appearance of their product <u>Technical knowledge</u> <u>Mechanisms and control</u> • Use simple mechanisms, e.g. syringes for pneumatics, levers.	Order the main stages of making <u>Practical skills and techniques</u> Apply knowledge in order to follow procedures for safety and hygiene. Apply measuring, marking and cutting skills with some accuracy. Assemble, join and combine materials and components with some accuracy. Select the correct tools to use with different materials. Apply a range of finishing techniques, including those from art and design, with some accuracy.

	• Give a series of commands (Roamer). • Use levers and pulleys to create moving parts using split pins, card and string. <u>Structures</u> • Use construction kits to test for strength. • Investigate how structures can fail when loaded, and stabilise structures to withstand greater loads. • Understand different structures types, shell/frame <u>Electrical Circuits</u> • Explore batteries and bulbs. • Use simple switches to achieve a functional result	
	<u>ANALYSING AND EVALUATING</u>	
	Know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products <u>Own ideas and products</u> Be able to refer to their design criteria as they design and make. Modifying plans as they work and use their design criteria to evaluate their completed products. <u>Existing products</u> Learn to investigate and analyse: • how well products have been designed • how well products have been made • why materials have been chosen • what methods of construction have been used • how well products work • how well products achieve their purposes • how well products meet user needs and wants	Use what the work of famous inventors and engineers to influence and inspire their own design process. <u>Own ideas and products</u> Be able to identify the strengths and areas for development in their ideas and products Be able to consider the views of others, including intended users, to improve their work With support, suggest alternative ways to make their products or how their products could be improved. <u>Existing products</u> Investigate and analyse asking questions such as: • who designed and made the products? • where products were designed and made? • when were these products designed and made? • can this product can be recycled or reused? • What is the intended purpose of the product?

Possible Contexts	
LKS2	Structures – Skyscrapers (link to y4 geography topic: North America) Mechanisms – making shadow puppets (link to Y3 science: Light) Electrical – (link to Y4 Science: Electricity) – light circuit with a switch. Use to light a night light.
UKS2	Structures – Bridges (link to Victorians: Isambard Kingdom Brunel) Mechanisms – levers and pulleys Electrical – make a game or fairground ride using buzzers, alarms, motors

UKS2	Substantive Knowledge	Disciplinary Knowledge
	DESIGNING	
	Understanding contexts, users and purposes Generate ideas by collecting and using information, from a number of sources, including ICT based sources. Look at mechanical products to see how they function and meet user's needs. Know how to carry out research, using surveys, interviews, questionnaires and web-based resources Learn how to develop their own simple design specification to guide their thinking.	Understanding contexts, users and purposes Work confidently within an increasing range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment Be able to identify the needs, wants, preferences and values of particular individuals and groups. Take user's views into account when designing. Indicate the design features of their products that will appeal to intended users. Considering safety and reliability. Describe the purpose of their products explain how particular parts of their products work.

	<u>Generating, developing, modelling and communicating ideas</u> Learn how to create a prototype/pattern to scale Learn to create cross-sectional drawings and exploded diagrams. Learn about the properties and qualities of materials they might use such as cardboard, wood, plastic.	<u>Generating, developing, modelling and communicating ideas</u> Test their ideas using prototypes and pattern pieces in order to develop and improve their ideas. Communicate design ideas in a variety of ways including verbally, written, using annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas. Use computer-aided design to develop and communicate their ideas? How could we enable this in KS2? Make design decisions, taking account of constraints such as time, resources and cost.
	<u>MAKING</u>	
	<u>Planning</u> Learn to use a range of tools in order to be able to choose appropriately from them. Know: • how to use learning from science to help design and make products that work • how to use learning from mathematics to help design and make products that work • that materials have both functional properties and aesthetic qualities • *that materials can be combined and mixed to create more useful characteristics* • that mechanical and electrical systems have an input, process and output • *the correct technical vocabulary for the projects they are undertaking* Know: • how mechanical systems such as cams or pulleys or gears create movement	<u>Planning</u> Produce appropriate lists of tools, equipment and materials that they need. Formulate step-by-step plans as a guide to making. Work from a detailed plan.

	• how more complex electrical circuits and components can be used to create functional products • how to program a computer to monitor changes in the environment and control their products • how to reinforce and strengthen a 3D framework <u>Practical skills and techniques</u> Learn essential procedures for safety and hygiene when handling materials and tools safely. Learn to measure, mark, cut out and shape a range of materials. e.g. using saws and sand paper using cm & mm to measure. Use modelling wire, pliers, wire cutters etc. Be taught how to use techniques that involve a number of steps. Learn how finishing techniques can strengthen and improve the appearance of their product. <u>Technical knowledge</u> <u>Mechanisms and control</u> • Use simple mechanisms, e.g. pulleys, cams, cogs. Attach to motors for electrical control • Begin to use hydraulics. • Design ICT controlled mechanisms- use computer to control programs and equipment. FLOWOL. <u>Structures</u> • Construct regular free standing 3D frames - bridges • Use techniques for reinforcing and strengthening structures. • Use construction kits and building instructions to identify how structures are stabilised and strengthened. <u>Electrical Circuits</u> • Switch motors on/off	<u>Practical skills and techniques</u> Apply knowledge in order to follow procedures for safety and hygiene Accurately apply skills to measure, mark out, cut and shape materials and components Accurately assemble, join and combine materials and components Demonstrate resourcefulness when tackling practical problems. Applying knowledge of materials and tools to solve problems they encounter. Choose appropriate finishing techniques and apply with increasing accuracy, e.g. collage, paint to enhance the appearance of their product.

	• Control electrical circuits with ICT (e.g. use computer to operate switch – see above)	
	ANALYSING AND EVALUATING	
	Know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products <u>Own ideas and products</u> Be able to refer to their design criteria as they design and make. Modifying plans as they work and use their design criteria to evaluate their completed products. <u>Existing products</u> Learn ow to investigate and analyse: • how well products have been designed • how well products have been made • why materials have been chosen • what methods of construction have been used • how well products work • how well products achieve their purposes • how well products meet user needs and wants	Use what the work of famous inventors and engineers to influence and inspire their own design process. <u>Own ideas and products</u> Be able to identify the strengths and areas for development in their ideas and products Be able to consider the views of others, including intended users, to improve their work Be able to critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make Be able to evaluate their ideas and products against their original design specification suggesting things they would do differently next time. <u>Existing products</u> Investigate and analyse products by asking questions such as: • how much products cost to make? • how innovative products are? • how sustainable the materials in products are ? • what impact products have beyond their intended purpose?

Possible Contexts	
LKS2	Structures – Skyscrapers (link to y4 geography topic: North America) Mechanisms – making shadow puppets (link to Y3 science: Light) Electrical – (link to Y4 Science: Electricity) – light circuit with a switch. Use to light a night light.
UKS2	Structures – Bridges (link to Victorians: Isambard Kingdom Brunel) Mechanisms – levers and pulleys Electrical – make a game or fairground ride using buzzers, alarms, motors

This progression draws on the progression framework produced by DATA (Design and Technology Association) in line with the 2014 DT curriculum. Additional resources to support the teaching of DT can be found on their website by following the links below.

We support and champion design and technology education in schools - D&T Association (data.org.uk)

D&T Primary Clickable Progression Framework KS1 & 2 - D&T Association (data.org.uk)

PRODUCT DESIGN Curriculum Map	
Designing	
LKS2	**UKS2**
SUBSTANTIVE KNOWLEDGE	
Understanding contexts, users and purposes Know how to gather information about the needs and wants of particular individuals and groups using surveys, questionnaires, etc Generate ideas by collecting and using information from a number of sources, including ICT based sources to generate design ideas. Disassemble and investigate everyday products to see how they fit their purpose. Work from a given design specification to guide their thinking. **Generating, developing, modelling and communicating ideas** Learn what a prototype is and use pre-made examples of prototypes and patterns Learn to create labelled and annotated sketches of their ideas.	**Understanding contexts, users and purposes** Generate ideas by collecting and using information, from a number of sources, including ICT based sources. Look at mechanical products to see how they function and meet user's needs. Know how to carry out research, using surveys, interviews, questionnaires and web-based resources Learn how to develop their own simple design specification to guide their thinking. **Generating, developing, modelling and communicating ideas** Learn how to create a prototype/pattern to scale Learn to create cross-sectional drawings and exploded diagrams. Learn about the properties and qualities of materials they might use such as cardboard, wood, plastic.

Learn an increasing range of correct technical vocabulary to use to enable them to explaining	
DISCIPLINARY KNOWLEDGE	
Understanding contexts, users and purposes Work confidently within a range of contexts, such as the home, school and leisure. Indicate the design features of their products that will appeal to intended users Describe the purpose of their products and explain how particular parts of their products work **Generating, developing, modelling and communicating ideas** Use pre-given prototypes to discuss design ideas. Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas Generate realistic ideas, focusing on the needs of the user Make design decisions that take account of the availability of resources	**Understanding contexts, users and purposes** Work confidently within an increasing range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment Be able to identify the needs, wants, preferences and values of particular individuals and groups. Take user's views into account when designing. Indicate the design features of their products that will appeal to intended users. Considering safety and reliability. Describe the purpose of their products explain how particular parts of their products work. **Generating, developing, modelling and communicating ideas** Test their ideas using prototypes and pattern pieces in order to develop and improve their ideas. Communicate design ideas in a variety of ways including verbally, written, using annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas. Use computer-aided design to develop and communicate their ideas Make design decisions, taking account of constraints such as time, resources and cost.
Making	
LKS2	UKS2
SUBSTANTIVE KNOWLEDGE	
Planning	**Planning**

Know: • how to use learning from science to help design and make products that work • how to use learning from mathematics to help design and make products that work • that materials have both functional properties and aesthetic qualities • the correct technical vocabulary for the projects they are undertaking Know: • how mechanical systems such as levers and linkages or pneumatic systems create movement • how simple electrical circuits and components can be used to create functional products • how to program a computer to control products • how to make strong, stiff shell structures **<u>Practical skills and techniques</u>** Learn essential procedures for safety and hygiene when handling materials and tools safely. Learn skills needed to measure, mark, cut out and shape a range of materials. e.g. using saws and sand paper using cms to measure. Use a wider range of materials and components than KS1, including construction materials and kits, mechanical components and electrical components. Use tools independently with increasing accuracy, control and awareness of conservation e.g. bench hooks and mitre	Learn to use a range of tools in order to be able to choose appropriately from them. Know: • how to use learning from science to help design and make products that work • how to use learning from mathematics to help design and make products that work • that materials have both functional properties and aesthetic qualities • *that materials can be combined and mixed to create more useful characteristics* • that mechanical and electrical systems have an input, process and output • *the correct technical vocabulary for the projects they are undertaking* Know: • how mechanical systems such as cams or pulleys or gears create movement • how more complex electrical circuits and components can be used to create functional products • how to program a computer to monitor changes in the environment and control their products • how to reinforce and strengthen a 3D framework **<u>Practical skills and techniques</u>** Learn essential procedures for safety and hygiene when handling materials and tools safely. Learn to measure, mark, cut out and shape a range of materials. e.g. using saws and sand paper using cm & mm to measure. Use modelling wire, pliers, wire cutters etc. Be taught how to use techniques that involve a number of steps.

blocks, electric components (such as bulbs and buzzers), wire strippers, staplers, cardboard triangles etc. Learn to use a range of tools with accuracy including scissors Learn how finishing techniques can improve the appearance of their product **Technical knowledge** **Mechanisms and control** • Use simple mechanisms, e.g. syringes for pneumatics, levers. • Give a series of commands (Roamer). • Use levers and pulleys to create moving parts using split pins, card and string. **Structures** • Use construction kits to test for strength. • Investigate how structures can fail when loaded, and stabilise structures to withstand greater loads. • Understand different structures types, shell/frame **Electrical Circuits** • Explore batteries and bulbs. • Use simple switches to achieve a functional result	Learn how finishing techniques can strengthen and improve the appearance of their product. **Technical knowledge** **Mechanisms and control** • Use simple mechanisms, e.g. pulleys, cams, cogs. Attach to motors for electrical control • Begin to use hydraulics. • Design ICT controlled mechanisms- use computer to control programs and equipment. FLOWOL. **Structures** • Construct regular free standing 3D frames - bridges • Use techniques for reinforcing and strengthening structures. • Use construction kits and building instructions to identify how structures are stabilised and strengthened. **Electrical Circuits** • Switch motors on/off • Control electrical circuits with ICT (e.g. use computer to operate switch – see above)
DISCIPLINARY KNOWLEDGE	
Planning Select tools and equipment suitable for the task Explain their choice of tools and equipment in relation to the skills and techniques they will be using. explain their choice of materials and components according to functional properties and aesthetic qualities	**Planning** Produce appropriate lists of tools, equipment and materials that they need. Formulate step-by-step plans as a guide to making. Work from a detailed plan. **Practical skills and techniques**

Order the main stages of making **Practical skills and techniques** Apply knowledge in order to follow procedures for safety and hygiene. Apply measuring, marking and cutting skills with some accuracy. Assemble, join and combine materials and components with some accuracy. Select the correct tools to use with different materials. Apply a range of finishing techniques, including those from art and design, with some accuracy.	Apply knowledge in order to follow procedures for safety and hygiene Accurately apply skills to measure, mark out, cut and shape materials and components Accurately assemble, join and combine materials and components Demonstrate resourcefulness when tackling practical problems. Applying knowledge of materials and tools to solve problems they encounter. Choose appropriate finishing techniques and apply with increasing accuracy, e.g. collage, paint to enhance the appearance of their product.
ANALYSING AND EVALUATING	
LKS2	UKS2
SUBSTANTIVE KNOWLEDGE	
Know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products **Own ideas and products** Be able to refer to their design criteria as they design and make. Modifying plans as they work and use their design criteria to evaluate their completed products.	Know about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products **Own ideas and products** Be able to refer to their design criteria as they design and make. Modifying plans as they work and use their design criteria to evaluate their completed products. **Existing products**

Existing products Learn to investigate and analyse: • how well products have been designed • how well products have been made • why materials have been chosen • what methods of construction have been used • how well products work • how well products achieve their purposes • how well products meet user needs and wants	Learn to investigate and analyse: • how well products have been designed • how well products have been made • why materials have been chosen • what methods of construction have been used • how well products work • how well products achieve their purposes • how well products meet user needs and wants
DISCIPLINARY KNOWLEDGE	
Use what the work of famous inventors and engineers to influence and inspire their own design process. **Own ideas and products** Be able to identify the strengths and areas for development in their ideas and products Be able to consider the views of others, including intended users, to improve their work With support, suggest alternative ways to make their products or how their products could be improved. **Existing products** Investigate and analyse asking questions such as: • who designed and made the products? • where products were designed and made? • when were these products designed and made? • can this product can be recycled or reused? • What is the intended purpose of the product?	Use what the work of famous inventors and engineers to influence and inspire their own design process. **Own ideas and products** Be able to identify the strengths and areas for development in their ideas and products Be able to consider the views of others, including intended users, to improve their work Be able to critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make Be able to evaluate their ideas and products against their original design specification suggesting things they would do differently next time. **Existing products** Investigate and analyse products by asking questions such as: • how much products cost to make? • how innovative products are? • how sustainable the materials in products are ? • what impact products have beyond their intended purpose?

Primary Textiles

Year Group	Substantive Knowledge	Disciplinary Knowledge	Possible contexts
EYFS	Learn to thread using pre-punctured fabric and card		Sewing cards
KS1	Introduce learning to thread a needle (large binca type). Learn to tie simple reef knots. Learn to use running stitch to join two pieces of fabric.	Understand the difference between running stitch and basting stitch and apply. Understand that a 3-D textiles product can be assembled from two identical fabric shapes	Threading garlands or Lei Create simple stuffed toy
LKS2	Learn to weave with a variety of materials. Learn to sew using a range of basic stitches e.g: running stitch, back stitch and over stitch. Learn to thread a needle (large binca type). Learn to tie simple knots. Use patterns and templates. Pinning and cutting with increasing accuracy. Learn about the properties of a small range of fabrics.	Make informed choices from the sewing stiches they have learned in order to join fabrics and/or add embellishment and decoration (applique). Apply decoration to their work using buttons, beads, sequins. Choose from a small range of fabrics according to properties, purpose, ease of working, aesthetics.	Binca bookmarks Link weaving to History (Bronze, Iron age) Felt Christmas decorations/ winter hangings

UKS2	Learn to use different ways to join materials, e.g. glue, pins, press studs, Velcro, various stitches, buttons. Learn to make own simple pattern pieces. Children are able to join fabrics using a range of stitches with increasing independence including blanket stitch.	Use patterns and prototypes to try out ideas.	Victorian embroidery Make a bag, purse

TEXTILES Progression Map	
LKS2	**UKS2**
Learn to weave with a variety of materials. Learn to sew using a range of basic stitches e.g: running stitch, back stitch and over stitch. Make informed choices from the sewing stiches they have learned in order to join fabrics and/or add embellishment and decoration (applique). Learn to thread a needle (large binca type). Learn to tie simple knots. Use patterns and templates. Pinning and cutting with increasing accuracy. Learn about the properties of a small range of fabrics. Choose from a small range of fabrics according to properties, purpose, ease of working, aesthetics. **<u>Suggested Products</u>** Binca bookmarks Link weaving to History (Bronze, Iron age) Felt Christmas decorations/ winter hangings	Learn to use different ways to join materials, e.g. glue, pins, press studs, Velcro, various stitches, buttons. They choose and apply decoration to their work using buttons, beads, sequins. Learn to make own simple pattern pieces. Use patterns and prototypes to try out ideas. Children are able to join fabrics using a range of stitches with increasing independence including blanket stitch. They make informed choices from the sewing stiches they have learned in order to join fabrics and/or add embellishment and decoration (applique). **<u>Suggested Products</u>** Victorian embroidery Make a bag, purse or wallet.

Primary Food

Year Group	Substantive Knowledge	Disciplinary Knowledge	Possible contexts
KS1	Know how to name and sort foods into the five groups in The eatwell plate. Know that everyone should eat at least five portions of fruit and vegetables every day. Know that all food comes from plants or animals. Know that food has to be farmed, grown elsewhere (e.g. home) or caught. Know how to prepare simple dishes safely and hygienically, without using a heat source. <u>Techniques to be taught should include</u> Learn to use a bridge technique to cut soft food safely. Know how to use a peel and grate safely and accurately. Spread butter with a knife.	Apply knowledge of healthy eating to plan a balanced meal for themselves. Follow procedures for safety and hygiene for the skills learned. Follow a simple recipe applying skills learned.	<u>Notes:</u> Grow vegetables Farm visits Soup making Sandwich making

LKS2	To understand the importance of a varied diet and know the 5 areas of the 'eatwell' plate. To develop an awareness of seasonality and food miles. To develop an understanding of basic hygiene and how bacteria develops. <u>Techniques to be taught should include</u> Use both a bridge and a claw technique to cut soft food. Use measuring cups, spoons, and digital scales to measure out ingredients in grams. Using a jug to measure liquids in ml. Cracking an egg & beating an egg Mixing to form a bread dough Kneading & shaping dough Use both a bridge and a claw technique to cut hard food. Peeling & grating soft foods e.g. courgette, cheese Using measuring cups, spoons, and balance scales. Using a jug to measure liquids. Cutting fat into flour and rubbing fat into flour.	Apply knowledge of healthy eating to plan a balanced diet. Use their knowledge of seasonality and food miles to influence their choice of ingredients when designing. Follow procedures for safety and hygiene Know when to use a bridge or a claw technique when cutting food.	Bread making – possibly leading to sandwich making Pizza making – pair with a healthy salad Pancake making Smoothies Cheese scones Fruit crumble Shortcrust pastry – cheese straws x

UKS2	To develop an understanding of the dietary needs of individuals and how they differ (athlete, older person, child). Know how a variety of ingredients are grown, reared, caught and processed. To develop a deeper understanding of basic hygiene and how bacteria develops. <u>Techniques to be taught should include</u> Introduce simple combination of 'Bridge' and 'Claw' e.g. onion Grating harder foods e.g. apple, carrot, parmesan Using the hob with adult supervision e.g. to sweat a soup Rolling pastry Cracking an egg & separating Using a hand mixer or blender	Use their understanding of dietary needs to design a meal for an individual. Choose ingredients with a growing awareness of conservation, sustainability and animal welfare. Independently select equipment appropriate to the task. Be able to explain their choices. Begin to use their time efficiently e.g: wash up or cut toppings whilst waiting for a pie to cook.	Making soup WW2 link: humble pie Muffins Cupcakes Tarts

This skills progression is based on the ***Focus on Food*** checklist for Primary schools.

Additional information along with video clips to help teach techniques and useful recipe ideas linked to teaching specific skills can be found at:

http://focusonfood.fudgetechnical.co.uk/index

FOOD Progression Map			
Year 3	**Year 4**	**Year 5**	**Year 6**
To understand the importance of a varied diet and know the 5 areas of the 'eatwell' plate and apply knowledge of healthy eating to plan a balanced meal. To develop and apply understanding of basic hygiene and how bacteria develops. **<u>Techniques to be taught should include</u>** Use both a bridge and a claw technique to cut soft food. Use measuring cups, spoons, and digital scales to measure out ingredients in grams. Using a jug to measure liquids in ml. Mixing to form a bread dough Kneading & shaping dough Peeling & grating soft foods e.g. courgette, cheese **<u>Suggested products</u>**	To develop an awareness of seasonality and food miles. Use their knowledge of seasonality and food miles to influence their choice of ingredients when designing. To continue to develop and apply understanding of basic hygiene and how bacteria develops. **<u>Techniques to be taught should include</u>** Use both a bridge and a claw technique to cut hard food. Be able to select techniques appropriately. Use measuring cups, spoons, and digital scales to measure out ingredients in grams. Using a jug to measure liquids in ml. Cracking an egg & beating an egg	To develop an understanding of the dietary needs of individuals and how they differ (athlete, older person, child). Know how a variety of ingredients are grown, reared, caught and processed. To develop a deeper understanding of basic hygiene and how bacteria develops. **<u>Techniques to be taught should include</u>** Introduce simple combination of 'Bridge' and 'Claw' e.g. onion Grating harder foods e.g. apple, carrot, parmesan Using the hob with adult supervision e.g. to sweat a soup **<u>Suggested products</u>** Making soup or stew	Be able to apply their understanding of individual dietary needs to design a meal for an individual such as an athlete, soldier. Know how a variety of ingredients are grown, reared, caught and processed. To develop a deeper understanding of basic hygiene and how bacteria develops. **<u>Techniques to be taught should include</u>** Rolling pastry Cracking an egg & separating Using a hand mixer or blender **<u>Suggested products</u>** WW2 link: humble pie Muffins

Bread making – possibly leading to sandwich making Pizza making – pair with a healthy salad Pancake making Smoothies Cheese scones Fruit crumble Shortcrust pastry – cheese straws	Peeling & grating soft foods e.g. courgette, cheese Cutting fat into flour and rubbing fat into flour. **<u>Suggested products</u>** Cheese scones Fruit crumble Shortcrust pastry – cheese straws	Muffins	Choose ingredients with a growing awareness of conservation, sustainability and animal welfare. Independently select equipment appropriate to the task. Be able to explain their choices. Begin to use their time efficiently e.g: wash up or cut toppings whilst waiting for a pie to cook.

Suggested contexts and extra-curricular links

Year 3	Textiles Science link - Plants and their uses	Mechanisms Shadow puppets Science link: Light	Food Geography link: Wet & Dry places Science link: Animals including humans (nutrition and food)
Year 4	Electrical circuits Night lights Science link: Electricity – light circuit with a switch.	Structures Skyscrapers Geography link: North America	Food Science links - States of matter, Food chains & digestive system Geography link: Sustainability
Year 5	Structures Bridges History link: Local history - Isambard Kingdom Brunel Geography link: Rivers	Textiles Cross stitch History link – Victorians	Food States of matter, reproduction in plants (fruit & seeds) Geography link: Climate change
Year 6	Electrical circuits Make a game or fairground ride using buzzers, alarms, motors Science link – Electricity & light	Mechanisms Levers and pulleys Science link: Forces (Y5 revision) Geography link: Mountains	Food Science link - States of matter, diet & exercise, classifying plants

Secondary Product Design, DT Textiles and Engineering

Curriculum Intent Statement:

For students to:

- Be able to apply scientific, mathematical and material knowledge in order to problem solve, design and build quality prototypes.
- Develop a consideration of users' needs wants and values in an ever evolving technological world.
- Be encouraged to take risks and be able to test and refine practical solutions in order to develop innovative outcomes.
- Develop practical skills to solve problems in a variety of contexts.
- To be aware of social, moral and environmental issues in order to inspire a more sustainable future.

The key schema (areas of knowledge and skills) in Product Design and Engineering are:

- Understanding user needs – Identification of different market sectors, demographics, cultural, social and economic design considerations. The different research techniques used to refine design contexts.
- Drawing skills – Orthographic, Isometric and One and Two point perspective, freehand design sketches.
- Mathematics – Area, units of measurement, conversion and engineering calculations.
- Mechanical Systems, Motion and Forces – Hydraulics, Gears and Pulleys. How to use these systems to solve a proposed problem. Types of motion, Forces.
- Materials and Properties – Metals, Polymers, Wood, fabrics, textiles materials, Ceramics, Composites. Classification of materials, working properties and how to test materials.
- Health and Safety – To be able to work safely in the workshop/textiles rooms environment and understand the importance of health and safety and the associated legislation in an industrial environment.
- Tools and Equipment – To be able to work independently in the workshop/textiles rooms in order to manufacture products using a range of materials. To be able to identify feasible manufacturing solutions.
- CAD/CAM – To be able to appropriately apply CAD/CAM within the design and make process in order to manufacture high quality products.
- Engineering Disciplines – To develop and awareness and understanding of the different sectors of engineering.
- Electronics – Simple electronics, circuits with an input and output, programmable components.
- Sustainable Design – To develop an awareness and understanding of the need to sustain resources and create a conscious and analytical design methodology.
- Evaluating – To be able to reflect, refine and identify future development opportunities.

'Subject' disciplinary knowledge is:

In designing:

The ability to use primary and secondary research methods in order to develop an understanding of user needs; to develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations; to apply knowledge of materials and how they behave to designs; to design feasible products and outline how they will be manufactured; to be able to communicate their designs using a range of methods including hand drawings and CAD. To consider sustainability when developing design solutions.

In making:
The ability to work safely and independently in order to manufacture high quality working solutions; to accurately produce and follow a project plan; to be able to adapt their approach in response to challenges during manufacture.

In knowledge:
The ability to apply their knowledge of Materials, Mathematics, Mechanical Systems and their effect on forces and motion to their designing in order to create innovative and feasible solutions; to be able to incorporate electronic systems in to their designing; to be able to embed intelligence in products that respond to inputs and control outputs using programmable components.

In Evaluating:
The ability to analyse the work of other designers and engineers, past and present to develop and broaden their understanding; to investigate new and emerging technologies and understand its' impact on individuals, society and the environment, to be able to test, evaluate and refine their own ideas against a specification, taking into account the views and needs of others.

Our curriculum is planned and sequenced as a cumulative curriculum where knowledge builds upon, reinforces and expands previous learning. This enables students to know more and remember more. Our schemes of learning are built around our key schema and substantive knowledge is built upon from KS2 across Key Stage 3 and 4. Our curriculum connects prior learning and ensures that essential skills are covered early that they can be applied in numerous contexts later.

Whilst we are aware of the vast differences in the experience students will have had of DT at primary school our KS3 curriculum is ambitious and students are encouraged to apply their designing, making, evaluative skills alongside substantive technical knowledge to design situations, using their skills to solve problems and producing high quality outcomes.

Our KS4 curriculum builds on from the strong foundations we lay at Key Stage 3 …

Our curriculum model plans for students to remember more through

- Low stakes testing throughout each module in KS3 – Key terms and concepts, the content that is included on the knowledge organiser.
- End of module tests in KS3 focusing on key concepts from the schema that have been covered in that module.
- Use of retrieval starters in KS4 focusing on substantive knowledge that we would want to be automatic and fluent for students.
- Formal end of unit tests in KS4.

The cultural capital needed to succeed in Engineering is woven through our curriculum:

- We have CEIAG activities written in to our schemes of learning from Year 7-11. These focus on developing students' awareness of the different roles that are available in the engineering and product design sectors and the qualification paths to those roles. We aim to expose students through these activities to careers that they might not have considered and show them that it is possible for anybody to pursue these qualifications and roles. Our aim is to raise our students' aspirations beyond that of the manual trades that they automatically link to the word 'engineering'.
- Throughout our schemes of work we introduce students to important Engineers and designers past and present in order that they develop an appreciation of iconic designs and technologies.
- In lessons we highlight current affairs relating to the subject or work topic as they appear. We aim to give current and relevant real world context to all of our design situations.

The key Schema

Understanding User Needs

Success in **'curriculum schema'** is students knowing, remembering, understanding and being able to Identify different market sectors, demographics, cultural, social and economic groups. To use a range of research techniques in order to understand the needs of identified users and be able to adapt and refine designs in order to meet user needs.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Needs of users of different age, gender, interests and abilities. Designing for a client with imposed design constraints.	Students can recognise the different needs of different user groups and can apply their knowledge of user and client needs to build design specifications and inform design solutions.
KS4	As above plus: Requirements of different cultures, social and economic groups.	Students can use primary and secondary research techniques in order to gather information about a specific user group and understand the advantages and disadvantages of the research techniques used. Students are able to adapt existing designs to meet the needs of new users and situations.

Drawing Skills

Success in **Drawing Skills** is students knowing, remembering, understanding and being able to communicate their ideas fluently with others through 2D and 3D freehand sketches, 2D and 3D working drawings applying the conventions of engineering drawings from BS8888 and using rendering, dimensions, different types of line and scale appropriately.

	Substantive Knowledge	Disciplinary Knowledge
KS3	How to draw simple shapes using 1 and 2 point perspective. Using isometric for 3D drawings. Use of 3rd angle orthographic drawing. Confidently sketching to communicate. Visible, construction and dimension lines.	Students are able to identify the different types of drawing and can communicate their own design ideas using these methods.
KS4	As above looking at more complex shapes and assemblies. Use of 1st angle orthographic. Conversion from imperial to metric measurement and vice versa. Appropriate choice	Students are able to independently select appropriate drawing methods for their requirements and can confidently produce 2D and 3D working drawings in order to communicate their ideas that fully comply with BS8888. They are

	of scale. Use of Tolerance. Hidden detail and centre lines. BSI, BS8888, ISO.	able to explain the benefits of working to BS8888 and how it fits with the corresponding ISO standards.

Mathematics

Success in **Mathematics** is students knowing how to apply the concepts and formulae in engineering contexts and to use these processes to support the development of their own concepts and ideas. Students will remember the appropriate units for the calculations that they do and will be able to use a scientific calculator correctly in order to perform calculations. Students will understand how Maths and Science can be used to solve engineering problems.

	Substantive Knowledge	Disciplinary Knowledge
Ks3	Area, Volume. Power, Resistance, Current and Voltage.	To be able to apply the formulae in order to solve problems related to their project work during design, development and manufacture. Students will be able to remember and apply the correct units for the calculations that they undertake.
KS4	SI Units. Power, Force, etc from spec	Students will be able to select the appropriate formulae to use in a given situation. They will be able to draw out the important quantities from engineering scenarios in order to help them to determine which calculation is most appropriate in each situation.

Mechanical Systems, motion and forces

Success in **Mechanical systems, motion and forces** is students knowing and understanding the different types of forces and motion and how mechanical systems can be used in products to enable changes in movement and force.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Movement: Linear, Reciprocating, Oscillating, Rotating.	To be able to apply their knowledge of movement and forces to a design situation, producing feasible design solutions that can resist the forces acting on

	Forces: Tension, Compression, Torsion, Bending, Shear. Mechanical Systems - Gears	them. To be able to explain how gear systems can be used to our advantage in products and to be able to devise simple gear systems for use in their own designs.
KS4	As above plus Mechanical Systems: Hydraulics, Pulleys.	Students can identify a range of mechanical systems in existing products and explain the purpose of using them in that scenario. Students can develop their own mechanical system designs to solve a specific problem.

Materials and their properties

Success in **Materials** is students knowing the different types of materials, where they originate from and being able to classify them. Students will know how to use technical vocabulary to describe properties of each material. They will understand how to test and select suitable materials for a specific purpose based on their working properties and will be able to justify their choices.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Woods: Classifications of timber, hardwoods, softwoods, composition of manufactured boards. Plastics: Classification, thermoplastics, thermosetting plastics. Metals: Classification, ferrous and non-ferrous metals, alloys. Material Properties: Mechanical, Textiles: smart and modern materials, fibres and fabrics, natural and synthetic fabrics, primary source to stock form. Material characteristics: Aesthetics, Cost, Environmental Impact.	Students will be able be identify specific materials used in existing products and explain why they were used, suggesting alternatives where appropriate. They will be able to carry out material tests for a range of mechanical properties and select materials based on the outcomes using their data to justify material choice. They will be able to suggest materials for their design ideas. They will understand where materials come from and the implications of this source for cost, environmental impact.
KS4	As above, plus: composite materials, ceramics, elastomers. Material Properties: Chemical, Optical, Textiles: smart and modern materials, fibres and fabrics, natural and synthetic fabrics, how fabrics behave for different purposes, primary source to	Students will be able to justify their material choices based on a wider range of material properties. They will select from a broader range of materials. They will understand how materials can be combined to create new materials with improved properties, be able to identify where

	stock form, stock form and types, weaving, knitting and bonding.	these have been used in existing products and make suggestions for where these could be used in their own designs.

Health and Safety

Success in **Health and Safety** is students knowing health and safety rules pertaining to the workshop and being able to explain why they are in place. They will be able to demonstrate independent and confident use of the guidelines in order to work safely in the workshop environment. They will know and understand the range of control measures that are in place in the school workshop environment and the PPE requirements of each machine. They will go on to learn about the various items of legislation that relate to the manufacturing environment and be able to relate the legislation to specific engineering scenarios across a range of sectors.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Workshop/textiles rooms Health and Safety rules. Control Measures used in the workshop. PPE used in the workshop.	Students will follow the health and safety rules relating to the school workshop environment. They will be able to explain why the rules in place and how they reduce the risk to individuals. They will be able to identify PPE used in the workshop and apply the correct PPE in a given situation. They will be able to identify and explain the control measures used in the workshop. They will be able to identify unsafe situations and make suggestions of how to reduce the risk
KS4	Health and Safety Legislation: COSHH, RIDDOR, HASAWA, MHOR, PPE in industry.	Students will be able to identify what aspect of H&S each piece of legislation covers and how this reduces risk in specific engineering environments. They will be able to identify and explain the consequences that may results from not following the relevant health and safety legislation. They will be able to suggest suitable PPE for a range of industrial scenarios.

Tools and Equipment

Success in **Tools and Equipment** is students being able to identify and range of hand tools, portable power tools and fixed machines and what they are used for. Students will be able to independently select and use a range of tools and machinery skilfully and safely in order to produce high quality, functional products.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Hand Tools: Coping saw, tenon saw, hack saw, chisel, file, tin snips, abrasive paper, screw driver, Marking out: Try square, steel rule, bradawl, scriber, centre punch. Portable Power Tools: Biscuit Cutter, Cordless Drill, line bender, Fixed Machines: Pillar Drill, Buffing Machine, Belt Sander, Scroll Saw, vacuum former Sewing machines, hand sewing, cutting, soldering	Students will be able to identify and competently use the tools and machinery outlined in order to produce high quality outcomes.
KS4	As above, plus: Portable Power tools: use of hand held sander, hand held router, Knowledge of: angle grinder, Sewing machines, hand sewing, Tyvek, tie dye, batik, heat press.	Students can select and competently use the tools and equipment in order to produce high quality outcomes. Where students are unable to use equipment (due to H&S guidance) they will have an awareness and understanding of the machinery, its appropriate use and the health and safety implications associated with each.

CAD/CAM

Success in **CAD/CAM** is students being able to apply CAD/CAM skills appropriately within the Design and Make process in order to manufacture high quality products.

	Substantive Knowledge	Disciplinary Knowledge
KS3	CAD: 2D Design Tinker CAD Google Sketch Up CAM: Laser Cutter	Students will be able to use the CAD packages in order to produce 2D and 3D digital drawings and know how to prepare a file for laser cutting. They will understand how a laser cuter works and the health and safety considerations for the machine.

		They will know which materials are able to be laser cut.
KS4	CAD: As above plus Autodesk Inventor. CAM: As above plus knowledge (not use) of CNC router and CNC lathe. CAD/CAM sewing machine	Students will be able to use the CAD software to produce 2D and 3D digital drawings. They will understand when and how the CNC router and lathe are used in industry and be able to identify and give examples of products that have been manufactured in this way.

Engineering Disciplines, Iconic and Important work of others.

Success in **Engineering disciplines** is students knowing and understanding a range of different engineering sectors. Being able to give examples of products developed and manufactured by each sector and being able to explain the benefit and impact that these products have had on society. This knowledge will encompass a range of important and iconic designs and designers/engineers.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Mechanical, Civil, Aerospace, Electronic,	Students will be able to explain what type of products each of the sectors are concerned with and give specific examples, explaining the benefits that each product has brought to society and individuals. They will be able explain the qualifications/subjects needed to enter each sector.
KS4	As above plus: Biomedical, Automotive Biomedical, Chemical, Communications, Software	Students will be able to explain what type of products each of the sectors are concerned with and give specific examples, explaining the benefits that each product has brought to society and individuals. They will be able explain the qualifications/subjects needed to enter each sector.

Electronics

Success in **electronics** is students understanding the basic principles of electronics: current, voltage, resistance and power. They will be able to use appropriate formulae to calculate these values for a given scenario. They will be able to design and construct simple electronic circuits, with an input and an output. They will experiment with programmable components and understand how they can be programmed to achieve different outcomes.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Basic electronic principles. How to calculate voltage, power, current and resistance. How to decode a resistor's value. How to build simple circuits. How to use programmable controllers in circuits.	Students will use their electronics knowledge in order to design and build electronic products to satisfy a given design scenario.
KS4	Students will revisit the above information looking at more complex applications of their electronics knowledge.	Students will use their electronics knowledge in order to design and build electronic products to satisfy a given design scenario.

Sustainable Design

Success in **sustainable design** is students understanding the 6 Rs of sustainability and being able to explain why it is important for us to sustain the resources that we have for future generations. They will be able to identify where the materials that they use originate from in their raw form and the implications of this for the environment. They will consider the end of a products life when designing and be able to analyse and evaluate the environmental credentials of existing products.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Where materials come from. The environmental implications of materials. The 6 Rs. End of life considerations.	Students will be able to apply their knowledge of sustainability in order to design environmentally conscious products. They will select materials with sustainability in mind and be able to justify their selections on this basis.
KS4	As above plus how materials are recycled, how many times they can be recycled and whether the material loses quality upon recycling.	Students will select materials based on a wide range of environmental credentials, fully justifying their selection.

Evaluating

Success in **evaluating** is students being able to analyse the work of others identifying good features and areas for development. They will then be able to incorporate these findings in to their work. They will be able to reflect on their own work throughout the design and manufacture process and refine their products based on findings. At the end of a project they will be able to identify successes and areas for future development.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Evaluative language: Structure of a final evaluation: Positives, Negatives, Improvements. Product Analysis using ACCESS FM.	Students will be able to reflect on their own work and that of others to identify positives, negatives and improvements that could be made. Students will be able to evaluate their own skills alongside practical outcomes.
KS4	As above plus: Iterative Design.	Students will be able to reflect on their own work and that of others to identify strengths and areas for development. Students will be able to evaluate their own skills alongside practical outcomes. Students will evaluate throughout the design and make process refining their ideas in response to their findings,

Summative Assessment plan

In all Key Stage 3 units of work we assess against the 4 areas of:

- Develop
- Make
- Knowledge
- Evaluate

Students receive a Red, Amber or Green against each skill assessed for that unit and these are communicated to the student via the assessment sheet that is stuck in the front of their DT book. Students have the opportunity to improve the skill and the RAG will then be updated on the sheet, this may take place as part of live marking.

These RAG ratings are then transferred in to Doddle

In Key stage 4 students are formally tested at the end of every unit of work in preparation for the exam. These test marks are communicated on students tracking sheets and recorded on teacher tracking sheets.

Secondary Art Textiles

Curriculum Intent Statement:

For students to;

- Have an in depth knowledge of the formal elements within Art Textiles
- Be able to identify and analyse the formal elements in the work of Textiles Artists and Designers to inform and enhance their own creative practice.
- Understand how to effectively communicate their ideas using a range of textile and drawing techniques, developing confidence with a wide range of textiles tools and equipment.
- Apply an understanding of the elements in Textiles to their exploration and experimentation of a range of different media and techniques.
- Reflect on their creative output to enable the refinement and development of work through purposeful risk taking.
- Connect their experiences within Textiles to the wider context of the Creative Industries, Art History and Cultural identity.

The key schema (areas of knowledge and skills) in 'subject' are:

- Designing and developing – Use a range of appropriate techniques to communicate ideas.
- Making – The ability to produce practical outcomes using a range of textiles techniques, tools and equipment.
- Knowledge – Colour Theory, formal element, textiles media and components.
- Evaluating/ Artist Research – The ability to analyse and evaluate artists work to inform their own design and development.

'Subject' disciplinary knowledge is:

In designing and developing: The ability to communicate unique and creative ideas using drawn and textile techniques and to develop ideas through experimentation.

In making: The ability to apply knowledge of textile techniques and processes in order to produce practical textile outcomes.

In knowledge: The ability to apply colour theory, knowledge of the formal elements, textiles media and components to analysis, designing, experimentation and production of final personal outcomes.

In evaluating: The ability to critically analyse the work of artists, identifying how they have used the formal elements and using a wide range of sophisticated vocabulary.

Our curriculum is planned and sequenced as a cumulative curriculum where knowledge builds upon, reinforces and expands previous learning. Our schemes of learning are built around our key schema and substantive knowledge is built upon across Key Stage 3 and 4. Disciplinary knowledge will become progressively more advanced and students will incorporate more complex skills and techniques into their designing and making.

Outcomes from students will increasingly be self-led with each student working independently from a chosen theme. Our curriculum allows our students to apply the iterative process to their chosen body of work by allowing students to explore their own strengths and interests.
Our curriculum model plans for students to remember more through: • Low stakes testing throughout each module in KS3 – Key terms and concepts, the content that is included on the knowledge organiser. • Low stakes retrieval starters in KS4 based on knowledge from the previous weeks learning.
The cultural capital needed to succeed in Textiles' is woven through our curriculum, for example: • CEIAG activities written in to the schemes of work. • Links with Ken Stradling gallery giving students exposure to working artists and opportunities to exhibit their work in a public gallery. • Teachers reference industry experience to inspire students.

The key Schema

Designing and developing

Success in **Designing and developing** is students understanding how to use inspiration from a range of sources including other artists work and their own experimentation to inspire their own work. They will be able to communicate their ideas confidently and fluently, presenting their ideas to a high standard. They will clearly show development in their creative practice, articulately explaining their design and development decisions.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Drawing skills, use of texture, line, tone, pattern and shape. Colour theory.	Students will be able communicate their own design ideas using different methods.
KS4	As above plus be able to continue developing ideas over a prolonged period of time.	Students will be able communicate their own ideas through combining technique and apply the iterative process to their development of techniques and designs.

Making

Success in **Making** is students being able to use a wide range of textiles art techniques in order to create a high quality, refined practical outcome.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Tacking, hand stitching, decorative stitching. Set-up and use of sewing machine. Seam allowance, zips, buttons, sequins. Applique, Reverse Applique, Stencilling, batik and different printing methods (mono and block)	Students will be able to transform communicated ideas into 3D outcomes using textiles techniques.
KS4	As above plus couching, quilting, stitch and cut, transfer printing and patchwork.	As above but independently.

Knowledge

Success in **Knowledge** is students understanding the creative process, being able to use a number of creative strategies in order to generate ideas. Students will know about a range of textiles materials and understand how to best work with them in order to create their desired outcomes. Students will know and understand how to work with a range of components and embellishments and be able to use them in order to enhance their practical work. They will have an understanding of colour theory and the formal elements and be able to comment on artist's use of it in their work as well as applying it in their own.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Colour Theory. The formal elements; Texture, Line, Pattern, Shape.	Students will be able to apply knowledge to their communicated ideas and final outcomes.
KS4	As above plus awareness of a broad range of artists/designers.	As above.

Evaluation

Success in **Evaluation** is students knowing and understanding how to analyse and evaluate work of others, identifying key features, materials, themes, the use of colour and the formal elements. They will be able to evaluate their own work at completion and throughout the creative process in order to drive the development of their project. They will be able to form and express their own opinions in response to the work of others.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Evaluative language and creative analysis of artist and own work.	Students will be able to reflect on their own work and that of others to identify how successful they have been and how others can inspire students own work. Students will be able to evaluate their own skills alongside practical outcomes.
KS4	As above plus compare and contrast.	Students will be able to reflect on their own work and that of others to identify how successful they have been and how others can inspire students own work. Students will be able to evaluate their own skills alongside practical outcomes. Students will be able to compare works of others and suggest where work contrasts.

Secondary Food

Curriculum Intent Statement:

For students to:

- Develop knowledge of and become competent in a wide range of food skills and techniques.
- Be able to select and use a range of equipment safely and efficiently.
- Understand the functional properties of ingredients to build scientific understanding that underpins key food preparation and cooking processes.
- Apply an understanding of functional properties of ingredients when choosing and planning recipes.
- Reflect on theoretical and practical outcomes to enable them to make judgments about food choices
- Develop knowledge and understanding of Food preparation and Nutrition (SBL / WW) the hospitality and catering industry (BDS)
- Connect their experiences to develop life skills for the future.

The key schema (areas of knowledge and skills) in Food are:

- Tools and Equipment – Selecting and using the appropriate equipment in order to prepare dishes.
- Skills and Techniques – Skilfully use a range of techniques and processes in order to prepare, cook and present food.
- Functional properties of ingredients – Understand the role that each ingredient plays in a recipe and how to adapt recipes to meet particular customer needs.
- Health and Safety – How to work safely in the kitchen environment. How to prevent food causing ill health. Legislation relating to the hospitality and catering industry.
- Nutrition – What constitutes a balanced diet? Which food groups do different nutrients come from? Understanding the function of nutrients for individuals' particular needs and the effects of excess and deficiency of nutrients. The effect of cooking on nutritional value.
- Where food comes from – Provenance, Sustainability, Food Miles., environmental impact of food choice.
- Evaluation – Identifying successes and areas for development in dishes. Suggesting Improvements and checking for quality throughout preparation to the finished product. The

BDS

- Hospitality and Catering environment – Understanding the hospitality and catering environment and how the industry operates

SBL / WW

- Food Preparation and Nutrition

‘Subject’ disciplinary knowledge is: In developing: the ability to adapt and develop recipes to meet healthy dietary guidelines and meet a range of dietary requirements. To be able to make decisions about the suitability of menu choices addressing a range of factors, showing an awareness of customer needs, environmental factors and the impact of food provenance and organoleptic properties of food choices made. To be able to plan menus for given situations considering equipment, techniques, production plans and identifying risks and recommend personal safety and control measures. To be able to describe the structure and analyse job requirements within the hospitality and catering industry to develop an understanding of factors that affect the successes and recommend suitable provisions for particular target groups. In making: the ability to work safely and hygienically in order to use a variety of food commodities, skills, techniques and equipment during food preparation and cooking. To be able to follow recipes independently and use time effectively to make food products with increased accuracy using a range of presentational techniques. In knowledge: the ability to apply their knowledge of safety, equipment, techniques, functions of ingredients, food provenance when planning menus and making food choices in order to create quality successful outcomes. To incorporate knowledge of how the hospitality and catering provision operates and the environment in which providers operate to meet customer requirements and to be successful. In evaluating: the ability to identify areas of success in practical outcomes and to be able to suggest strengths and weaknesses. To show an understanding of where improvements and be made whilst identifying quality checks throughout choice of food commodities, preparation techniques, cooking methods and presentation of food. To be able to make adjustments to skills, techniques and organoleptic properties of food products being made.

The key Schema

Tools and equipment

Success in Tools and Equipment is students knowing the names of the tools and equipment that they use in the food room and remembering what they look like. They should understand how to safely and independently use each piece of equipment in order to prepare food and be able to identify the correct tool to complete a desired result when preparing, cooking and presenting food.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Use a range of small hand tools and electrical equipment. Oven, hob, grill , microwave, food processor , electrical hand whisk, blender, weighing scales, measuring jugs ,sharp knives, mashers, peelers, garlic press, colander , sieves, bun tins , baking trays, rolling pins, colour coded chopping boards , grater , juice extractors, zesters Prepare a variety of food items using a range of equipment ; cakes, bolognaise, cheese and potato pie, fruit crumble, pizza , banana cake, scotch eggs, quiche, soup, sauces sweet and savoury	Students are able to independently select and use an appropriate range of small hand and electrical equipment safely and efficiently to prepare a range of dishes.

Skills and techniques

Success in **Skills and Techniques** is students being able to use a wide range of skills and techniques confidently and safely in the kitchen. They will be able to select appropriate skills and justify their choice. They will be able to present food in a professional manner which is appealing to the consumer.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Skills and techniques: Food preparation – weighing , measuring, mixing , beating , sieving , portioning, slicing , dicing, crushing, peeling, cutting, mashing, grating, rubbing in, coring, kneading, proving ,rolling, blending, enrobing, whisking, squeezing, zesting, melting Cooking methods – baking, simmering, browning, sweating, boiling, grilling, shallow frying, sauce reduction. Dextrinisation, co-agulation, gelatinisation	Students are able to successfully use a range of techniques, independently following a recipe in order to prepare and cook dishes.

Functional properties of ingredients

Success in **Functional properties of ingredients** is students understanding the role that each ingredient plays in a recipe from a scientific perspective. This will enable students to design, develop and adapt dishes successfully. They will be able to identify specific areas for development where outcomes are not successful.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Testing for readiness, enzymic browning, dextrinisation, co agulation, gelatinisation	Be able to explain how and why food is cooked and the functional properties of ingredients to

		build up scientific understanding that underpins key food preparation and cooking processes.

Health and Safety

Success in **Health and Safety** is students knowing how to work safely in the food room. They will be able to explain why the health and safety rules are in place and why it is important to follow them. They will understand how to work safely with food in order to avoid food causing ill health. They will be able to describe and explain the various pieces of legislation pertaining to the hospitality and catering industry.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Personal hygiene rules and general safety rules within the kitchen. Bacteria, cross contamination, food storage	To be able to understand the importance of good food safety and hygiene including knowing how to get ready to cook. Be able to apply principles of cleaning, preventing cross contamination, safe storage of food including chilling, cooking food thoroughly and reheating food until it is steaming hot.

Nutrition

Success in **Nutrition** is students knowing how to eat a balanced diet in line with the Eat Well Guide and the 8 tips to healthy eating. They will be able to explain which foods contain which nutrients and why those nutrients are important. They will be able to explain how to develop dishes for those with special diets and adapt recipes to meet these needs.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Eat well guide, 8 tips/ government guidelines to healthy eating, 5 a day campaign Nutrients to include water and fibre Special dietary needs	Students can apply healthy eating advice and understand people's needs to develop diets for different individuals when planning recipes and choosing ingredients. To be able to identify nutrients within foods and be aware of the importance of achieving a balanced diet.

Where food comes from

Success in **Where food comes from** is students being able to make informed decisions about what food and ingredients to buy and where and when to buy it based on its seasonality, provenance and environmental impact. They will understand the processing that the food has undergone before the point of purchase. Students will become informed consumers and be aware of the impact of food choice within the hospitality and catering on menu planning and meeting customer needs.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Provenance, country of origin, seasonality , food miles, carbon foot print, sustainability, organic farming	How to apply knowledge of where food comes from, in order to make good choices when selecting and purchasing ingredients. Understand how this affects menu choice and the environment

Evaluation

Success in **Evaluation** is students being able to identify strengths and areas for development of the dishes that they prepare. Students will be able to analyse issues with practical outcomes and identify the cause of them, applying their knowledge of food science to solve problems and suggest improvements.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Write evaluations to describe the taste, texture and appearance of food made. Skills and techniques covered How food meets a particular need	To be able to reflect upon outcomes and show an understanding of outcomes relating to skills, techniques, processes use and to discuss how to make changes or improvements to products. Students will be able to describe the organoleptic qualities of food products.

KS4 Hospitality & Catering

Subject: Hospitality and Catering Level 1/2 Award WJEC	**Topic**: A04 Term 1 Know how food can cause ill health	**Duration**: Term 1 (8 weeks – 1 double / 3 single lessons a fortnight) *Term 2 (7 weeks AO3 should be started within term 2)*	**Year**: 10 (& 11 Production plan practical assessment)
	Topic: A03 Understand how hospitality and catering provision meets health and safety requirements	**Duration:** Term 2 (7 weeks – 1 double / 3 single lessons a fortnight) *Term 3 (6 weeks AO1/2 should be started within term 3)*	**Year**: 10

Substantive, Disciplinary knowledge and Skills expectation
Health and Safety Success in **Health and Safety** is students knowing how to work safely in the food room. They will be able to explain why the health and safety rules are in place and why it is important to follow them. They will understand how to work safely with food in order to avoid food causing ill health. They will be able to describe and explain the various pieces of legislation pertaining to the hospitality and catering industry.

	Substantive Knowledge	Disciplinary Knowledge
KS4	How the hospitality and catering provision meets health and safety requirements : Personal responsibility within the workplace, risks to personal safety and control measures to avoid risks in hospitality and catering provision. Know how food can cause ill health – food related causes of ill health, role and responsibility of the environmental health officer, food safety legislation, types of food poisoning, symptoms of food induced ill health.	As key stage3 and to also have a deeper understanding of the food related causes of ill health including food allergies and intolerances. To understand the importance of food safety legislation within the hospitality and catering industry and describing the roles and responsibilities of the environmental health officer. To also be able to identify risks and control measures for personal safety within a catering situation and be aware of their own responsibilities to ensure good safety and hygienic practices.

MAKING / PRACTICAL SKILLS

Tools and equipment

Success in Tools and Equipment is students knowing the names of the tools and equipment that they use in the food room and remembering what they look like. They should understand how to safely and independently use each piece of equipment in order to prepare food and be able to identify the correct tool to complete a desired result when preparing, cooking and presenting food.

	Substantive Knowledge	Disciplinary Knowledge
KS4	Tools and equipment as Key Stage 3 but also to include **Electrical** –food mixers, ice cream makers, deep fat fryers, variety of attachments for the food processor – grating, slicing **Specialist equipment**: piping bags, waffle maker, pancake tray, blow torch, pasta machines, ravioli tray, cannoli tubes, burger press, lattice pastry cutter	Students are able to independently select and use an appropriate range of small hand and electrical equipment safely and efficiently to prepare a range of dishes. Students are also be able to use a wider range of specialised equipment for particular food product and make choices when menu planning.

Skills and techniques

Success in Skills and Techniques is students being able to use a wide range of skills and techniques confidently and safely in the kitchen. They will be able to select appropriate skills and justify their choice. They will be able to present food in a professional manner which is appealing to the consumer.

	Substantive Knowledge	**Disciplinary Knowledge**
KS4	**Skills and techniques**: as KS3 and also **food preparation** – shaping, hydrating, presentation techniques, piping , filleting, setting, marinate, manipulate sensory properties. **cooking methods**, steaming, poaching, braising, stewing, roasting, sautéing, au gratin, baking blind , blanching quality assurance of commodities to be used in food preparation	Students are able to select with reasoning the appropriate techniques required in order to prepare dishes and demonstrate a high level of competence in a wider range of food skills.

Subject: Hospitality and Catering Level 1/2 Award WJEC	**Topic: A01** Understand the environment in which hospitality and catering provisions operate. **A02** Understand how hospitality and catering provisions operate.	**Duration**: Term 3 (6 weeks – 1 double / 3 single lessons a fortnight) Term 4 (6 weeks – 1 double / 3 singles a fortnight)	**Year**: 10
Subject: Hospitality and Catering Level 1/2 Award WJEC	**Topic:** revision / exam question practice. Unit 2 introduction – food groups / balanced diet	**Duration**: Term 5 (6 weeks – 1 double / 3 single lessons a fortnight) Term 6 (6 ½ weeks)	**Year:** 10

Substantive, Disciplinary knowledge and Skills expectation

Terms 3& 4 will focus on LO1&2 knowledge
Terms 5 & 6 will complete Unit 1 and re visit all LO 1 – 4 during revision activities. After the Unit 1 exam in June pupils will start to research knowledge required for Unit 2
Term 1 Year 11 – Nutrition knowledge

The Hospitality and Catering Environment

Success in **The Hospitality and Catering Environment** is students being able to understand the environment in which hospitality and catering providers operate and how hospitality and catering provision operates. Students will be able to develop an awareness of the structure, job requirements and working conditions within the industry and students will have a wider understanding of how the industry operates. This understanding will allow students to understand factors that make the hospitality and catering industry successful and review and recommend provisions and their suitability for given situations.

	Substantive Knowledge	**Disciplinary Knowledge**
KS4	Structure of the hospitality and catering industry Job requirements within the industry Working conditions of different job roles within the industry Factors affecting success of hospitality and catering providers Operation of the kitchen Operation of front of house	To be able to propose a hospitality and catering provision to meet specific requirements and discuss the disadvantages and advantages of proposals.

	How the hospitality and catering provision meets customer requirements	

Nutrition

Success in **Nutrition** is students knowing how to eat a balanced diet in line with the Eat Well Guide and the 8 tips to healthy eating. They will be able to explain which foods contain which nutrients and why those nutrients are important. They will be able to explain how to develop dishes for those with special diets and adapt recipes to meet these needs.

	Substantive Knowledge	**Disciplinary Knowledge**
KS4	Functions of nutrients in the human body Nutritional needs of specific groups Characteristics of unsatisfactory nutritional intake. The impact of cooking methods on the nutritional value of foods	To be able to understand the importance of nutrition when planning menus and to understand the importance of creating balanced meals / menus that will meet particular dietary needs

Subject: Hospitality and Catering Level 1/2 Award WJEC	**Topic:** Unit 2	**Year:** 11

Substantive, Disciplinary knowledge and Skills expectation
Term 1 - Nutrition substantive and disciplinary knowledge applies **Where food comes from**

Success in **Where food comes from** is students being able to make informed decisions about what food and ingredients to buy and where and when to buy it based on its seasonality, provenance and environmental impact. They will understand the processing that the food has undergone before the point of purchase. Students will become informed consumers and be aware of the impact of food choice within the hospitality and catering on menu planning and meeting customer needs.

	Substantive Knowledge	**Disciplinary Knowledge**
KS4	Factors to consider when proposing dishes when planning a menu to explain how dishes on a menu address environmental issues whilst meeting customer needs and trends. Fossil fuels, non-renewable energy, packaging	To be able to discuss how the hospitality and catering industry has an impact on the environment and to be able to discuss ways in which the industry can reduce its impact when planning menus, storing and preparing foods, cooking foods,

Functional properties of ingredients

Success in **Functional properties of ingredients** is students understanding the role that each ingredient plays in a recipe from a scientific perspective. This will enable students to design, develop and adapt dishes successfully. They will be able to identify specific areas for development where outcomes are not successful.

	Substantive Knowledge	**Disciplinary Knowledge**
KS4	As above plus setting agents, raising agents, denaturing, Water soluble, fat soluble vitamins, starches, proteins, calcium, sodium	And also to be able to understand the impact that different cooking methods have on the nutritional value of food.

KS5 Product Design

Curriculum Intent Statement:

For students to:

- To work creatively when designing and making and apply technical and practical expertise.
- Be open to taking design risks, showing innovation and enterprise whilst considering their role as responsible designers and citizens
- Develop intellectual curiosity about the design and manufacture of products and systems, and their impact on daily life and the wider world
- Work collaboratively to develop and refine their ideas, responding to feedback from users, peers and expert practitioners
- Gain an insight into the creative, engineering and/or manufacturing industries
- Develop the capacity to think creatively, innovatively and critically through focused research and the exploration of design opportunities arising from the needs, wants and values of users and clients
- Develop knowledge and experience of real world contexts for design and technological activity
- Develop an in-depth knowledge and understanding of materials, components and processes associated with the creation of products that can be tested and evaluated in use
- Be able to make informed design decisions through an in-depth understanding of the management and development of taking a design through to a prototype/product
- Be able to create and analyse a design concept and use a range of skills and knowledge from other subject areas, including mathematics and science, to inform decisions in design and the application or development of technology
- Be able to work safely and skilfully to produce high-quality prototypes/products
- Have a critical understanding of the wider influences on design and technology, including cultural, economic, environmental, historical and social factors
- Develop the ability to draw on and apply a range of skills and knowledge from other subject areas, including the use of mathematics and science for analysis and informing decisions in design
- To be aware of social, moral and environmental issues in order to inspire a more sustainable future.

The key schema (areas of knowledge and skills) in Product Design are:

- Understanding user needs – Human responsibility, Identification of different market sectors, demographics, cultural, social and economic design considerations.
- The different research techniques used to refine design contexts.
- Understanding the industrial and commercial practices – Stages of production, manufacturing methods, manufacturing and management systems, Risk assessment and safe working practices.
- Drawing skills – Orthographic, Isometric and One- and Two-point perspective, freehand design sketches, Computer aided design.
- Mathematics – Area, units of measurement, conversion and engineering calculations.
- Mechanical Systems, Motion and Forces – Hydraulics, Gears and Pulleys. How to use these systems to solve a proposed problem. Types of motion, Forces.
- Materials and components – Materials working characteristics, application properties, finishes, components and their application.

- Health and Safety – To be able to work safely in the workshop environment and understand the importance of health and safety and the associated legislation in an industrial environment including risk assessment.
- Tools and Equipment – To be able to work independently in the workshop in order to manufacture products using a range of materials and processes.
- To be able to identify feasible manufacturing solutions.
- CAD/CAM – To be able to appropriately apply CAD/CAM within the design and make process in order to manufacture high quality products.
- Sustainable Design – To develop an awareness and understanding of the need to sustain resources and create a conscious and analytical design methodology.
- Evaluating – To be able to reflect, refine and identify future development opportunities.

'Subject' disciplinary knowledge is:

In designing:
The ability to use primary and secondary research methods in order to develop an understanding of user needs and product marketability ; to develop a design brief and specifications to inform the design of innovative, functional, appealing products that respond to needs of the client; to apply knowledge of materials and how they behave to designs; to design feasible products and outline how they will be manufactured and marketed; to be able to communicate their designs using a range of methods including hand drawings and CAD. To consider sustainability when developing design solutions.

In making:
The ability to work safely and independently in order to model and manufacture high quality working solutions; to accurately produce and follow a project plan; to be able to adapt their approach in response to challenges during manufacture.

In knowledge:
The ability to apply their knowledge of Materials, Mathematics, and science to their designing in order to create innovative and feasible solutions; to be able to incorporate components, composites and electronic systems into their designing; to be able to embed intelligence in products that respond to inputs and control outputs using programmable components.

In Evaluating:
The ability to analyse the work of other designers and engineers, past and present to develop and broaden their understanding; to investigate new and emerging technologies and understand its' impact on individuals, society and the environment, to be able to test, evaluate and refine their own ideas against a specification, considering the views and needs of others.

Our curriculum is planned and sequenced as a cumulative curriculum where knowledge builds upon, reinforces and expands previous learning. This enables students to know more and remember more. Our schemes of learning are built around our key schema and substantive knowledge is built upon from KS2 across Key Stage 3 and 4 into key stage 5. Our curriculum connects prior learning and ensures that essential skills are covered early that they can be applied in numerous contexts later.

Whilst we are aware of the vast differences in the experience students will have had of DT at primary school and secondary, our KS5 curriculum is ambitious and students are encouraged to apply their designing, making, evaluative skills alongside substantive technical knowledge to design situations, using their skills to solve problems and producing high quality outcomes.

Our KS5 curriculum builds on from the strong foundations we lay at Key Stage 3 and 4 …

Our curriculum model plans for students to remember more through

- Low stakes testing throughout each module in KS3 – Key terms and concepts, the content that is included on the knowledge organiser.
- End of module tests in KS3 focusing on key concepts from the schema that have been covered in that module.
- Use of retrieval starters in KS4 and KS5 focusing on substantive knowledge that we would want to be automatic and fluent for students.
- Formal end of unit tests in KS5

The cultural capital needed to succeed in product design is woven through our curriculum:

- We have CEIAG activities written in to our schemes of learning from Year 7-11. These focus on developing students' awareness of the different roles that are available in the engineering and product design sectors and the qualification paths to those roles. We aim to expose students through these activities to careers that they might not have considered and show them that it is possible for anybody to pursue these qualifications and roles. Our aim is to raise our students' aspirations beyond that of the manual trades that they automatically link to the word 'engineering'.
- Throughout our schemes of work we introduce students to important Engineers and designers past and present in order that they develop an appreciation of iconic designs and technologies.
- In lessons we highlight current affairs relating to the subject or work topic as they appear. We aim to give current and relevant real-world context to all of our design situations.

The key Schema

Understanding User Needs

Success in **'curriculum schema'** is students knowing, remembering, understanding and being able to Identify different market sectors, demographics, cultural, social and economic groups. To use a range of research techniques in order to understand the needs of identified users and be able to adapt and refine designs in order to meet user needs.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Needs of users of different age, gender, interests and abilities. Designing for a client with imposed design constraints.	Students can recognise the different needs of different user groups and can apply their knowledge of user and client needs to build design specifications and inform design solutions.
KS4	As above plus: Requirements of different cultures, social and economic groups.	Students can use primary and secondary research techniques in order to gather information about a specific user group and understand the advantages and disadvantages of the research techniques used. Students can adapt existing designs to meet the needs of new users and situations.
KS5	As above plus: User centred design, needs wants and values. Sowing an appreciation of the needs of specific consumers, such as young children, the elderly or those with special physical needs.	Students can use investigative research into the needs, wants and values of users to define a design opportunity or problem that could lead to the production of a design brief and specification. Using above and below the line analysis an in-depth approach of research. Students can understand the effect of legislation/regulations related to product design and consumer protection

Drawing Skills

Success in **Drawing Skills** is students knowing, remembering, understanding and being able to communicate their ideas fluently with others through 2D and 3D freehand sketches, 2D and 3D working drawings applying the conventions of engineering drawings from BS8888 and using rendering, dimensions, different types of line and scale appropriately.

	Substantive Knowledge	Disciplinary Knowledge

KS3	How to draw simple shapes using 1 and 2 point perspective. Using isometric for 3D drawings. Use of 3rd angle orthographic drawing. Confidently sketching to communicate. Visible, construction and dimension lines.	Students are able to identify the different types of drawing and can communicate their own design ideas using these methods.
KS4	As above looking at more complex shapes and assemblies. Use of 1st angle orthographic. Conversion from imperial to metric measurement and vice versa. Appropriate choice of scale. Use of Tolerance. Hidden detail and centre lines. BSI, BS8888, ISO.	Students are able to independently select appropriate drawing methods for their requirements and can confidently produce 2D and 3D working drawings in order to communicate their ideas that fully comply with BS8888. They are able to explain the benefits of working to BS8888 and how it fits with the corresponding ISO standards.
KS5	As above looking at more complex shapes and assemblies. Use of modelling and testing to evolve ideas and to support decision making, demonstrating effective independent use of skills/techniques to clearly communicate ideas and proposals to a third party. Appropriate choice of 2D, 3D drawing, section drawings or partial sectioned drawings, system and schematic diagrams, mathematical drawings and CAD	Students are able to apply an iterative design process to generate and communicate excellent initial ideas with sophisticated detailing, selecting the appropriate drawing method for their requirements and can confidently produce 2D and 3D working drawings, which has identified and perceptively considered environmental, sustainability, costs, social, moral and ethical factors, which are clearly relevant to the design and potential user(s). Students are able to develop a detailed proposal, including comprehensive and relevant details of materials, dimensions, finishes and production techniques, which clearly addresses all requirements of the design brief and specification. Students will know ow to find relevant information related their product's design and use, from documents such as Health and Safety legislation, BS and COSHH.

Mathematics

Success in **Mathematics** is students knowing how to apply the concepts and formulae in engineering contexts and to use these processes to support the development of their own concepts and ideas. Students will remember the appropriate units for the calculations that they do and will be able to use a scientific calculator correctly in order to perform calculations. Students will understand how Maths and Science can be used to solve engineering problems.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Area, Volume. Power, Resistance, Current and Voltage.	To be able to apply the formulae in order to solve problems related to their project work during design, development and manufacture. Students will be able to remember and apply the correct units for the calculations that they undertake.
KS4	SI Units. Power, Force, etc from spec	Students will be able to select the appropriate formulae to use in a given situation. They will be able to draw out the important quantities from engineering scenarios in order to help them to determine which calculation is most appropriate in each situation.
KS5	Percentages, surface area, volume, trigonometry, graphs and charts, coordinates and geometry, statistics and probability, Ratio	Students will be able to select the appropriate formulae to use in each design situation. They will be able to apply the important quantities from engineering scenarios in order to help them to determine which calculation is most appropriate in each design situation. They will be able to demonstrate an understanding of the Mathematical requirements appropriate to both technical principles and design and make skills.

Mechanical Systems, motion and forces

Success in **Mechanical systems, motion and forces** is students knowing and understanding the different types of forces and motion and how mechanical systems can be used in products to enable changes in movement and force.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Movement: Linear, Reciprocating, Oscillating, Rotating. Forces: Tension, Compression, Torsion, Bending, Shear. Mechanical Systems - Gears	To be able to apply their knowledge of movement and forces to a design situation, producing feasible design solutions that can resist the forces acting on them. To be able to explain how gear systems can be used to our advantage in products and to be

		able to devise simple gear systems for use in their own designs.
KS4	As above plus Mechanical Systems: Hydraulics, Pulleys.	Students can identify a range of mechanical systems in existing products and explain the purpose of using them in that scenario. Students can develop their own mechanical system designs to solve a specific problem.
KS5	N/A	N/A

Materials and their properties

Success in **Materials** is students knowing the different types of materials, where they originate from and being able to classify them. Students will know how to use technical vocabulary to describe properties of each material. They will understand how to test and select suitable materials for a specific purpose based on their working properties and will be able to justify their choices.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Woods: Classifications of timber, hardwoods, softwoods, composition of manufactured boards. Plastics: Classification, thermoplastics, thermosetting plastics. Metals: Classification, ferrous and non-ferrous metals, alloys. Material Properties: Mechanical, Textiles: smart and modern materials, fibres and fabrics, natural and synthetic fabrics, primary source to stock form. Material characteristics: Aesthetics, Cost, Environmental Impact.	Students will be able be identify specific materials used in existing products and explain why they were used, suggesting alternatives where appropriate. They will be able to carry out material tests for a range of mechanical properties and select materials based on the outcomes using their data to justify material choice. They will be able to suggest materials for their design ideas. They will understand where materials come from and the implications of this source for cost, environmental impact.
KS4	As above, plus: composite materials, ceramics, elastomers. Material Properties: Chemical, Optical, Textiles: smart and modern materials, fibres and fabrics, natural and synthetic fabrics, how fabrics behave for different purposes, primary source to stock form, stock form and types, weaving, knitting and bonding.	Students will be able to justify their material choices based on a wider range of material properties. They will select from a broader range of materials. They will understand how materials can be combined to create new materials with improved properties, be able to identify where these have been used in existing products and make suggestions for where these could be used in their own designs.

KS5	As above, plus: natural materials and elements synthetic materials, regenerated materials, composites. Stock forms of the above materials to include, bonded, laminated, profiled, sheet and woven forms, availability and comparative costs	Students will be able to develop a general appreciation of the wide range of materials and components available to them, designers and manufacturers. The students will be able to show a more detailed knowledge of a range of materials, partly developed through use in their specialist NEA work. Students will show an understanding of the complex interrelationships between material, form and manufacturing process and show consideration of how the material affects the structure of the product, which will allow students to make an informed decision of material selection.

Health and Safety

Success in **Health and Safety** is students knowing health and safety rules pertaining to the workshop and being able to explain why they are in place. They will be able to demonstrate independent and confident use of the guidelines in order to work safely in the workshop environment. They will know and understand the range of control measures that are in place in the school workshop environment and the PPE requirements of each machine. They will go on to learn about the various items of legislation that relate to the manufacturing environment and be able to relate the legislation to specific engineering scenarios across a range of sectors.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Workshop/textiles rooms Health and Safety rules. Control Measures used in the workshop. PPE used in the workshop.	Students will follow the health and safety rules relating to the school workshop environment. They will be able to explain why the rules in place and how they reduce the risk to individuals. They will be able to identify PPE used in the workshop and apply the correct PPE in a given situation. They will be able to identify and explain the control measures used in the workshop. They will be able

		to identify unsafe situations and make suggestions of how to reduce the risk
KS4	Health and Safety Legislation: COSHH, RIDDOR, HASAWA, MHOR, PPE in industry.	Students will be able to identify what aspect of H&S each piece of legislation covers and how this reduces risk in specific engineering environments. They will be able to identify and explain the consequences that may results from not following the relevant health and safety legislation. They will be able to suggest suitable PPE for a range of industrial scenarios.
KS5	Workshop/textiles rooms Health and Safety rules. Control Measures used in the workshop. PPE used in the workshop. Health and Safety Legislation: COSHH, RIDDOR, HASAWA, MHOR, PPE in industry.	Students will be able to select and safely use a range of specialist tools, techniques, processes, equipment and machinery appropriate to the design and manufacture of domestic, commercial and industrial products and systems they will be able to Select and safely work with appropriate machinery, tools, materials and components to realise their chosen prototype. Students will show a good understanding of all Health and Safety regulations needed within the environment they will work in.

Tools and Equipment

Success in **Tools and Equipment** is students being able to identify and range of hand tools, portable power tools and fixed machines and what they are used for. Students will be able to independently select and use a range of tools and machinery skilfully and safely in order to produce high quality, functional products.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Hand Tools: Coping saw, tenon saw, hack saw, chisel, file, tin snips, abrasive paper, screwdriver, Marking out: Try square, steel rule, bradawl, scriber, centre punch. Portable Power Tools: Biscuit Cutter, Cordless Drill, line bender,	Students will be able to identify and competently use the tools and machinery outlined in order to produce high quality outcomes.

	Fixed Machines: Pillar Drill, Buffing Machine, Belt Sander, Scroll Saw, vacuum former Sewing machines, hand sewing, cutting, soldering	
KS4	As above, plus: Portable Power tools: use of handheld sander, hand held router, Knowledge of: angle grinder, Sewing machines, hand sewing, Tyvek, tie dye, batik, heat press.	Students can select and competently use the tools and equipment in order to produce high quality outcomes. Where students are unable to use equipment (due to H&S guidance) they will have an awareness and understanding of the machinery, its appropriate use and the health and safety implications associated with each.
KS5	As above, plus: Hot glue gun,	Students can select and competently use the tools and equipment in order to produce high quality outcomes. Where students are unable to use equipment (due to H&S guidance) they will have an awareness and understanding of the machinery, its appropriate use and the health and safety implications as well as the risk assessment associated with each.

CAD/CAM

Success in **CAD/CAM** is students being able to apply CAD/CAM skills appropriately within the Design and Make process in order to manufacture high quality products.

	Substantive Knowledge	Disciplinary Knowledge
KS3	CAD: 2D Design Tinker CAD Google Sketch Up CAM: Laser Cutter	Students will be able to use the CAD packages in order to produce 2D and 3D digital drawings and know how to prepare a file for laser cutting. They will understand how a laser cuter works and the health and safety considerations for the machine. They will know which materials are able to be laser cut.
KS4	CAD: As above plus Autodesk Inventor. CAM: As above plus knowledge (not use) of CNC router and CNC lathe. CAD/CAM sewing machine	Students will be able to use the CAD software to produce 2D and 3D digital drawings. They will understand when and how the CNC router and lathe are used in industry and be able to identify and give

		examples of products that have been manufactured in this way.
KS5	CAD: Autodesk inventor, 2D design, CURA CAM: Laser cutter (independently used) 3D Printer	Students will be able to independently use CAD and CAM software and processes to develop their design idea's. Showing an understanding of the software and how this can influence the products processes and speed. Students will be able to use appropriate software at both formative and summative stages of their designing. Modelling their prototypes to 1/6th scale suitable to their outcome. Using CAD to communicate their ideas clearly.

Engineering Disciplines, Iconic and Important work of others.

Success in **Engineering disciplines** is students knowing and understanding a range of different engineering sectors. Being able to give examples of products developed and manufactured by each sector and being able to explain the benefit and impact that these products have had on society. This knowledge will encompass a range of important and iconic designs and designers/engineers.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Mechanical, Civil, Aerospace, Electronic,	Students will be able to explain what type of products each of the sectors are concerned with and give specific examples, explaining the benefits that each product has brought to society and individuals. They will be able explain the qualifications/subjects needed to enter each sector.
KS4	As above plus: Biomedical, Automotive Biomedical, Chemical, Communications, Software	Students will be able to explain what type of products each of the sectors are concerned with and give specific examples, explaining the benefits that each product has brought to society and individuals. They will be able explain the qualifications/subjects needed to enter each sector.
KS5	As above:	Students will be able to explain what type of products each of the sectors are concerned with and give specific examples, explaining the benefits that each product has brought to society and individuals. They will be able explain the qualifications/subjects needed to enter each sector.

Electronics

Success in **electronics** is students understanding the basic principles of electronics: current, voltage, resistance and power. They will be able to use appropriate formulae to calculate these values for a given scenario. They will be able to design and construct simple electronic circuits, with an input and an output. They will experiment with programmable components and understand how they can be programmed to achieve different outcomes.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Basic electronic principles. How to calculate voltage, power, current and resistance. How to decode a resistor's value. How to build simple circuits. How to use programmable controllers in circuits.	Students will use their electronics knowledge in order to design and build electronic products to satisfy a given design scenario.
KS4	Students will revisit the above information looking at more complex applications of their electronics knowledge.	Students will use their electronics knowledge in order to design and build electronic products to satisfy a given design scenario.
KS5	As above:	Students will use their prior electronics knowledge in order to design and make products suitable for the current market / client needs to enhance their own design ideas where needed.

Sustainable Design

Success in **sustainable design** is students understanding the 6 Rs of sustainability and being able to explain why it is important for us to sustain the resources that we have for future generations. They will be able to identify where the materials that they use originate from in their raw form and the implications of this for the environment. They will consider the end of a products life when designing and be able to analyse and evaluate the environmental credentials of existing products.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Where materials come from. The environmental implications of materials. The 6 Rs. End of life considerations.	Students will be able to apply their knowledge of sustainability in order to design environmentally conscious products. They will select materials with

		sustainability in mind and be able to justify their selections on this basis.
KS4	As above plus how materials are recycled, how many times they can be recycled and whether the material loses quality upon recycling.	Students will select materials based on a wide range of environmental credentials, fully justifying their selection.
KS5	As above plus understanding what values (technical. Economic, social, environmental and moral) are implicit in product design solutions. The conservation of raw materials. how manufacturing products effect the environment. What the Sustainability issues are that impacts the environment.	Students will be able to apply their knowledge of environmental factors showing an understanding how the disposal, surplus materials, components and by-products can affect the environment and re-design accordingly for a greener future. Justifying their selection of materials for the design and make outcome.

Evaluating

Success in **evaluating** is students being able to analyse the work of others identifying good features and areas for development. They will then be able to incorporate these findings into their work. They will be able to reflect on their own work throughout the design and manufacture process and refine their products based on findings. At the end of a project, they will be able to identify successes and areas for future development.

	Substantive Knowledge	Disciplinary Knowledge
KS3	Evaluative language: Structure of a final evaluation: Positives, Negatives, Improvements. Product Analysis using ACCESS FM.	Students will be able to reflect on their own work and that of others to identify positives, negatives and improvements that could be made. Students will be able to evaluate their own skills alongside practical outcomes.
KS4	As above plus: Iterative Design.	Students will be able to reflect on their own work and that of others to identify strengths and areas for development. Students will be able to evaluate their own skills alongside practical outcomes. Students will evaluate throughout the design and make process refining their ideas in response to their findings,
KS5	As above plus: qualitative and/or quantitative criteria	Students will be able to reflect on their own work and that of others to identify strengths and areas for

		development. Students will be able to evaluate their ideas and decisions whilst applying iterative design processes. Students will evaluate throughout the design and make process refining their ideas in response to their findings.

Summative Assessment plan

In all Key Stage 3 units of work we assess against the 4 areas of:

- Develop
- Make
- Knowledge
- Evaluate

Students receive a Red, Amber or Green against each skill assessed for that unit and these are communicated to the student via the assessment sheet that is stuck in the front of their DT book. Students have the opportunity to improve the skill and the RAG will then be updated on the sheet, this may take place as part of live marking.

These RAG ratings are then transferred in to Doddle

In Key stage 4 students are formally tested at the end of every unit of work in preparation for the exam. These test marks are communicated on students tracking sheets and recorded on teacher tracking sheets.

In Key Stage 5 students are formally tested at the end of every unit of work in preparation for the exam. These test marks are communicated on students tracking sheets and recorded on teacher tracking sheets.