Design and Technology KS3 Pathway Statements

Students will be taught to:

- **Holistic Design & Making:** How to apply a structured design process (identifying needs, generating ideas, planning, making, and evaluating) to create functional and appealing food products, integrating both creative and practical skills.
- **Material Science (Food Focus):** Understanding the properties and characteristics of various food ingredients, and how they behave and change during different preparation and cooking processes.
- **Practical & Technical Proficiency:** Developing a diverse set of hands-on skills across both subjects, including safe and accurate use of tools and equipment (from workshop tools to kitchen utensils), as well as precise cooking and food preparation techniques.
- **Problem-Solving & Evaluation:** Critically analysing existing products and their own creations against specific criteria, considering factors like functionality, aesthetics, user needs, and nutritional value, and identifying areas for improvement.
- **Wider Contexts & Impact:** Exploring the broader implications of design and food choices, including sustainability, environmental impact, ethical considerations, and how technology and food affect individuals and society.

Stage	Research	Design	Craftsmanship/Making	Evaluate	Technical knowledge
7	The student demonstrates expert-level understanding and application of structural elements, material properties, nutrition, and ingredient characteristics. Research is insightful, wide-ranging, and critically analysed to directly inform all decisions. There is clear, consistent integration of seasonality, sustainability, economic and social context, and client needs, resulting in highly developed and contextually appropriate outcomes.	The student demonstrates exceptional competence in using research, including cultural studies, to deeply understand user needs. They independently identify, critique, and reformulate complex design problems. Specifications are exhaustive, user-focused, and rooted in thorough analysis. They apply an extensive repertoire of advanced design strategies to generate unique, innovative, and non-stereotypical solutions. Their design communication is exemplary, making use of sophisticated annotated sketches, 3D and mathematical modelling, and highly effective digital and oral presentations.	The student demonstrates exceptional skill and precision in the use of a wide range of specialist tools, materials, techniques, and computer-aided manufacture. Quality control is rigorous and consistently applied, ensuring precise tolerances throughout. The final prototype is of outstanding quality, fully meets or exceeds the specification and client/user needs, and is commercially viable.	The student demonstrates an exceptional level of testing and refinement, with all decisions driven by critical evaluation and comprehensive user feedback. Specialist tools, ingredients, and technologies are used with precision and innovation. The final design or food product fully meets the needs of the user/client and shows expert awareness of its nutritional, ethical, environmental, and societal implications, with potential for real-world or commercial application.	The student demonstrates expert-level understanding and application of material, structural, ingredient, and system properties to produce highly functional, efficient, and innovative solutions. Mechanical, electrical, and programmable systems are seamlessly integrated to achieve dynamic, intelligent outcomes. In both design and food, solutions respond accurately to inputs, adapt outputs effectively, and show advanced awareness of the interaction between structure, system, and user.
6	The student integrates knowledge of materials, structures, nutrition, and food	The student demonstrates independent and analytical research skills, effectively	The student selects and uses specialist tools, materials, and equipment (including CAM)	The student applies thorough and evidence-based testing against the specification,	The student shows a well-developed ability to select and combine materials or

	science in a sophisticated and functional way. Research is ongoing and analytically applied throughout the project. The student demonstrates clear understanding of user needs, sustainability, sourcing, and broader contextual factors, leading to well-informed design or food choices.	exploring diverse user needs and cultural factors. They consistently identify complex design problems and reformulate them creatively and appropriately. Specifications are comprehensive, justified, and aligned with user requirements. A wide range of design strategies are used to develop highly innovative and purposeful ideas. Communication of ideas is clear, structured, and multi-modal, including high-quality digital presentations and advanced modelling techniques.	with high skill and consistency. Making and finishing are accurate and refined throughout. Quality control processes are well established and applied using tolerances. The resulting prototype is of high quality, meets client/user requirements effectively, and has strong commercial potential.	including detailed sensory analysis or user trials. A wide range of complex materials, tools, ingredients, or technologies (including CAM or precision equipment) are used with accuracy. Feedback from diverse users is integrated effectively, with clear understanding of the social, environmental, and health responsibilities of designers, engineers, and food technologists.	ingredients based on detailed knowledge of their properties and suitability for complex functions. Mechanical and electronic systems are integrated with purpose to enhance performance or usability. Computing and programmable systems (e.g., microcontrollers or smart kitchen tech) are applied with precision to create intelligent, responsive solutions in both product and food-related contexts.
5	The student selects and uses materials or ingredients based on a sound understanding of their properties, structure, and nutritional value. Research is concise, well-organised, and directly linked to the contextual challenge. The student draws accurate conclusions from primary and secondary sources and demonstrates consistent awareness of seasonality, sourcing, and social or economic influences.	The student conducts purposeful research to identify and understand user needs within a range of cultural contexts. They independently identify and reformulate design problems. Specifications are detailed, realistic, and responsive to identified needs. The student confidently applies a variety of design methods, such as biomimicry or user-centred design, to generate original and relevant ideas. Design concepts are clearly communicated using detailed drawings, appropriate digital tools, and basic 3D or mathematical modelling.	The student demonstrates a good level of proficiency in selecting and using a range of specialist tools, equipment, and materials, including confident use of CAM. Making and finishing skills are of a good standard. Quality control is clearly evident, including partial application of tolerances. The prototype is well-constructed and demonstrates good potential for commercial viability while meeting most requirements	The student uses structured and consistent testing (e.g. sensory, nutritional, functional) alongside targeted feedback to refine the product. A wide range of materials, ingredients, and processes are selected and used effectively, with good understanding of their properties. Decisions are clearly informed by user requirements, and thoughtful consideration is given to health, sustainability, and ethical issues.	The student demonstrates a secure understanding of the properties and functions of materials, ingredients, or systems, applying them effectively to create high-functioning products or recipes. Advanced mechanical or electrical systems are integrated to produce controlled and purposeful movement or response. Computing and programmable components are confidently applied to automate functions, respond to sensor input, or adjust system performance.
4	The student applies	The student undertakes	The student uses a suitable	The student tests and refines	The student selects and

	knowledge of material properties, structures, nutrition, and food characteristics to achieve functioning outcomes. Research is relevant, purposeful, and includes the views of clients or users. Seasonality and sourcing are considered. Investigation continues throughout the project and informs decisions with increasing clarity.	research with some independence to identify user needs, including cultural influences. They identify and begin to reformulate design problems with guided support. Specifications are generally clear, functional, and reflect an understanding of the design brief. The student applies structured design approaches to generate creative ideas that begin to move beyond stereotypes. They communicate design intentions using annotated sketches, simple digital modelling, and oral or written explanations.	range of tools, techniques, and equipment safely and with adequate skill, including CAM where appropriate. Making and finishing are mostly consistent and appropriate. Quality control processes are applied in part, with some awareness of tolerances. The resulting prototype is of good quality and mostly meets user and client needs with some commercial potential.	most aspects of their design or food product, using user feedback and evaluation to guide changes. A range of ingredients, components, or tools are selected with purpose. Appropriate technologies (including kitchen equipment or digital tools) are used with growing confidence. The student considers health, lifestyle, environmental impact, and consumer needs in their decisions.	applies materials, ingredients, and components with functional understanding of their performance (e.g., food chemistry, material strength, texture, or thermal conductivity). There is growing confidence in using advanced mechanical and electronic systems to control outcomes (e.g., gears, pulleys, circuits, or feedback loops). Programmable components are used to respond to inputs and influence outputs with some accuracy.
3	The student uses a developing understanding of materials, structures, and food characteristics to inform some functional choices. Research is more focused and relates to the challenge. Both primary and secondary methods may be used to gather evidence. There is some understanding of nutrition and ingredient origins, influencing basic decisions.	The student conducts basic research to explore user needs and demonstrates emerging consideration of cultural relevance. They can identify their own design problems with support and show early attempts at reformulation. Specifications are loosely linked to design intentions but often lack depth. Idea generation is somewhat varied but still lacks originality. Design ideas are communicated through simple annotated sketches and basic use of digital tools.	The student safely uses selected tools, equipment, and materials with a developing level of accuracy, including limited application of CAM. Making and finishing techniques are appropriate in some areas. Basic quality control is evident, though tolerances are not consistently considered. The prototype is functional but only partially meets the specification and user requirements.	The student begins to refine food ideas based on testing and feedback. There is developing understanding of functional ingredients and preparation techniques. Some investigation into emerging food trends or technologies (e.g. plant-based alternatives, new cooking methods) is evident. The student considers dietary needs and begins to recognise environmental and ethical food issues.	The student begins to apply knowledge of materials and ingredients with consideration of strength, durability, or function (e.g., structural stability, nutritional content). There is a developing understanding of how mechanical or electronic systems affect movement, force, or sensory feedback. Programmable components or digital control systems may be included at a basic level (e.g., timer, temperature sensor in food tech or robotics in design).
2	The student begins to identify simple material, structural, or ingredient properties, though application is limited.	The student shows some awareness of user needs with significant guidance and begins to consider cultural	The student uses appropriate tools and equipment safely, but with variable accuracy.	The student carries out some testing of food products and gathers limited feedback, occasionally used to inform	The student shows some understanding of the basic properties of materials, structural elements, or

	Research includes some primary or secondary sources but lacks depth or relevance to the contextual challenge. There is a basic understanding of nutrition and seasonal ingredients, with limited connection to decision-making.	factors at a superficial level. They can identify design problems when presented but struggle to interpret or reformulate them. Attempts at writing specifications are rudimentary and lack clarity. Design ideas are limited in scope and often derivative. Communication methods are basic and inconsistently applied, typically involving simple sketches with limited annotation.	Making and finishing skills are inconsistent, and quality control is evident only through simple measurements. The resulting prototype partially functions but does not adequately meet the intended needs or show commercial viability.	decisions. Some awareness of existing food products and current food trends is shown. Basic use of ingredients, techniques, and equipment is evident. User preferences are mentioned, with minimal consideration of health, sustainability, or wider impact.	ingredients, and their impact on function or outcome. There is limited awareness of how mechanical or electronic systems influence movement or control. Early attempts are made to identify how sensors, temperature control, or simple computing might be relevant to design or food processes.
1	The student demonstrates a basic awareness of materials, structures, and food ingredients but struggles to link their properties to functional outcomes. Research is minimal or unfocused. There is limited understanding of user needs, nutrition, or where ingredients come from. Investigation is superficial and lacks purpose.	The student demonstrates limited awareness of user needs and is unable to draw meaningful insights from research or cultural contexts. They rely heavily on teacher support to identify design problems and are unable to formulate or reformulate them. Specifications, if attempted, are vague and unrelated to design requirements. Idea generation is minimal, unoriginal, and typically reflects stereotypical thinking. Communication of design ideas is basic and lacks clarity, often limited to unlabelled or unclear sketches.	The student demonstrates basic use of tools, materials, and equipment, including computer-aided manufacture (CAM), with limited skill. Quality control is minimal and inconsistently applied. The prototype is of basic quality, with little or no alignment to client or user needs and lacks commercial potential.	The student demonstrates a basic awareness of food design or preparation processes with minimal testing or refinement. Food products are developed through trial-and-error without clear evaluation. There is limited understanding of ingredients, equipment, or technologies. User needs are not considered, and social, ethical, or environmental impacts are not addressed.	The student demonstrates a basic awareness of materials, ingredients, or components but with limited understanding of their properties or performance. Knowledge of movement, force, or systems (mechanical, electronic, or computational) is minimal. There is no meaningful use of intelligent systems or automation in design or food contexts.