Transitional Curriculum Progression Map

Design and Technology

National Curriculum:

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts.

Design

- Generate, develop, model and communicate ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose and aimed at particular individuals or groups.

Make

- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.
- Select from and use a wider range of tools and equipment to perform practical tasks accurately.

Evaluate

- Understand how key events and individuals in design and technology have helped shape the world.
- Evaluate ideas and products against their own design criteria and consider the views of others to improve their work.
- Investigate and analyse a range of existing products.

Technical knowledge

- Apply understanding of computing to program, monitor and control products.
- Understand and use electrical systems in products, such as series circuits incorporating switches, bulbs, buzzers and motors.
- Understand and use mechanical systems in products, such as gears, pulleys, cams, levers and linkages.
- Apply understanding of how to strengthen, stiffen and reinforce more complex structures.

Cooking and nutrition

- Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.
- Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.
- Understand and apply the principles of a healthy and varied diet.

Each term, the relevant knowledge organiser and musical vocabulary will be shared with pupils. Assessment will draw on listening, composing and performance outcomes across the six units taught during the year.

Curriculum overview

	Year 3/4	Year 4/5	Year 5/6
Units	Textiles – fastenings Torches Tarts (TBC)	Bridges Microbit Bolognaise	Come Dine with Me Mechanical systems Digital world

Progression: Design

Skills

Year 3/4	Year 4/5	Year 5/6
• Noticing simple problems or needs in their everyday life. • Using empathy and conducting simple surveys to recognise the needs of others. • Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. • Taking part in structured idea-generation sessions. • Coming up with more ideas and considering the feasibility of their ideas in the classroom. • Beginning to use 2D CAD software to communicate their ideas. • Developing drawing and sketching skills with a focus on clarity and simplicity. • Developing designs by adding detail and justifications about materials, tools, methods. • Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches,	• Identify needs or problems beyond immediate personal experience and use simple research to understand a target user. • Create design criteria that consider function, appeal and user needs, beginning to include constraints such as materials, environmental impact and cost. • Generate several feasible ideas independently and discuss their practicality and originality. • Communicate ideas through increasingly detailed annotated sketches, diagrams, prototypes and appropriate CAD. • Use prototypes to test, refine and improve design ideas before making.	• Noticing wider-reaching problems or needs in the community. • Identifying a wide range of needs and potential barriers through market research. • Identifying more complex problems that consider multiple factors and constraints with guidance. • Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. • Developing more independence in generating ideas. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Using 3D CAD software to communicate their ideas. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.

Year 3/4	Year 4/5	Year 5/6
cross-sectional diagram, thumbnail sketches and exploded diagrams). • Creating prototypes using materials with similar properties to their final design.		• Using a series of prototypes to refine and improve their designs.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that a problem or need is something that a designer can help to solve. • To know that a target audience is a group of people that might like the idea. • To know that thinking together can help generate ideas. • To know that not everything can be made in the classroom. • To know that CAD is computer-aided design. • To know that CAD can be used to better communicate ideas. • To know that extra information on drawings or diagrams can help the user understand a design or idea. • To know that thumbnail sketches are less detailed quick sketches. • To know that a cross-sectional diagram shows the inside of a product. • To know that an exploded diagram shows how the parts of a product fit together. • To know that a prototype is a detailed model that helps a user understand how a product will work.	• To know that designers solve problems for users and that research helps identify needs. • To know that design criteria describe what a successful product should achieve. • To know that a constraint is a limit or condition that affects a design. • To know that annotations, cross-sectional/exploded diagrams and CAD can communicate design ideas clearly. • To know that prototypes can be tested and improved before a final product is made.	• To know that problems can be large and small. • To know that market research is a way of collecting information about problems or needs. • To know that a constraint is a limit or condition when making a product. • To know that environmental impact is how the product and making the product might affect the environment. • To know that different materials have different costs. • To know that original and innovative ideas are different from what has been made before. • To know that drawings and diagrams can be communicated in 3D. • To know that annotations are detailed labels and comments on diagrams. • To know that improving on prototypes can help to improve the final design.

Make

Skills

Year 3/4	Year 4/5	Year 5/6
• Ordering the main stages of making into a plan. • Selecting materials, components or ingredients from a wider choice but within a limited design space (e.g. seasonal ingredients from May and June in the UK). • Selecting materials, components or ingredients based on their form as well as their functional properties. • Explaining their choices with regard to function and form. • Selecting equipment required for a series of tasks based on the plan. Explain why each piece is suitable for each stage. • Suggesting simple safety rules based on their understanding of tool dangers. • Participating in discussions about classroom safety procedures. • Following detailed safety instructions. • Marking and measuring: Using a ruler accurately to measure and mark straight lines. • Cutting: Cutting more complex shapes and a wider range of materials and foods accurately and safely (e.g. using a bridge or claw hold when chopping foods). • Joining: Joining materials securely by selecting and applying appropriate joining methods for the material and purpose. • Shaping: Creating and refining accurate 2D and 3D shapes to suit the function of a product. • Finishing: Applying precise and varied finishing techniques to enhance appearance and surface quality.	• Create an ordered, step-by-step plan and identify the materials, tools and equipment required. • Select materials and components for their functional and aesthetic properties and explain choices. • Choose suitable equipment with increasing independence and consider which tools work effectively together. • Identify risks, follow safety procedures consistently and explain why key rules are needed. • Measure, mark, cut, join, shape and finish with increasing accuracy, selecting techniques appropriate to the material and purpose.	• Producing lists of equipment, materials and tools that they need for a task. • Creating a step-by-step plan for making. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research. • Considering which equipment will work well together. • Choosing from the known range of equipment available to them with little guidance. • Assessing risks associated with different tools and equipment. • Understanding and explaining the importance of each safety rule. • Consistently apply safety instructions. • Marking and measuring: Measuring and marking to a greater degree of accuracy to support more complex designs and components. • Cutting: Using appropriate cutting tools and techniques to achieve accurate and aesthetic cuts. • Joining: Selecting and applying joining methods to create strong, durable and well-finished products. • Shaping: Shaping and refining materials and components to balance aesthetics and functionality. • Finishing: Selecting and applying finishes to enhance appearance and protect the product.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that ordering the steps of a build can make it easier. • To know that form is the look and shape of something. • To know that function is what something does and how it works. • To know that different pieces of equipment will be used at different stages in a plan. • To know that different tools and equipment have different dangers. • Marking and measuring: To know that a ruler is used to measure and mark length precisely. • Cutting: To know that different tools and techniques are suited to specific materials and levels of resistance. • Joining: To know that stronger and long lasting joins may be needed depending on the materials and how the product will be used. • Shaping: To know that accurate shaping and refining of 2D and 3D forms improves appearance and performance. • Finishing: To know that finishing techniques can improve both the look and performance of a product.	• To know that careful planning improves the efficiency and accuracy of making. • To know that form describes how something looks and function describes what it does. • To know that material properties and research help determine suitable choices. • To know that different tools present different risks and require specific safety procedures. • To know that accuracy in measuring, cutting, joining and finishing affects how well a product looks and works.	• To know that materials and equipment lists help to plan better. • To know that aesthetics are the way something looks. • To know that research can help decide on form and function. • To know that some equipment can work well with other equipment. • To know that risks are things that might go wrong. • Marking and measuring: To know that precise measuring and marking are essential for parts to fit and function correctly. • Cutting: To know that precision in cutting affects how well parts fit, function and look. • Joining: To know that joins may need reinforcement or adjustment to improve strength and stability. • Shaping:To know that the form of a product influences how it looks, feels and performs. • Finishing: To know that finishes can improve durability, protect materials and make products suitable for different uses or environments.

Evaluate

Skills

Year 3/4	Year 4/5	Year 5/6
• Investigating and analysing a range of existing products by looking at their functionality and appeal. • Analysing why specific products, designers or inventors are successful. • Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. • Evaluating how effective their chosen materials and tools were in fulfilling the design brief. • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. • Reflecting on feedback to decide if and how it could be used to improve future iterations.	• Investigate existing products for function, appeal, usability and sustainability and use findings to inform design decisions. • Evaluate designs and final products against increasingly detailed design criteria. • Consider whether different materials, tools or techniques would improve a product. • Give specific, constructive feedback and use relevant feedback to refine a product. • Explain changes made during evaluation and the impact of those changes.	• Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. • Evaluating the work of a range of designers to help inform their designs. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Considering alternative materials, tools or techniques that could enhance the product. • Providing feedback that is helpful, specific, and encouraging. • Incorporating feedback from peers or users improve their product further, explaining the changes they made and the impact they had.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that some products are more successful than other because of their function. • To know that designers and inventors create products. • To know that choices of materials and equipment can affect the final product. • To know that feedback is ideas and suggestions from other people that can help improve their work. • To know that the better the suggestions the better the feedback. • To know that they can choose to use feedback or not.	• To know that successful products balance function, appearance and user needs. • To know that material and tool choices affect the quality of a final product. • To know that sustainability includes considering materials and how a product is made. • To know that detailed evaluation identifies successful and less successful aspects of a product. • To know that useful feedback is positive, specific and focused on improvement.	• To know that sustainability means thinking about the materials that were used to make a product and how the product was made. • To know that looking at other designers work can help inform designs. • To know that their final product can still be improved by different materials or techniques. • To know that evaluating their designs in detail will help them understand its successful and less successful parts. • To know that feedback should be positive, helpful and specific. • To know that explaining how they used feedback to improve their design can help them create better products in the future.

Progression in technical knowledge

The technical areas below are best read vertically across the three mixed-age classes. Not every area appears as a discrete unit in every class, but the statements show the intended progression when that technical knowledge is encountered.

Mechanisms

Skills

Year 3/4	Year 4/5	Year 5/6
• Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. • Evaluating the work of a range of designers to help inform their designs. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Considering alternative materials, tools or techniques that could enhance the product. • Providing feedback that is helpful, specific, and encouraging. • Incorporating feedback from peers or users improve their product further, explaining the changes they made and the impact they had.	• Identify mechanisms within mechanical systems and describe the movement they create. • Recognise different directions and types of movement and begin to explain how mechanisms can change movement. • Explore how gears, pulleys, cams, axles and followers can be combined to create a desired output.	• Naming which mechanisms work together to make a mechanical system. • Recognising that there are different directions of movement. • Understanding that some mechanical systems allow a small input force to be turned into a greater output force. • Recognising that mechanisms can change one type of movement to another. • Recognising mechanical systems that use gears in everyday objects (e.g. a bicycle, clock). • Using cams to change motion as desired.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that sustainability means thinking about the materials that were used to make a product and how the product was made. • To know that looking at other designers work can help inform designs. • To know that their final product can still be improved by different materials or techniques. • To know that evaluating their designs in detail will help them understand its successful and less successful parts. • To know that feedback should be positive, helpful and specific. • To know that explaining how they used feedback to improve their design can help them create better products in the future.	• To know that mechanisms are parts that work together in a mechanical system. • To know that movement can be circular, linear, up and down, back and forth or side to side. • To know that mechanisms can transfer or change movement and force. • To know that cams, axles and followers work together and that different cam profiles create different movements.	• To know that movement can be up and down, back and forth, side to side, circular. • To know that there are different names for the types of movement. • To know that some mechanisms change one type of movement to another. • To know that gears and pulleys allow us to transfer movement and force from one part of a mechanical system to another. • To know that gears allow us to increase the output of a mechanism. • To know that cams, axles and followers work together to create movement. • To understand that different cam shapes produce different movements. • To know that cams allow us to change a rotary input to a linear output. • To know that rotating the axles and cams makes the follower move. • To understand that the cam profile changes the movement of the follower.

Structures

Skills

Year 3/4	Year 4/5	Year 5/6
• Beginning to understand how different structures are built. • Constructing a range of 3D shapes. • Stiffening structures. • Strengthening structures by ribbing. • Making a variety of free standing shell structures of different shapes and sizes.	• Construct and compare shell and frame structures. • Strengthen and stiffen structures using techniques such as layering, ribbing, bracing and triangulation. • Identify weak points in a structure and select an appropriate reinforcement.	• Understanding how to reinforce structures to make them more stable. • Creating a frame structure using strong shapes, like triangles. • Identifying where a structure needs reinforcement. • Using triangulation to strengthen or stabilise a structure.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know how a range of structures are built. • To know a shell structure is a hollow shape with a thin outer layer. • To know that 3D shapes can form structures. • To know that structures can be strengthened by manipulating materials and shapes. • To stiffen structures by layering. • To strengthen structures by layering materials (lamination). • To strengthen structures by ribbing.	• To know the difference between shell and frame structures. • To know that materials and shapes can be manipulated to strengthen structures. • To know that triangles, bracing and reinforced joins can improve stability and strength.	• To know a frame structure supports or holds a shape, and is made up of strong parts joined together, like a skeleton or a climbing frame. • To know how to reinforce structures. • To know that triangles can be used to reinforce structures. • To know that adding materials to the corners of frames can strengthen the join. • To know that triangles can create strong and stable structures. • To know that bracing is a way of reinforcing a structure.

Textiles

Skills

Year 3/4	Year 4/5	Year 5/6
• Threading needles with greater independence. • Sewing with smaller needles to create smaller stitches. • Selecting similar or different colour thread to hide or show the stitch. • Creating a template. • Sewing cross stitch to decorate or join fabric. • Decorating fabric using appliqué. • Stuffing and sewing to finish a product. • Making and testing a paper template. • Incorporating a fastening to a design. • Sewing using a running stitch.	• Thread a needle independently and use increasingly small, regular stitches. • Use templates accurately to mark and cut fabric. • Select and use stitches for joining or decoration, including running, cross and blanket stitch as appropriate. • Use appliqué, fastenings and simple attachments such as buttons to meet a design purpose.	• Threading needles independently. • Beginning to follow simple patterns or templates that require accurate cutting or measuring. • Sewing a blanket stitch to join fabric. • Sewing using a blanket stitch with even a regular spaces between the stitches. • Using pins effectively to secure a template to fabric without creases or bulges. • Attaching objects like buttons using thread. • Tying strong knots.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that smaller stitches with similar colour thread to the fabric can hide the stitching. • To know that thread of a different colour to the fabric will make the stitch more decorative. • To know that appliqué is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. • To know that when two edges of fabric have been joined together it is called a seam. • To know that it is important to leave space on the fabric for the seam. • To know that some products are turned inside out after sewing so the stitching is hidden. • To know that different fastening types are useful for different purposes. • To know that a fastening is something that holds two pieces of material together.	• To know that templates support accurate marking and cutting. • To know that stitch size, spacing and thread colour affect strength and appearance. • To know that seams join fabric and may be hidden by turning a product inside out. • To know that different stitches and fastenings are suited to different purposes.	• To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. • To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. • To know that complete products are sometimes made in parts that are sewn together. • To know that consistently sized stitches improve the aesthetic of a product.

Cooking and nutrition

Skills

Year 3/4	Year 4/5	Year 5/6
• Identifying foods with different nutritional properties. • Recognising the seasonality of foods. • Understanding that many foods are imported from other countries. • Following the instructions within a recipe. • Tasting seasonal ingredients. • Selecting seasonal ingredients. • Peeling ingredients safely. • Cutting safely with a vegetable knife. • Following a baking recipe, including the preparation of ingredients. • Cooking safely, following basic hygiene rules.	• Follow and adapt recipes with increasing independence, measuring and preparing ingredients safely. • Identify nutritional properties and consider how substitutions alter nutritional value. • Recognise seasonality, food origins and the journey from farm to fork. • Use appropriate hygiene procedures and explain how to reduce cross-contamination.	• Understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Recognising that meat is farmed and reared. • Adapting a traditional recipe. • Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Following a step by step method carefully to make a recipe. • Knowing how to avoid cross-contamination. • Identifying the flavours of different foods. • Pairing foods based on their flavours.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that similar coloured fruits and vegetables often have similar nutritional benefits. • To know that the appearance of food is as important as taste. • To know which foods are grown in the UK in a specified season. • To know which foods can be cut and peeled using equipment. • To know that the amount of an ingredient in a recipe is known as the 'quantity.' • To know that safety and hygiene are important when cooking. • To know the following cooking techniques: sieving, measuring, stirring, cutting out and shaping.	• To know that climate and season affect where and when foods are grown. • To know that recipes can be adapted for nutrition, dietary needs and flavour. • To know that food can be grown, reared or imported and may pass through several stages before consumption. • To know that safe preparation, hygiene and avoiding cross-contamination are essential when cooking.	• To understand where meat comes from. • To know that recipes can be adapted to suit nutritional needs and dietary requirements. • To know that I can use a nutritional calculator to see how healthy a food option is. • To know that adapting means changing ingredients. • To know how the steps in a recipe fit together and what happens if they are changed. • To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. • To know that coloured chopping boards can prevent cross-contamination. • To know that flavour is how a food or drink tastes.

Electrical systems

Skills

Year 3/4	Year 4/5	Year 5/6
• Recognising and exploring everyday electrical products. • Identifying some electrical components. • Using batteries and other electrical components safely. • Creating a working electrical circuit. • Incorporating switches into circuits.	• Identify common electrical components and create complete working circuits safely. • Use switches and a wider range of components to achieve a desired function. • Apply relevant science knowledge when testing and improving an electrical product.	• Beginning to understand that electricity flows around a circuit. • Using different components to produce different results from electrical systems. • Creating working electrical circuits with a wider variety of electrical components. • Deconstructing electrical systems to understand how they work. • Apply knowledge from science to improve the function of an electrical system.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. • To know some common features of an electric product (e.g. switch, battery, plug, dials, buttons, etc). • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow. • To know that a switch can be used to complete and break an electrical circuit.	• To know that an electrical system contains components that work together in a circuit. • To know that a complete circuit is needed for electricity to flow and that switches can make or break a circuit. • To know that different components produce different outputs and that motors convert electricity into rotational movement.	• To know that an electric motor converts electricity into rotational movement. • To know a motorised product is one which uses a motor to function. • To know the names of components that can form an electrical system.

Digital world

Skills

Year 3/4	Year 4/5	Year 5/6
• Beginning to use understanding from computing to control products. • Begin to use a micro:bit as the starting point for a product. • Using code to control button presses. • Using code to sense light. • Using code to monitor time. • Using a micro:bit simulator to test code.	• Use computing knowledge and a micro:bit to control or monitor a product. • Use variables, loops and sensor inputs within simple programs. • Test code in a simulator and refine it so a product responds to specified conditions. • Begin to use conditional statements to trigger an output such as a light or sound.	• Designing products that require an understanding from computing to work. • Understanding the functions of the micro:bit and use these when creating products. • Using code that triggers an alert such as a sound or light.

Knowledge

Year 3/4	Year 4/5	Year 5/6
• To know that creating simple programs can help control products. • To know some features of a micro:bit. • To know that loops and variables can be used in programmable products. • To know that a simulator is able to replicate the functions of an existing piece of technology.	• To know that programs can control products and that a micro:bit contains useful inputs and outputs. • To know that loops and variables can be used in programmable products. • To know that a simulator can replicate functions for testing. • To know that conditional statements can be used to monitor and control a product.	• To know that coding can complete tasks when used with a device such as a micro:bit. • To know the features of a micro:bit that are useful for the product. • To know that conditional statements (and, or, if) can be used to monitor and control products. • To know that some micro:bit functions can detect movement.

Year 3/4

Textiles – fastenings

Key knowledge	Key skills	Key vocabulary
• To know that a fastening is something that holds two pieces of material together. • To know that different fastening types are useful for different purposes. • To know that creating a mock-up (prototype) of their design is useful for checking ideas and proportions.	• Writing design criteria for a product, articulating decisions made. • Designing a personalised book sleeve. • Making and testing a paper template with accuracy and in keeping with the design criteria. • Measuring, marking and cutting fabric using a paper template. • Selecting a stitch style to join fabric. • Sewing neatly using small regular stitches. • Incorporating a fastening to a design. • Testing and evaluating an end product against the original design criteria. • Show all	• criteria • fabric • fastening • fix • mock-up • stitch • template

Year 3/4

Torches

Key knowledge	Key skills	Key vocabulary
• Electrical conductors are materials which electricity can pass through. • Electrical insulators are materials which electricity cannot pass through. • A battery contains stored electricity that can be used to power products. • An electrical circuit must be complete for electricity to flow. • A switch can be used to complete and break an electrical circuit.	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. • Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria. • Evaluating electrical products. • Testing and evaluating the success of a final product.	• battery • bulb • buzzer • circuit diagram • component • conductor • electrical item • electricity • electronic item • insulator • series circuit • switch • target audience • test • torch • wire

Year 3/4

Tarts (TBC)

Key knowledge	Key skills	Key vocabulary

Year 4/5

Bridges

Key knowledge	Key skills	Key vocabulary
• Some different ways to reinforce structures. • Triangles can be used to reinforce bridges. • Material selection is important based on properties. • The material (functional and aesthetic) properties of wood. • The difference between arch, beam, truss and suspension bridges. • How to carry and use a saw safely. • Properties are words that describe the form and function of materials.	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation. • Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saw safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriate materials is an important part of the design process. • Understanding basic wood functional properties. • Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.	• accuracy • arch bridge • assemble • beam bridge • bench hook/vice • corrugation • factors • hardwood • joints • lamination • mark out • material properties • quality of finish • reinforce • rigid • sandpaper • softwood • tenon saw/coping saw • truss bridge

Year 4/5

Microbit

Key knowledge	Key skills	Key vocabulary
• A device means equipment created for a certain purpose or job and that monitoring devices observe and record. • A sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. • Conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met.	• Researching (books or internet) for a particular animal's needs. • Developing design criteria based on research. • Generating multiple housing ideas using building bricks. • Understanding what a virtual model is and the pros and cons of traditional and CAD modelling. • Placing and manoeuvring 3D objects using CAD. • Changing the properties of or combining one or more 3D object using CAD. • Understanding the functional and aesthetic properties of plastics. • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature moves out of a specified range. • Stating an event or fact from the last 100 years of plastic history. • Explaining how plastic affects planet Earth and suggesting ways to make more sustainable choices. • Explaining key functions in their program (audible alert or visuals). • Explaining how the product's programmed features would be useful for an animal carer.	• alert • ambient • boolean • CAD • design brief • design criteria • device • electronic • group • loop • model • monitor • monitoring device • plastic • plastic pollution • programming comment • sensor • sustainability • synthetic • thermometer • Tinkercad • ungroup • value • variable • versatile • workplane

Year 4/5

Bolognaise

Key knowledge	Key skills	Key vocabulary
• That beef comes from cows reared on farms. • That recipes can be adapted to suit nutritional needs and dietary requirements. • That nutritional information is found on food packaging. • That coloured chopping boards can prevent cross-contamination. • That food packaging serves many purposes.	• Explaining the farm-to-fork process. • Researching existing recipes. • Suggesting alternative ingredients. • Analysing nutritional content. • Writing an alternative recipe. • Understanding cross-contamination. • Using preparation skills. • Designing a jar label. • Making a developed recipe.	• abattoir • adaptation • balanced • beef • brand • cook • cross-contamination • cut • design • enhance • equipment • evaluate • farm • grate • hygiene • ingredients • label • measure • nutrient • nutrition • nutritional value • preference • press • process • recipe • safety • theme • Year 5/6

Year 5/6

Come Dine with Me

Key knowledge	Key skills	Key vocabulary
• That 'flavour' is how a food or drink tastes. • That many countries have 'national dishes' which are recipes associated with that country. • That 'processed food' means food that has been put through multiple changes in a factory. • That it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. • What happens to a certain food before it appears on the supermarket shelf (farm to fork).	• Writing a recipe, explaining the key steps, method and ingredients. • Including facts and drawings from research undertaken. • Following a recipe, including using the correct quantities of each ingredient. • Adapting a recipe based on research. • Working to a given timescale. • Working safely and hygienically with independence. • Evaluating a recipe, considering: taste, smell, texture and origin of the food group. • Taste testing and scoring final products. • Suggesting and writing up points of improvements in productions. • Evaluating health and safety in production to minimise cross contamination.	• balance • bitter • bridge method • complement • cookbook • cross-contamination • enhance • equipment • farm to fork • flavours • ingredients • method • pairing • preparation • recipe • research • salty • sour • storyboard • sweet • umami

Year 5/6

Mechanical systems

Key knowledge	Key skills	Key vocabulary
• Which mechanisms are working together to make a mechanical system. • That there are different directions of movement. • That mechanisms can change one type of movement to another.	• Noticing wider-reaching problems or needs in the community. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. • Producing lists of equipment, materials and tools that they need for a task. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research. • Considering which equipment will work well together. • Choosing from the known range of equipment available to them with little guidance. • Assessing risks associated with different tools and equipment. • Understanding and explaining the importance of each safety rule. • Consistently apply safety instructions. • Cutting jelutong or other harder wood with a coping saw or a tenon saw in small groups. • Cutting in a back-and-forth sawing motion where appropriate. • In supervised groups, using hot glue guns safely. • Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Providing feedback that is helpful, specific and encouraging. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.	• accurate • automata • axle • bench hook • cam • cam profile • component • cross-sectional diagram • diagram • dowel • evaluate • exploded diagram • follower • form • frame • function • housing • mechanism • storefront • visual

Year 5/6

Digital world

Key knowledge	Key skills	Key vocabulary
• Problems can be large and small. • Market research is a way of collecting information about problems or needs. • Environmental impact is how making the product and the product itself might affect the environment. • Different materials have different costs. • Original and innovative ideas are different from what has been made before. • Drawings and diagrams can be communicated in 3D. • Improving on prototypes can help to improve the final design. • Aesthetics are the way something looks. • Research can help decide which materials are best for both aesthetics and functional properties. • Some equipment can work well with other equipment. • Risks are things that might go wrong. • The shape of an object can affect both its aesthetics and function. • The finish can make a product suitable for use outside. • Sustainability means thinking about the materials that were used to make a product and how the product was made. • Looking at other designers' work can help inform designs. • Their final product can still be improved by using different materials or techniques. • Evaluating their designs in detail will help them understand their successful and less successful parts. • Feedback should be positive, helpful and specific. • That explaining how they used feedback to improve their design can help them create better products in the future. • Coding can complete tasks when used with a controller like the micro:bit. • Features of a micro:bit that are useful for the product. • Conditional statements (and, or, if) in programming can be used to monitor and control products.	• Noticing wider-reaching problems or needs in the community. • Identifying more complex problem statements that consider multiple factors and constraints with guidance. • Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. • Developing more independence in generating ideas. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about the practicality and originality. • Using 3D CAD software to communicate their ideas. • Using a series of prototypes to refine and improve their designs. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research. • Considering which equipment will work well together. • Balancing aesthetics and functionality when creating parts of a design. • Considering when best to apply finishing effects. • Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. • Evaluating the work of a range of designers to help inform their designs. • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Considering alternative materials, tools or techniques that could enhance the product. • Providing feedback that is helpful, specific and encouraging. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had. • Designing products that require an understanding of computing to work. • Understand the functions of the micro:bit and use these when creating products. • Designing, writing and debugging programs that show directions.	• Some micro:bit functions can detect movements. • aesthetic • alternative • constraints • design criteria (KS1) • innovative • iteration (LKS2) • target audience (LKS2) • user (KS1)