

Baydon St Nicholas Progression of Skills and Knowledge in DT by Strand

Knowledge

Knowledge	Design	Make	Evaluate	Technical Knowledge
KS1	- Identifying needs and problems - To know that different users may want different things from a design. - To know that the 'user' is the person who will use the product. - To know that designers usually design and make something to solve a problem. - Developing for a user - To know that who they are designing for makes a difference to what they design. - To know that the purpose is what something is for. - To know that a design brief helps to decide what to make. - To know that design criteria are the steps for making a product successful. - Generating ideas - To know that existing products can help when deciding what to design. - To know that the design criteria help when thinking of ideas. - To know that different products work in different ways and have parts that make them work. - Communicating ideas - To know that drawings are a way to explain ideas. - To know that drawings can help explain how something works. - To know that a label explains part of a drawing.	Planning To know that a plan is deciding what to do first and next. Selecting materials To know that choosing different materials or components will have an effect on what their product does or looks like. To know some properties of materials like hard, soft, flexible, waterproof, strong etc. Tool safety To know that some tools are sharp, such as scissors and knives. To know that following instructions means using tools safely. To know that some tools are sharp like scissors and knives. To know that following instructions means using tools safely. Tool use Marking and measuring: To know that straight lines, equal spacing and finding the middle of an object help to make products more accurate. Marking and measuring: To know that length can be measured and marked to improve the accuracy of products. Cutting: To know that different tools and techniques are used to cut materials and soft foods safely and accurately. Cutting: To know that changing grip and how a material is held can make cutting safer and more accurate. Joining: To know that materials can be joined in different ways to create a secure and neat finish. Joining: To know that careful alignment and neat application make a join stronger and tidier. Shaping: To know that tools are used to change the shape of different materials. Shaping: To know that templates and geometric shapes can help create accurate forms that improve how a product works. Finishing: To know that texture and careful colouring improve how a product looks and feels. Finishing: To know that balanced and consistent finishing improves the overall appearance of their product.	Evaluating existing products To know that some products will be better than others. To know that existing products can be evaluated against design criteria. Evaluating own ideas and products To know that their ideas or products can be made better. To know that their final product might be different to their original idea. To know that design criteria help to decide if their product is a success. To know what different tools and equipment do. Giving and receiving feedback To know that their ideas can make someone else's work better. To know that other people's ideas can help make their work better. To know that improve means to make something better. To know that their suggestions can improve someone else's work.	Mechanisms To know that many moving objects contain internal parts to help them function. To know that mechanisms usually limit unwanted movement. Key knowledge by unit To know that a slider mechanism moves an object in a straight line (e.g. left/right, up/down). To know that sliding mechanisms are designed to keep movement in one direction (e.g. using guides/rails etc). To know that an axle allows the wheel to turn without falling off. To know that a pivot is the part that a lever moves around. Structures To know that a structure is something that has been made and put together. To understand that the shape of a structure affects its strength. Key knowledge by unit To know that stable structures do not topple. To know that shapes and structures with wide, flat bases or legs are the most stable. To know that adding weight to the base of a structure can make it more stable. To know that materials can be manipulated to improve strength and stiffness. To know that a 'strong' structure is one which does not break easily. To know that a 'stiff' structure or material is one which does not bend easily. Textiles To know that sewing is a method of joining fabric. Key knowledge by unit To know that evenly spaced stitches help when following a pattern. To know that 'joining' means connecting two pieces of material together. To know that there are various temporary methods of joining fabric by using staples, glue or pins. To know that a template (or fabric pattern) is used to cut out the same shape multiple times. Cooking and Nutrition To know that fruits grow on trees or vines. To know that vegetables can grow either above or below ground. To know that vegetables are any edible part of a plant (e.g. potatoes are roots, lettuce is leaves, cucumber is a fruit). To know that 'diet' means the food and drink that a person or animal usually eats. To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. To know that a balanced diet is eating foods from different food groups. Key knowledge by unit To know that a fruit has seeds. To know that 'ingredients' means the items in a mixture or recipe. To know that different foods have different appearance, taste and smell. To know that kitchen equipment can be used to prepare foods.

Knowledge	Design	Make	Evaluate	Technical Knowledge
Year 3 & 4	- Identifying needs and problems - To know that a problem or need is something that a designer can help to solve. - Developing for a user - To know that a target audience is a group of people that might like the idea. - Generating ideas - To know that thinking together can help generate ideas. - To know that not everything can be made in the classroom. - Communicating ideas - 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.	Planning To know that ordering the steps of a build can make it easier. Selecting materials To know that form is the look and shape of something. To know that function is what something does and how it works. Selecting equipment To know that different pieces of equipment will be used at different stages in a plan. Tool safety To know that different tools and equipment have different dangers. Tool use 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.	Evaluating existing products To know that some products are more successful than others because of their function. To know that designers and inventors create products. Evaluating own ideas and 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. Giving and receiving feedback To know that the better the suggestions the better the feedback. To know that they can choose to use feedback or not.	Mechanisms Key knowledge by area To understand that a mechanical system can allow us to move something more easily. To know that mechanical systems have more than one mechanism that moves to make them work. To know that mechanical systems are often hidden in products to make them look more appealing. Key knowledge by unit To know that pushing air can be used to move a mechanism. To know that linkages can be used to create more movement in a mechanical system. To know that a combination of mechanisms can improve a product. To know that by using a mechanical system, they can make the car go further. To know that either the wheels move around the axle or with the axle and the advantages and disadvantages of each. Structures Key knowledge by area To know how a range of structures are built. To know that 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. Key knowledge by unit To stiffen structures by layering. To strengthen structures by layering materials (lamination). To strengthen structures by ribbing. Textiles Key knowledge by area 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. Key knowledge by unit 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. Cooking and Nutrition 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. Key knowledge by unit 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. Electrical Systems 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). Key knowledge by unit 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. Digital World Key knowledge by area To know that creating simple programs can help control products. To know some features of a micro:bit. Key knowledge by unit 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.

Knowledge	Design	Make	Evaluate	Technical Knowledge
Year 5 & 6	Identifying needs and problems 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. Developing for a user 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. Generating ideas To know that original and innovative ideas are different from what has been made before. Communicating ideas 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.	Planning To know that materials and equipment lists help to plan better. Selecting materials To know that aesthetics are the way something looks. To know that research can help decide on form and function. Selecting equipment To know that some equipment can work well with other equipment. Tool safety To know that risks are things that might go wrong. Tool use 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.	Evaluating existing products 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. Evaluating own ideas and products 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. Giving and receiving feedback 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.	Mechanisms Key knowledge by area 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. Key knowledge by unit 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 Key knowledge by area 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. Key knowledge by unit 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 Key skills by unit 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. Key knowledge by area To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. Key knowledge by unit 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 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. Key knowledge by unit 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 Key knowledge by area To know that an electric motor converts electricity into rotational movement. To know a motorised product is one which uses a motor to function. Key knowledge by unit To know the names of components that can form an electrical system. Digital World 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. Key knowledge by unit 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.

Skills

SKILLS	Design	Make	Evaluate	Technical Knowledge
KS1	Identifying needs and problems Thinking about what others might want from a design. Beginning to recognise how products and designs in the world around us solve certain needs. Developing for a user Considering who they are designing for - identifying the user. Stating what they intend to make and why - identifying the purpose. Using a simple design brief that outlines the intended use, target user and key features of the product, to create simple design criteria. Generating ideas Talking about ideas, with purpose and user in mind. Talking about existing products when generating ideas. Creating ideas with design criteria in mind. Referring to specific parts of existing products when generating ideas. Communicating ideas Using basic drawing skills to communicate ideas. Using labels to explain parts of a design, label materials etc, including using ICT. Integrating moving parts when creating mock-ups.	Planning Planning more than one step ahead. Selecting materials Choosing between a small number of materials, ingredients or components. Explaining their choices based on personal experiences. Choosing materials, ingredients or components from a wider range of materials, ingredients or components. Explaining their choices based on the properties of materials and components. Selecting equipment Requesting equipment appropriate to the purpose (e.g. scissors for cutting, glue for joining). Selecting from a wider range of equipment some of which are used for the same purpose (e.g. joining by sewing instead of glue). Tool safety Explaining in simple terms why certain tools must be handled carefully. Following and recalling simple safety instructions. Explaining in simple terms why certain tools must be handled carefully. Following and recalling simple safety instructions. Tool use Marking and measuring: Measuring, marking and spacing materials accurately using simple tools and by identifying midpoints. Marking and measuring: Measuring, marking and spacing lines of a given length using simple tools. Cutting: Cutting straight and spaced lines, larger shapes and simple holes safely and with control. Cutting: Cutting a range of materials with improving control by adjusting grip and positioning the material carefully. Joining: Joining materials using glue, tape or simple stitching. Joining: Joining materials by aligning edges carefully and applying glue or stitches neatly and evenly. Shaping: Using simple tools to shape materials by cutting and forming. Shaping: Using templates and known shapes to create and adapt forms for a purpose. Finishing: Finishing products using controlled colouring and simple textures. Finishing: Applying consistent brush/pen/pencil strokes to create balance in their finishing.	Evaluating existing products Discussing existing products, saying what they like about them. Comparing two products and discuss which is better for a specific purpose. Discussing a range of existing products and saying what they like and dislike about them. Comparing a range of products and explaining why some better meet different design criteria than others. Evaluating own ideas and products Discussing how their products could be improved based on personal preferences. Comparing their finished products with their original designs. Evaluating their ideas and creations against simple design criteria. Discussing whether they were able to use the tools and techniques effectively. Giving and receiving feedback Saying what they like about their peers' designs and products. Accepting feedback and understanding it is meant to improve their work. Suggesting improvements to their peers' designs and products.	Mechanisms Key skills by area Recognising and exploring everyday objects that have mechanisms. Key skills by unit Recognising everyday objects that use a slider mechanism (e.g. drawers, sliding doors, a paper trimmer). Recognising everyday objects that utilise wheels and axles (shopping trolley, car, revolving door). Recognising that wheels must be able to turn to work effectively. Exploring everyday objects that use levers (e.g. scissors, tongs, door handle, stapler). Structures Key skills by area Recognising that different structures are used for different purposes. Exploring the features of structures. Describing structures as buildings or freestanding structures. Key skills by unit Making stable structures from card. Creating supporting structures to aid stability. Using stable objects, such as cylinders, to create structures. Building a strong and stiff structure by folding paper. Folding to strengthen or stiffen. Comparing the stability of different shapes. Identifying the weakest part of a structure. Textiles Key skills by area Discussing fabric properties. Threading large needles. Rehearsing sewing techniques with large needles and thick thread like wool. Sewing a running stitch in large-weave embroidery fabric or hessian. Beginning to sew stitches into a fabric. Key skills by unit Creating patterns and following them with stitching. Spacing stitches evenly. Pinning fabric to a template. Selecting fabric for sewing. Sewing a running stitch, with evenly spaced, neat, even stitches to join fabric. Cooking and Nutrition Key skills by area Understanding where fruits and vegetables come from. Selecting foods to create a balanced recipe. Selecting foods based on their food group. Key skills by unit Chopping fruit and vegetables safely to make a smoothie. Juicing fruits safely to make a smoothie. Describing appearance, smell and taste. Chopping foods safely to make a wrap. Grating foods. Snipping smaller foods instead of cutting.

SKILLS	Design	Make	Evaluate	Technical Knowledge
Year 3 & 4	Identifying needs and problems Noticing simple problems or needs in their everyday life. Using empathy and conducting simple surveys to recognise the needs of others. Developing for a user Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. Generating ideas Taking part in structured idea-generation sessions. Coming up with more ideas and considering the feasibility of their ideas in the classroom. Communicating ideas 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, cross-sectional diagram, thumbnail sketches and exploded diagrams). Creating prototypes using materials with similar properties to their final design.	Planning Ordering the main stages of making into a plan. Selecting materials 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 Selecting equipment required for a series of tasks based on the plan. Explain why each piece is suitable for each stage. Tool safety Suggesting simple safety rules based on their understanding of tool dangers. Participating in discussions about classroom safety procedures. Following detailed safety instructions. Tool use 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.	Evaluating existing products 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 own ideas and products 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. Giving and receiving feedback 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.	Mechanisms Key skills by area Beginning to understand how mechanisms work. Key skills by unit Using a series of pivots to create linkages. Combining levers to create linkages. Recognising pneumatic systems in everyday objects (e.g. a car boot, an adjustable chair).Structures Key skills by area Beginning to understand how different structures are built. Key skills by unit 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. Textiles Key skills by area 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. Key skills by unit 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.Cooking and Nutrition Key skills by area Identifying foods with different nutritional properties. Recognising the seasonality of foods. Understanding that many foods are imported from other countries. Key skills by unit 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. Electrical Systems Key skills by area Recognising and exploring everyday electrical products. Key skills by unit Identifying some electrical components. Using batteries and other electrical components safely. Creating a working electrical circuit. Incorporating switches into circuits. Digital World Key skills by area Beginning to use understanding from computing to control products. Begin to use a micro:bit as the starting point for a product. Key skills by unit Using code to control button presses. Using code to sense light. Using code to monitor time. Using a micro:bit simulator to test code.

SKILLS	Design	Make	Evaluate	Technical Knowledge
Year 5 & 6	Identifying needs and problems 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. Developing for a user Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. Generating ideas 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. Communicating ideas 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. Using a series of prototypes to refine and improve their designs.	Planning Producing lists of equipment, materials and tools that they need for a task. Creating a step-by-step plan for making. Selecting materials Selecting materials, components or ingredients based on research or user needs. Explaining their choices, referring to their research. Selecting equipment Considering which equipment will work well together. Choosing from the known range of equipment available to them with little guidance. Tool safety Assessing risks associated with different tools and equipment. Understanding and explaining the importance of each safety rule. Consistently apply safety instructions. Tool use 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.	Evaluating existing products 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. Evaluating own ideas and products 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. Giving and receiving feedback 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.	Mechanisms Key skills by area 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. Key skills by unit Recognising mechanical systems that use gears in everyday objects (e.g. a bicycle, clock). Using cams to change motion as desired. Structures Key skills by area Understanding how to reinforce structures to make them more stable. Key skills by unit Creating a frame structure using strong shapes, like triangles. Identifying where a structure needs reinforcement. Using triangulation to strengthen or stabilise a structure. Textiles Key skills by area Threading needles independently. Beginning to follow simple patterns or templates that require accurate cutting or measuring. Knowledge Key skills by unit 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 knot Cooking and Nutrition 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. Key knowledge by unit 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 Key skills by area Beginning to understand that electricity flows around a circuit. Using different components to produce different results from electrical systems. Key skills by unit 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. Digital World Key skills by area Designing products that require an understanding from computing to work. Understanding the functions of the micro:bit and use these when creating products. Key skills by unit Using code that triggers an alert such as a sound or light.