Batheaston Church School

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Knowledge and Skills Progression for DT

Strand	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Design	Explore, use and refine a variety of artistic effects to express their ideas and feelings. **ELG** Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	Use knowledge of existing products to support plans for a similar product Describe, explore and investigate products that have been disassembled Construction kits, pictures, templates, mock-ups and captions to plan and design Talk about and describe the tools needed in order to complete the key tasks within a plan	Use knowledge of a range of products to inform plans and designs Talk about and disassemble products and describe their function Use simple prototypes, labelled sketches and detailed instructions in plans and designs Talk in depth about ideas, plans and reasons for choices	Use research to develop design criteria that are fit for purpose. Disassemble products and describe in detail their functions Use annotated sketches, cross-sectional, exploded diagrams and increasingly complex prototypes. Support discussions about ideas, plans and designs with relevant information	Generate plans and designs based on research and ideas that take account of the users' views and the intended purpose. Produce detailed designs and plans using prototypes, commentary and diagrams that include accurate measurements. Link discussions about ideas, plans and designs to the investigation, disassembly and evaluation of a range of products describing in detail their parts and their function.	Clarify and justify plans, designs and ideas by drawing upon and using a range of relevant sources of information. Produce detailed designs and plans drawn to scale from a range of viewpoints, using pattern pieces and computer-aided design packages effectively. Discuss ways in which ideas, plans and designs are formed and modify to ensure that the design criteria are met effectively.	Use research and exploration, such as the study of different cultures, to identify and understand user needs. Develop and communicate ideas using annotated sketches, detailed plans, 3D and mathematical modelling, oral and digital presentations and computer-based tools. Use a variety of approaches, **e.g., biomimicry and user-centred design to generate creative ideas and avoid stereotypical responses**
Make	Create collaboratively,	Explore and talk about the characteristics of an increasing range of	Select materials and components according to known	Select from and use a wide range of materials and	Select a range of appropriate tools to cut, shape and join	Select a range of appropriate tools to cut, shape and join	Select from and use a wider, more complex range of

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	sharing ideas, resources and skills. **ELG** Use a range of small tools, including scissors and paintbrushes. (Physical dev) **ELG** Make use of props and materials when role-playing characters in narratives and stories.	materials Select and use simple tools to cut and join a range of materials Use a straight edge to mark lines for cutting Join edge to edge using glue Curl paper Use a hole punch and stapler Select from a range of finishes to improve the appearance of a product Follow procedures for safety and hygiene	characteristics and functions Select and use and increasing range of tools to cut, shape and join materials and components Use a rule to measure and mark lines for cutting Make and use gluing tabs Make simple paper models, mock-ups and templates Select and appropriate way to improve the appearance of a product Follow procedures for safety and hygiene	components according to both functional and aesthetic qualities. Select and use tools and equipment to measure, mark out and shape materials and components. Use a hack saw and bench hook safely Insert paper fasteners for card linkages. Make increasingly complex paper models, mock-ups and templates. Select the most effective finish to enhance the appearance of a product. Follow procedures for safety and hygiene.	materials and components effectively. Select and use tools and equipment to measure, mark out and shape materials and components accurately. Use a G clamp effectively. Join and combine materials and components in permanent and temporary ways. Make a range of complex paper models, mock-ups and templates Produce a well-finished product that fulfils the functional and aesthetic design criteria. Follow procedures for safety and hygiene.	materials and components with accuracy and precision. Use an increasing range of tools and equipment to measure, mark out and shape materials and components accurately Use a drill to make an off-centre hole. Join and combine a range of materials and components using the most effective permanent and temporary way. Make and adapt where necessary complex mock-ups and templates. Identify and apply an appropriate finishing technique to ensure a high-quality end product which meeting the design criteria.	materials, components and ingredients, taking account of their properties. Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture. Use a broad range of manufacturing techniques including handcrafted skills and machinery to manufacture products precisely. Produce ordered sequences and schedules for manufacturing products, detailing resources required. Produce costings using spreadsheets for products they design and make.

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						Follow procedures for safety and hygiene.	Exploit the use of CAD/CAM equipment to manufacture products, increasing standards of quality, scale of production and precision. Follow procedures for safety and hygiene and understand the process of risk assessment.
Evaluate	Return to and build on their previous learning, refining ideas and developing their ability to represent them. **ELG** Share their creations, explaining the process they have used.	Talk about and describe key features of a range of products Explore and evaluate a range of existing products Begin to evaluate the success of products in terms of function and aesthetic criteria	Investigate and compare and range of existing products Compare and contrast the similarities and differences of products with the same function Evaluate ideas and products against design criteria; and suggest ways in which products can be improved	Investigate and begin to analyse a range of existing products. Use knowledge of similarities and differences between products with the same function to support identification of most effective product. Evaluate ideas and products against own design criteria, taking into account the views of others.	Investigate and use analysis of existing products to inform own work. Identify from a range the key features and functions needed to create an effective and efficient working product. Give reasons, supported by factual evidence for the success of aspects of a product.	Use analysis of existing products supported by accurate factual information to inform own work. Test and evaluate products to identify the variants which may affect the function of a product. Give reasons, supported by factual evidence for the success of aspects of a product and provide considered solutions to resolve	Understand developments in D&T, its impact on individuals, society and the environment. Test, evaluate and refine ideas and products against a specification, taking into account the views of intended users. Analyse the work of past and present professionals and others to develop and broaden understanding.

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						those parts that could be improved.	Investigate new and emerging technologies.
Axels, pulleys and gears	Use junk modelling materials to make boxes. Find ways to join and adapt to create moving parts. Explore and use a range of construction kits. Challenge use with additional resources such as small parts (lolly sticks, buttons, pebbles etc)	Deconstruct and reconstruct boxes accurately Attach wheels to a chassis using an axel e.g., cotton reel to dowel Use pencils or tubes as rollers to move an object across the floor	Construct cubes of different sizes from a net With support, attach a fixed axel to a chassis and add wheels ensuring they can move freely Construct a simple pulley using role over a horizontal bar to raise an object off the ground Use construction kits with gears to construct a line of gears that turn	Construct cuboids of different sizes from a net. Attach a fixed axle to a chassis and add wheels ensuring that they can move freely. Construct a pulley that allows a load to travel horizontally along a rope. Use construction kits with gears to mesh gears at right angles.	Describe in detail the way in which an axle and chassis help a vehicle to move. Use a range of different ways to attach an axle to a chassis, **e.g., card triangles, drilled holes, cable clips and clothes pegs.** Identify, describe and evaluate products that contain pulleys and drive belts. Create pulleys and drive systems that can be driven by motor and computer.	Design and build a working model where the direction of movement can be controlled, **e.g., with a chassis with a pivoting axle.** Explain how a belt and pulley system can be used to reverse the direction of rotation and alter the plane of rotation by 90 degrees. Explain how the number of teeth of a gear affects the speed of rotation	Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions. Understand how more advance mechanical systems used in their product enable changes in movement and force.
Electrical and mechanical components	Use senses to explore battery powered toys Talk about electrical equipment in the home	Use remote controlled devices such as Beebots Talk about how common electrical equipment works e.g., kettle, toaster	Describe how a simple battery powered circuit can be controlled by different kinds of switches Talk about simple electrical safety	Explore and describe how an electric motor can be used in a circuit. Identify key features of electrical safety. Use a remote-	Explore and describe how electrical circuits can be created and controlled. Discuss in depth the hazards and safety	Explore and describe how switches can be used in a range of circuits to control components, **e.g., lights in a lighthouse, a**	Use computer-based systems to control an increasing range of components Apply computing and use of

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		Talk about how equipment can be used safely Create a simple circuit using a battery, wires and bulb.	Create simple circuits incorporating a bulb, buzzer, switch, battery and wire	controlled device to switch lights on and off. (Including computer control packages)	issues associated with electricity. Explore and explain how the direction and speed of an electrical motor can be controlled. Explore and program a simple control device.	**movement sensor in a burglar alarm.** Apply appropriate safety measures when constructing circuits. Explore and discuss ways in which electricity can be used to control movement. Explore and use an increasing range of complex control system, **e.g., a light sensor.**	electronics to embed intelligence in products that respond to inputs. Control outputs such as actuators and motors. Make use of sensors to detect heat, light, sound and movement.
Food technology	Sort fruit and veg by taste, shape, colour, texture and simple food groups eg: meat, vegetables Talk about the changes that take place when food is shaped and mixed Use basic tools to cut, shape and mix e.g., cutters and whisks	Sort and classify food into food groups e.g., vegetables, pulses, cereals, dairy Talk about what happens when food is heated and cooled Measure and weigh accurately using cups and spoons Work safely and hygienically	Sort and classify and increasing range of food according to specific food groups e.g., carbohydrates, sugars Talk about what needs to be done in order to work safely and hygienically Measure and weigh using standard scales and units Discuss the way in	Gain an understanding of the ways in which specific food groups apply to the principles of a health and varied diet. Identify what needs to be done in order to work safely and hygienically when working on a range of tasks. Convert measure and weigh using standard	Understand seasonality, know where and how a variety of ingredients are grown, reared, caught and processed. Talk about and give reasons for the need to work safely and hygienically. Talk about the impact of changing proportions within a	Talk about how the properties of certain foods can affect the final product. Know and understand the practice needed in terms of food hygiene and kitchen safety. Select the appropriate methods and equipment for measuring, **e.g.,**	Understand the source, seasonality and characteristics of a broad range of ingredients. Understand the principles of cleaning to prevent cross-contamination, chilling foods thoroughly and reheating food until steaming hot. Understand and

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			which food processing can affect the taste, appearance, texture and colour of food	and imperial units. Give reasons for the way in which food processing can affect the taste, appearance, texture and colour of food.	recipe and use knowledge of food and cooking to generate own recipes. Talk in scientific terms about the physical and chemical changes that take place when food is cooked, e**.g., heated and cooled**	**time, dry goods, liquids etc.** Compare commercial and domestic processes for producing food, e**.g., bread**.	apply the principles of nutrition and health including the implications of excess and deficiency. Become competent in a range of cooking techniques, e**.g., selecting and preparing ingredients, application of heat, seasoning dishes, combining ingredients**
Mechanisms	Explore and talk about books containing flaps and moving pictures Construct a simple slider with support Construct a simple lever with support	Deconstruct a simple slider and explain how it works Construct a simple slider independently Make a lever by joining card strips with paper fasteners	Construct a range of sliders and explain how they work Construct increasingly complex sliders Join levers to make linkages to create moving parts Construct a simple pneumatic system with one moving part	Deconstruct and reconstruct a range of sliders and levers. Vary the position of the pivot point to lift a load using a lever. Construct a pneumatic with two moving parts. Identify the cam within a simple mechanism and explain	Create a range of sliders and levers to produce horizontal and vertical movement. Combine sliders and levers to produce a range of movements. Generate questions to investigate and compare the efficiency of pneumatic systems. Describe the way in which a cam	Use a range of technical vocabulary to describe the properties and functions of mechanisms. Choose and use a range of sliders and levers accurately to create a range of effects. Analyse and evaluate the efficiency of pneumatic systems.	Make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines. Construct and use compound gear trains to drive mechanical systems from a high revving motor.

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					changes rotary motion into linear motion.	Discuss the relationship between a cam and follower, an off-centre cam, a peg cam, a pear-shaped cam and a snail cam.	
Structures	Explore and investigate a range of simple, large scale construction materials e.g., boxes Explore building bridges and towers using large- and small-scale construction e.g., Duplo Make simple 2D structures making straws	Construct a range of simple structures using simple construction kits Make a structure more stable by widening the base Make a square frame from strip wood using triangular cardboard joints Make a simple card hinge	Construct and assemble the net of basic 3D shapes Strengthen 2D frames by adding diagonal bracing struts Make a rectangular frame from strip wood Use materials to make simple joints, glue, tape and paper clips	Deconstruct and assemble the net of a range of basic 3D shapes. Join 2D frames to create 3D structures. Make rectangular frames of different sizes using strip wood, reinforcing with cross braces. Use a range of materials to make joints.	Create nets of increasingly complex 3D shapes which include the addition of gluing tabs. Reinforce and strengthen 3D framework using the concept o**f ‘triangulation’**. Explain in detail why some structures fail. Use a range of materials to make joints **e.g., card strips, elastic bands, thread and ties, and plastic tubing.**	Create nets and templates accurately in a range of sizes. Use a range of increasing methods to strengthen 3D structures and frames. Investigate measure and record the load tolerance of different structures and find ways of improving a structures load-bearing capacity. Build a range of structures using a wide range of effective materials.	Make use of specialist equipment to mark out materials. Select the most appropriate method to strength 3D structures and frames. Apply a range of finishing techniques, including those from art and design to a broad range of materials including textiles, metals, polymers and woods. Use a wider more complex range of materials, components and ingredients, taking into account their

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							properties.
Textiles	Explore, group and sort textiles and colour etc. Cut and stick fabrics together Apply simple finishing techniques e.g., fabric crayons, gluing on feathers	Talk about and begin to select textiles based on characteristics of an increasing range of materials Use a simple template Join fabrics using glue, staples and thread Apply an increasing range of finishing techniques e.g., printing and painting	Talk about similarities and differences between textiles based on the characteristics of an increasing range of materials Use a simple pattern with increasing accuracy Cut and join fabrics using running stitch, buttons and bond web Decorate fabric by applying beads and sequins	Give reasons for the selection of fabrics and techniques based on knowledge of characteristics. Make and use a simple paper pattern. Join fabrics in a range of different ways using zips, tie clasp, toggles, press-studs and buttons. Use a wide range of simple finishing techniques.	Support reasons for selections with justifiable evidence and facts. Make and use a paper pattern that includes a seam allowance. Sew using a range of stitches including, backward running stitch and over sewing. Use a wide range of techniques to add colour, texture and pattern to fabric.	Select appropriate materials to create a product. Create increasingly complex patterns and templates with more than one part that are accurately measured. Use a sewing machine to join and decorate fabric. Identify the most effective finishing technique in order to maximise the aesthetic value of the product.	Use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives. Investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e**.g. dying and applique** Use CAD/CAM to produce and apply surface finishing techniques, e**.g., using dye sublimation**