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DESIGN TECHNOLOGY SKILLS AND KNOWLEDGE PROGRESSION

Strand	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Design	Use senses to explore a wide range of familiar products. Take simple products apart and talk about their parts and how they work. Talk about and/or use construction materials, pictures and words to plan and design. Talk about what has been done/made in simple terms.	Use knowledge of existing products to support plans for a similar product. Describe, explore and investigate products that have been disassembled. Use construction kits, pictures, templates, mock ups and captions to plan and design. Talk about and describe the tools and materials needed in order 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. Use annotated sketches 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.	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. 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	Use the senses to explore and talk about materials. Use simple tools and materials with support, Cut paper/card using scissors. Join with tape or glue. Roll paper and card to form a tube. Add paper and card shapes to products. Apply simple finishes e.g. paint, PVA glue glaze. Follow procedures for safety and hygiene.	Explore and talk about the characteristics of an increasing range of 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 a finish to improve the appearance of a product.	Select materials and components according to known characteristics and functions. Use a ruler to measure and mark lines for cutting. Make and use gluing tabs. Make simple paper models, mock-ups and templates. Select an appropriate way to improve the appearance of a product. Follow procedures for safety and hygiene	Insert paper fasteners for card linkages. Select the most effective finish to enhance the appearance of a product. Follow procedures for safety and hygiene.	Select a range of appropriate tools to cut, shape and join materials and components effectively. Select and use tools and equipment to measure, mark out and shape materials and components accurately. Join and combine materials and components in permanent and temporary ways. Produce a well-finished product that fulfils the functional and aesthetic design criteria.	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. Follow procedures for safety and hygiene.	Select from and use a wider, more complex range of 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.

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		Follow procedures for safety and hygiene.			Follow procedures for safety and hygiene.		Produce ordered sequences and schedules for manufacturing products, detailing resources required. Produce costings using spreadsheets for products they design and make. 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	Use the senses to explore a wide range of familiar products. Talk about familiar products and what they do. Talk about what has been made and the steps taken to achieve the outcome.	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 the product in terms of function and aesthetic criteria	Investigate and compare a range of similar 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. 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 those parts that could be improved.	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. Investigate new and emerging technologies.
	Explore and talk about products made by famous inventors, designers, engineers, chefs and manufacturers, e.g. the vacuum cleaner.		Gain an understanding of the way in which the work of famous inventors, designers, engineers, chefs and manufacturers have impacted on the development of product design and function, e.g. Dyson use to inform and support evaluation and further development of own product.				Relate the work of designers, engineers, chefs, technologists and manufactures to own products and designs.

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Axles, pulleys And Gears	Use junk modelling materials to build boxes. Use simple construction materials to make a vehicle. Explore and use construction kits containing gears.	Deconstruct and reconstruct boxes accurately. Attach wheels to a chassis using an axle, e.g. cotton reels and dowel. Use pencils or tubes as rollers to move an object across the floor.	Construct a simple pulley.	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.		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 the senses to explore battery powered toys, e.g. cars, trains, tills etc. Talk about electrical equipment in the home, e.g., kettle, telephone, and microwave.	Use remote controlled devices, e.g. a remote controlled vehicle, Bee bot etc Talk about how common electrical equipment works, e.g., kettle, telephone, and microwave. Talk how equipment can be used safely.	. 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-controlled device to switch lights on and off.(including computer control packages)	Explore and describe how electrical circuits can be created and controlled. Discuss in depth the hazards and safety 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.		Use computer-based systems to control an increasing range of components Apply computing and use of 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 vegetables by taste, shape, size, colour, texture and simple food groups, e.g. meat, vegetables etc. 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 etc. 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 an increasing range of food according to specific food groups, e.g. proteins, carbohydrates, fats etc. Talk about what needs to be done in order to work safely and hygienically. Measure and weigh using standard units and scales.	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.	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 recipe and use	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. time, dry goods, liquids etc.	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 apply the principles of nutrition and

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				Convert measure and weigh using standard and imperial units. Give reasons for the way in which food processing can affect the taste, appearance, texture and colour of food. Discuss about the way in which food processing can affect the taste, appearance, texture and colour of food.	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	Compare commercial and domestic processes for producing food, e.g. bread.	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 describe how it works. Construct a simple slider independently. Make a lever by joining card strips with paper fasteners.	Deconstruct a range of sliders and describe how they work. Construct increasing complex sliders. Join levers to make linkages to create moving parts.	Make 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 how movement is changed.	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 changes rotary motion into linear motion.	Use a range of technical vocabulary to describe the properties and functions of mechanisms. Discuss the relationship between a cam and follower, an off-centre cam, a peg cam, a pear-shaped cam and a snail cam.	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.
Structures	Explore and investigate a range of simple, large scale construction materials, e.g. cardboard boxes. Explore building, bridges and towers using large and small-scale construction materials, e.g. Duplo, cardboard boxes. Make simple 2D structures using 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 card joints. Make a simple card hinge.	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.	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 loadbearing capacity. Build a range of structures using a wide	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,

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						range of effective materials.	components and ingredients, taking into account their properties.
Textiles	Explore, sort and group textiles by texture and colour etc. Cut and stick fabrics together. Apply simple finishing techniques, e.g. fabric crayons, gluing on feathers etc.	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.	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.		Work with textiles using a variety of materials, tools and techniques, e.g. painting, dyeing, weaving, felting, stitching, quilting, applique and collage.