Knowledge and Skills Progression for Design Technology

Strand	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Project Driving questions	1. How can we show compassion, care and love to those in need? 2. How can we care for our world? 3. What makes someone a hero?	1. How can we be compassionate, caring and loving towards others? 2. How can we look after our planet? 3. What is it like at the seaside? 4. What does it mean to be an explorer? 5. Growing, Changing, Belonging -Why are differences important? 6. Why did London burn and how can we design it safer today?		1. How can we be more compassionate, caring and loving towards others? 2. How could looking through 'my window' help me to be a better steward of the environment? 3. What can we learn from the Romans about work, innovation, and community? 4. Can rocks show us how to be sustainable? 5. Why is it important to hear everyone's story before we judge what happened in the past? 6. How did the Anglo Saxons build a life they could trust?		1. How can we show compassion, care and love to those in need? 2. What can we learn about stewardship from the medieval monarchs? 3. Why does Britain have the Benin bronzes and should they be given back? 4. Why is Earth special and how can we protect it? 5. How can learning about past and present lifestyles help us understand why we should not judge others? 6. How did trust help Ancient Egyptian society thrive, and how can we build fair and trusting communities today?	
Curriculum Topics - History/ *Science*	Ourselves People that help us Superheroes Journeys and transport	Neil Armstrong, Explorers, Fire of London, Holidays and Seaside, Homes and Houses, Mary Seacole ***Seasonal Changes, Plants, Animals including humans, Living things and their habitats, Everyday Materials***		Vikings and Anglo Saxons, Romans, Stone age to Iron age, Anglo Saxons to Scots, Victorians ***Plants , Light, Living things and their habitats, Animals including humans, Sound , Electricity, States of Matter, Forces and magnets***		Tudors, Ancient Egypt, Benin, Ancient Greece, WW2 ***Light, Electricity, Living things and their habitats, Earth and Space, Evolution and Inheritance, Properties and changes of materials, Animals including humans, Forces and Magnets***	
Design		design purposeful, functional, appealing products for themselves and other users based on design criteria generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology		use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided 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 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		select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics		select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately 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			
	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.	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	Select materials and components according to known characteristics and functions. Select and use an increasing range of tools to cut, shape and join materials and	Select from and use a wide range of materials and components according to both functional and aesthetic qualities. Select and use tools and equipment to	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	Select a range of appropriate tools to cut, shape and join materials and components with accuracy and precision. Use an increasing range of tools and	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,

	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.	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. Follow procedures for safety and hygiene	components. Use a ruler to measure and mark lines for cutting. Make and use glueing 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.	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.	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.	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. Follow procedures for safety and hygiene.	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. 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		explore and evaluate a range of existing products evaluate their ideas and products against design criteria		investigate and analyse a range of existing products evaluate their ideas and products against their own design criteria and consider the views of others to improve their work understand how key events and individuals in design and technology have helped shape the world			
	Use the senses to explore a wide range of familiar	Talk about and describe key features	Investigate and compare a range of	Investigate and begin to analyse a range of	Investigate and use analysis of existing	Use analysis of existing products	Understand developments in D&T, its

	products. Talk about familiar products and what they do. Talk about what has been made and the steps taken to achieve the outcome.	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	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.	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.	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.	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	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.
Technical Knowledge		build structures, exploring how they can be made stronger, stiffer and more stable explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.		apply their understanding of how to strengthen, stiffen and reinforce more complex structures understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] apply their understanding of computing to program, monitor and control their products.			
		To be able to design, make and evaluate a picture frame with a stable wooden **structure**, for a loved one, using different tools. To design and make a hand puppet using paper mache and **textiles** Make a moving picture with a **lever** to show the journey of an explorer, real or imaginary.		To design, make and evaluate a **structure** to display in the Great Exhibition that helps to demonstrate the achievements of the Victorians. (Oak - class desks, Silver Birch - factories and houses, Rowan - Railway carriages) Explore Roman engineering feats (catapults, aqueducts). Design and build a simple **lever** system. Make a patch - repair an item of clothing- join materials using a **simple stitch**.	To design, make and evaluate a peace memorial with a stable **structure**. Create a working intruder alarm for the Tower of London with an **electrical circuit**. Construct mechanisms using levers and linkages to create interactive rainforest or sustainability themed posters.	

				Design, make and evaluate a candle-style light with a **working circuit**. Gears and Pulleys		Design, make and evaluate a textile product (armband, pouch, or tapestry square) using cultural inspiration. Gears, Pulleys and CAMS	
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 cubes of different sizes from a net. With support attach a fixed axle to a chassis and add wheels ensuring that they can move freely. Construct a simple pulley using rope 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. 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. 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 advanced mechanical systems used in their product enable changes in movement and force.
Electrical and mechanical components	Use the senses to explore battery powered toys. Talk about electrical equipment in the home. Explore the use of bulbs, wires and batteries.	Use remote controlled devices, e.g. a remote controlled vehicle, Bee bot etc. Talk about how common electrical equipment works. Talk how equipment can be used safely. Create a simple circuit using a battery, bulb and wires.	Describe how a simple battery powered circuit can be controlled by different kinds of switches. Talk about simple electrical safety. Create simple circuits incorporating a battery, bulb, switch, buzzer and wires.	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.	Explore and describe how switches can be used in a range of circuits to control components. Apply appropriate safety measures when constructing circuits. Explore and discuss ways in which electricity can be used to control movement. Explore and use an	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.

						increasing range of complex control system.	
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. 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 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. Choose and use a range of sliders and levers accurately to create a range of effects. Analyse and evaluate the efficiency of pneumatic systems. 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 Explore building, bridges and towers using large and small-scale construction materials 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.	Deconstruct 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 glueing 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	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.	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

						Build a range of structures using a wide range of effective materials.	complex range of 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	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.	Talk about the 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 Use CAD/CAM to produce and apply surface finishing techniques.
Cooking and Nutrition		use the basic principles of a healthy and varied diet to prepare dishes understand where food comes from.		understand and apply the principles of a healthy and varied diet prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.			
		To design and create a healthy snack to share with our families Food tech - summer 2		Design and make a breakfast topping for toast, toppings for a pizza or create a pasta sauce.		Create a West African savoury meal to enjoy	

	Sort fruit and vegetables by taste, shape, size, colour, texture and simple food groups. Talk about the changes that take place when food is shaped and mixed. Use basic tools to cut, shape and mix.	Sort and classify food into food groups, 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 Talk about what needs to be done in order to work safely and hygienically. Measure and weigh using standard units and scales. Discuss about the way in which food processing can affect the taste, appearance, texture and colour of food.	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 and imperial units. Give reasons for the way in which food processing can affect the taste, appearance, texture and colour of food.	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 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.	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 Compare commercial and domestic processes for producing food	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 health including the implications of excess and deficiency. Become competent in a range of cooking techniques

Key
Purple - National Curriculum
Red - St Vincent's Curriculum
Black - Skills Progression