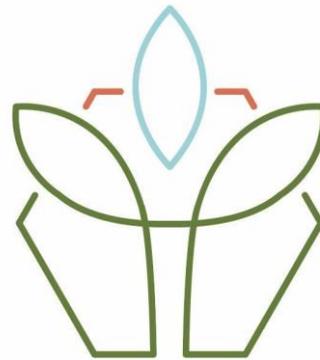# Design and Technology

Progression in Knowledge and Skills

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Be Ready, Be Respectful, Be Safe

Design and Technology Progression of Knowledge and Skills

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Design	Design purposeful, functional, appealing products for themselves and other users base on design criteria. Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.	Design	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.		
		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.	Make	Select from and use and wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining, and finishing) accurately. Select and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.		
		Evaluate	Explore and evaluate a range of existing products. Evaluate their ideas and products against design criteria.	Evaluate	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 event and individuals in design and technology have helped shape the world.		
		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.	Technical Knowledge	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.		

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Design	Use senses to explore a wide range of familiar products.	Use knowledge of existing products to support plans for a similar product.	Use knowledge of a range of products to inform plans and designs.	Use research to develop and plan design criteria that are fit for purpose.	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, beginning to reflect and refine during the design process.	Use research and exploration (e.g. study of different cultures, questionnaires, surveys, interviews) to identify and understand user needs. Reflect and refine designs.
	Take simple products apart and talk about their parts and how they work.	Describe, explore and investigate products that have been disassembled.	Talk about and disassemble products and describe their function.	Disassemble products and describe in detail their functions.	Produce detailed designs and plans from simple viewpoints e.g. front and side view.	Produce detailed designs and plans drawn to scale from a range of viewpoints (e.g. elevated, rear) using pattern pieces and computer-aided design packages effectively.	Evaluate, refine and reflect on detailed designs and plans drawn to scale from a range of viewpoints, using pattern pieces and computer-aided design packages effectively.
	Talk about and/or use construction materials, pictures and words to plan and design.	Use construction kits, pictures, templates, mock ups and captions to plan and design.	Use simple prototypes, labelled sketches and detailed instructions in plans and designs.	Use annotated sketches, cross-sectional, exploded diagrams and increasingly complex prototypes.	Begin to produce detailed designs and plans using prototypes, commentary and diagrams that include measurements.	Produce detailed designs and plans using prototypes, commentary and diagrams that include accurate measurements.	Develop and communicate ideas using annotated sketches, detailed plans, 3D and mathematical modelling, oral and digital presentations

							and computerbased tools.
	Talk about what has been done/made in simple terms.	Talk about and describe the tools and materials needed in order complete the key tasks within a plan.	Talk in depth about ideas, plans and reasons for choices.	Support discussions about ideas, plans and designs with relevant information. Draw outline of a simple figure.	Link discussions about ideas, plans and designs to the investigation, disassembly and evaluation of a range of products	Discuss ways in which ideas, plans and designs are formed and modified to ensure that the design criteria are met effectively.	Use a variety of approaches, e.g. biomimicry (the design and production of materials, structures, and systems that are modelled on biological entities and processes) and user-centred design to generate creative ideas and avoid stereotypical responses.
Make	Use the senses to explore and talk about materials.	Explore and talk about the characteristics of an increasing range of materials.	Select materials and components according to known characteristics and functions.	Select from and use a wide range of materials and components according to both functional and aesthetic qualities.	Join and combine materials and components in permanent and temporary ways.	Select a range of appropriate tools to cut, shape and join materials and components with accuracy and precision.	Select from and use a wider, more complex range of materials, components and ingredients, taking account of their properties.

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Use simple tools (e.g. tape or glue) and materials with support. Cut paper/card using scissors and roll to form a tube. Add paper and card shapes to products.	Select and use simple tools (e.g. holepunch, stapler, glue) to cut and join a range of materials. Use a straight edge to mark lines for cutting. Join edge to edge using glue.	Select and use an increasing range of tools to cut, shape and join materials and components. Use a ruler to measure and mark lines for cutting, use glue tabs. Make simple paper models, mock-ups and templates.	Select and use tools and equipment to measure, mark out and shape materials and components. E.g. hack saw, bench hook, paper fasteners. Make increasingly complex paper models, mock-ups and templates.	Select and use range of appropriate tools (g clamp) to cut, shape and join materials and components effectively. Make a range of complex paper models, mock-ups and templates.	Join and combine a range of materials and components (e.g. drill) using the most effective permanent and temporary way.	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.
Apply simple finishes e.g. paint, PVA glue glaze.	Select from a range of finishes to improve the appearance of a product.	Select an appropriate way to improve the appearance of a product.	Select the most effective finish to enhance the appearance of a product	Produce a well-finished product that fulfils the functional and aesthetic design criteria.	Identify and apply an appropriate finishing technique to ensure a quality end product which is meeting the design criteria.	Identify and apply an appropriate finishing technique to ensure a high quality end product which meeting the design criteria.

Evaluate	Talk about what has been made and the steps taken to achieve the outcome.	Begin to evaluate the success of the product in terms of function and aesthetic criteria.	Evaluate ideas and products against design criteria; and suggest ways in which products can be improved.	Evaluate ideas and products against own design criteria, taking into account the views of others.	Give reasons, supported by factual evidence for the success of aspects 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.	Analyse the work of past and present professionals and others to develop and broaden understanding. Investigate new and emerging technologies.
Axles, Pulleys and Gears	Use simple construction materials to make a vehicle.	Attach wheels to a chassis using an axle, e.g. cotton reels and dowel.	With support attach a fixed axle to a chassis and add wheels ensuring that they can move freely.	Attach a fixed axle to a chassis and add wheels ensuring that they can move freely.	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.	Design and build a working model where the direction of movement can be controlled, e.g. with a chassis with a pivoting axle.	Design and build a working model where the direction of movement can be controlled, including motorised circuits.

	Explore and use construction kits containing gears.	Use pencils or tubes as rollers to move an object across the floor.	Construct a simple pulley using rope over a horizontal bar to raise an object off the ground. Use contruction kits with gears to construct a line of gears that turn.	Construct a pulley that allows a load to travel horizontally along a rope. Use construction kits with gears to mesh gears at right angles.	Identify, describe and evaluate products that contain pulleys and drive belts. Create pulleys and drive systems that can be driven by motor and computer	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 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.	Use remote controlled devices, e.g. a remote controlled vehicle, Bee bot etc.	Describe how a simple battery powered circuit can be controlled by different kinds of switches.	Explore and describe how an electric motor can be used in a circuit.	Explore and describe how electrical circuits can be created and controlled.	Explore and describe how switches can be used in a range of circuits to control components, e.g. lights in a lighthouse, a movement sensor in a burglar alarm.	Use computer-based systems to control an increasing range of components.

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	Talk about electrical equipment in the home, e.g., kettle, telephone, and microwave. Model how to use equipment safely.	Talk about how common electrical equipment works and how to use them safely, e.g., kettle, telephone, and microwave.	Talk about simple electrical safety.	Identify key features of electrical safety.	Discuss in depth the hazards and safety issues associated with electricity.	Understand appropriate safety measures when constructing circuits.	Apply appropriate safety measures when constructing circuits and explain why.
	Explore the use of bulbs, wires and batteries.	Create a simple circuit using a battery, bulb and wires.	Create simple circuits incorporating a battery, bulb, switch, buzzer and wires.	Use a remote-controlled device to switch lights on and off.(including computer control packages)	Explore and explain how the direction and speed of an electrical motor can be controlled. Explore and program a simple control device.	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.	Apply computing and use of electronics to embed intelligence in products that respond to inputs and outputs. Make use of sensors to detect heat, light, sound and movement.

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Food Technology	Sort fruit and vegetables by taste, shape, size, colour, texture and simple food groups, e.g. meat, vegetables etc.	Sort and classify food into food groups, e.g. vegetables, pulses, cereals, dairy etc.	Sort and classify an increasing range of food according to specific food groups, e.g. proteins, carbohydrates, fats etc.	Gain an understanding of the ways in which specific food groups apply to the principles of a health and varied diet.	Understand seasonality, know where and how a variety of ingredients are grown, reared, caught and processed.	Talk about how the properties of certain foods can affect the final product.	Understand the source, seasonality and characteristics of a broad range of ingredients.
	Talk about the changes that take place when food is shaped and mixed.	Talk about what happens when food is heated and cooled	Talk about what needs to be done in order to work safely and hygienically.	Identify what needs to be done in order to work safely and hygienically when working on a range of tasks.	Talk about and give reasons for the need to work safely and hygienically.	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 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.
	Use basic tools to cut, shape and mix, e.g. cutters and whisks.	Measure and weigh accurately using cups and spoons.	Measure and weigh using standard units and scales.	Convert measure and weigh using standard and imperial units.	Talk about the impact of changing proportions within a recipe and use knowledge of food and cooking to generate own recipes.		
	Work safely and hygienically with support.	Work safely and hygienically.	Discuss about the way in which food processing can affect the taste, appearance, texture and colour of food.	Give reasons for the way in which food processing can affect the taste, appearance, texture and colour of food	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.	Become competent in a range of cooking techniques, e.g. selecting and preparing ingredients, application of heat, seasoning dishes,

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							combining ingredients
Structures	Explore and investigate a range of simple, large scale construction materials, e.g. cardboard boxes.	Construct a range of simple structures using simple construction kits.	Deconstruct and assemble the net of basic 3D shapes.	Deconstruct and assemble the net of a range of basic 3D shapes.	Create nets of increasingly complex 3D shapes which include the addition of gluing tabs.	Create nets and templates accurately in a range of sizes.	Make use of specialist equipment to mark out materials.
	Explore building, bridges and towers using large and small-scale construction materials, e.g. Duplo, cardboard boxes.	Make a structure more stable by widening the base.	Strengthen 2D frames by adding diagonal bracing struts.	Join 2D frames to create 3D structures.	Reinforce and strengthen 3D framework using the concept of 'triangulation'.	Use a range of increasing methods to strengthen 3D structures and frames.	Select the most appropriate method to strength 3D structures and frames.
	Make simple 2D structures using straws.	Make a square frame from strip wood using triangular card joints.	Make a rectangular frame from strip wood.	Make rectangular frames of different sizes using strip wood, reinforcing with cross braces.	Explain in detail why some structures fail.	Investigate measure and record the load tolerance of different structures and find ways of improving a structures loadbearing capacity.	Apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods.

		Make a simple card hinge.	Use materials to make simple joints, glue, tape and paper clips.	Use a range of materials to make joints.	Use a range of materials to make joints e.g., card strips, elastic bands, thread and ties, and plastic tubing.	Build a range of structures using a wide range of effective materials.	Use a wider more complex range of materials, components and ingredients, taking into account their properties.