Progression of Knowledge, Skills and Vocabulary: Design and Technology

Early Design and Technology Progression: Understanding the EYFS to KS1 Readiness to Progress

Organisation of Knowledge	Design	Using Materials	Drawing, painting and sculpture	Exploring techniques	Comparing and evaluating work
Relevant ELG	**ELG: Listening, Attention and Understanding** - Hold conversation when engaged in back-and-forth exchanges with their teacher and peers. **ELG: Speaking** - Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. **ELG: Self-Regulation** - Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate.	**ELG: Creating with Materials** Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. **ELG: Managing self** - Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. **ELG: Fine motor skills** - Use a range of small tools, including scissors, paintbrushes and cutlery. **ELG: Creating with Materials** - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. - Share their creations, explaining the process they have used.	**ELG: Listening, Attention and Understanding** - Hold conversation when engaged in back-and-forth exchanges with their teacher and peers. **ELG: Speaking** - Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate; **ELG: Speaking** - Express their ideas and feelings about their experiences using full sentences, including use of past, present and future tenses and making use of conjunctions, with modelling and support from their teacher. **ELG: Managing self** - Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. **ELG: Creating with Materials** - Share their creations, explaining the process they have used.		**ELG: Managing self** - Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. - Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate. **ELG: Fine motor skills** - Use a range of small tools, including scissors, paint brushes and cutlery.
KS1 Readiness Objective	- To describe something they want to make / build / construct - To say who they are making / building / constructing for - To talk about what materials they are going to use when making / building / constructing	- To make / build / construct objects using a variety of materials - To join materials together when making / building / constructing	- To talk about their constructions / products, and what they are pleased with - To talk about their constructions and say how it could be even better - To talk about everyday objects that they like and say why they are good	- To build / construct structures from a range of materials to a design brief that they have created or been given. - To build / construct structures that are tall or strong. - To know that tape and glue can join materials together and can make structures stronger.	- To recognise different foods as either healthy or unhealthy - To know how to use basic cutlery and utensils to make and eat food - To follow simple instructions to make different foods - To know when we make food for other people that it needs to be appealing.

Design and Technology Progression: National Curriculum Programme of Study

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims of the National Curriculum

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.
Schools are not required by law to teach the example content in [square brackets].

Design and Technology Progression: Programme of Study Overview

Key Stage 1	Key Stage 2
Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment].	Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

Design and Technology Progression: Design

Key Stage 1 National Curriculum
When designing and making, pupils should be taught to:
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

Key Stage 2 National Curriculum
When designing and making, pupils should be taught to:
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

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Core Knowledge		- Design criteria are the explicit goals that a project must achieve.	- Ideas can be communicated in a variety of ways, including writer work, drawings and diagrams, modelling, speaking and using information and communication technology.	- Design criteria (use, appearance, cost and target user) are the exact goals of a project must be achieved to be successful.	- Annotated sketches and exploded diagrams show specific parts of a design, highlight sections or show functions. They communicate ideas in a visual, detailed way.	- A pattern piece is a drawing or shape used to guide how to make something. - There are many different computer-aided design packages for designing products.	- Design criteria should cover the intended use of the product, age range targeted and final appearance.
Skills	- Create collaboratively, share ideas and use a variety of resources to make products inspired by existing products, stories or their own ideas, interests or experiences.	- Create a design for a purposeful, functional and appealing product to meet simple design criteria.	- Generate and communicate their ideas through a range of different methods.	- Develop design criteria to inform a design.	- Use annotated sketches and exploded diagrams to test and communicate their ideas. - Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fir for purpose, aimed at a particular audience.	- Use pattern pieces and computer-aided design packages to design a product.	- Develop design criteria for a functional and appealing product that is fit for purpose, communicating ideas clearly in a range of ways. - Communicate ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.
Vocabulary		design design criteria drawing frame function idea label material plan purpose shape size criteria diagram	design design criteria drawing equipment ingredient instruction label method picture recipe test describe diagram bag tag diagram explore talk labelled diagram plan sketch	design design criteria diagram health and safety plan dimension	build deconstruct net reconstruct sketch annotate design criteria plan annotated sketch exploded diagram labelled diagram prototype	computer-aided design (CAD) design product	design criteria exploded diagram annotated diagram design, modelling prototype test

Design and Technology Progression: Make

Key Stage 1 National Curriculum
When designing and making, pupils should be taught to:
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

Key Stage 2 National Curriculum
When designing and making, pupils should be taught to:
Make
- 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

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Core Knowledge	- Different tools are needed for different tasks. For example, pencils and paper are needed for drawing pictures.	- Specific tools are used for particular purposes. For example, scissors are used for cutting and glue is used for sticking.	- Different tools have characteristics that make them suitable for specific purposes. (scissors are used for cutting paper because they have sharp, metal blades that can cut through thin materials.)	- Specific tools can be used for cutting, such as saws. - Wood can be joined using glue, nails, staples, or a combination of these. - Safety rules must be followed to prevent injury from sharp blades. These rules include using a bench hook to keep the wood still, using a junior hacksaw with a pistol grip and working under adult supervision.	- Useful tools for cutting include scissors, craft knives, junior hacksaws with pistol grip and bench hooks. - Useful tools for joining include glue guns. - Tools should only be used with adult supervision and safety rules must be followed.	- There are many rules for using tools safely and these may vary depending on the tools being used (someone using a chisel should chip or cut with the cutting edge pointing away from their body). - All tools should be cleaned and put away after use and should not be used if they are loose or cracked.	- Precision is important in producing a polished, finished product. - Correct selection of tools and careful measurement can ensure the parts fit together correctly.
	Skills	- Choose and explore appropriate tools for simple practical tasks. - Select from and use a range of tools and equipment to perform practical tasks such as cutting, shaping, joining and finishing.	- Select the appropriate tool for a simple practical task.	- Select the appropriate tool for a task and explain their choice. - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.	- Use tools safely for cutting and joining materials and components.	- Select, name and use tools with adult supervision. - Select from and use a wider range of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, accurately.	- Name and select increasingly appropriate tools for a task and use them safely.	- Select appropriate tools for a task and use them safely and precisely. - 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.

	Vocabulary		attach evaluate string tool weak chop grate grater knife mash masher peel peeler slice tear	fork grate grater grip knife mash masher measure measuring spoon mix peel peeler property purpose slice spoon spread tongs tool cut finish model support equipment glue join sewing pattern stapler test	equipment investigate problem-solve technique test version		component cut join material test bench hook butt joint explore G clamp gluing hacksaw hot glue gun improve investigate joining reinforcing strengthening triangular corner	concertina investigation layers shape strength strengthening blanket stitch button decorative embroidery fabric property fastening function investigate label needle observation press stud ribbon running stitch seam thread tie toggle Velcro whip stitch zip

Design and Technology Progression: Technical Knowledge

Key Stage 1 National Curriculum
When designing and making, pupils should be taught to:
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.

Key Stage 2 National Curriculum
When designing and making, pupils should be taught to:
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.

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Materials	Core Knowledge	- Everyday products are objects that we use every day. - These objects have a specific use. - Different materials are suitable for different purposes, such as construction kits for modelling and ingredients for baking.	- Everyday products are objects that are used routinely at home and school, such as a toothbrush, cup or pencil. - All products are designed for a specific purpose. - Different materials are suitable for different purposes, depending on their specific properties. For example, glass is transparent, so it is suitable to be used for windows.	- Products can be improved in different ways, such as making them easier to use, more hardwearing or more attractive. - Properties of components and materials determine how they can and cannot be used. For example, plastic is shiny and strong but it is difficult to paint.	- Particular products have been designed for specific tasks, such as nail clippers, the spinning top and the cool box. - Materials for a specific task must be selected on the basis of their properties. These include physical properties as well as availability and cost	- Design features are the aspects of a product's design that the designer would like to emphasise, such as the use f a particular material or feature that makes the product easier to use or more durable. - Different materials and components have a range of properties, making them suitable for different tasks. - It is important to select the correct material or component for the specific purpose, depending on the design criteria. - Recipe ingredients have different tastes and appearances. - They look and taste better and are cheaper when in season.	- Culture is the language, interventions, ideas and art of a group of people. - A society is all the people in a community or group. - Culture affects the design of some products. For example, knives and forks are used in the western world, whereas chopsticks are used mainly in China and Japan. - The design of products needs to consider the culture of the target audience. For example, colours might mean very different things in different cultures. - Materials should be cut and combined with precision. For example, pieces of fabric could be cut with sharp scissors and sewn together using a variety of stitching techniques.	- People's lives have been improved in countless ways due to new inventions and designs. For example, the Morrison shelter, designed by John Baker in 1941, was an indoor air-raid shelter used in over half a million homes during the Second World War. It saved the lives of many people caught in bombing raids. - It is important to understand the characteristics of different materials to select the most appropriate material for a purpose. This might include flexibility, waterproofing, texture, colour, cost and availability.
	Skills	- Name and explore a range of everyday products and begin to talk about how they are used. - Select appropriate materials when	- Name and explore a range of everyday products and describe how they are used. - Select and use a range of materials, beginning to explain their choices	- Explain how an everyday product could be improved. - Choose appropriate components and materials and suggest ways of manipulating	- Explain how an existing product benefits the user. Plan which materials will be needed for a task and explain why. Measure and mark out to	- Investigate and identify the design features of a familiar product. - Choose from a range of materials, showing an understanding of their different characteristics	- Explain how the design of a product has been influenced by the culture or society in which it was designed and made. - Select and combine materials with precision	- Analyse how an invention or product has significantly changed or improved people's lives. - Choose the best materials for a task, showing an

	Vocabulary		function, permanent, protection, purpose, shelter, structure, temporary, axle, chassis, vehicle, wheel, brick, construction, fabric, rope, stick, tarpaulin, wooden cane, material, purpose	attractive, cushion, hardwearing, improve, peg bag, pillowcase, product, slippers, tablecloth, tea cosy, tea towel, toiletry bag, greeting card material, property, use, decorative, embellishment, fabric, textile, card, metal, plastic, stiff	cloche, cold frame, greenhouse glass, hardwearing, material, plastic, property, purpose, strength, transparent, waterproof	bag, bottle, box, can, carton, cling film, compostable, food packaging, jar, recyclable, recycle, reuse, Tetra Pak, Tupperware, home furnishing, home product, design feature, nightlight, programmable, programmable device, sensor, switch, compound machine, device, simple machine card, cardboard, cling film, glass, paper, plastic, Polystyrene, tin, tin foil, appearance, colour, elasticity, material, natural, pattern, shape, synthetic, textile, texture, yarn, comfortable, delicate, durable, fabric, flexibility, flexible, lightweight, man-made, property, soft, strength, stretchy, strong, tough, use, versatile, waterproof, conductive, non-conductive, purpose, characteristic, rigid, smooth.	heavy lifting equipment, jack, jack hammer, machinery, paint sprayer, pneumatic machine, pneumatic system, ancient Egyptian, architecture, Baroque, building, caryatid, Classical, Corinthian column, Doric column, entablature, frieze, Gothic, Industrial, Ionic column, Modernist, pediment, Postmodern, prehistoric, Renaissance, style, sustainable, temple appearance, functional, stability, stiffness	
Textiles	Core Knowledge		- Scissors are used to cut fabrics. - Glue and simple stitches, such as running stitch, can be used to join fabrics. - Running stitch is made by passing a needle in and out of fabric at an even distance. - Fabric can be decorated using materials and small objects, such as buttons and sequins. - Decorations can be attached to the fabric by gluing, stapling or tying.	- A running stitch is a basic stitch that is used to join fabric. It is made by passing a needle in and out of fabric at an even distance. - Embellishment is a decorative detail or feature added to something to make it more attractive.	- A loom is a piece of equipment that is used for making fabric by weaving wool or thread. - Weaving involves interfacing pieces of thread or yarn. - A loom weaving is a piece of fabric that has been woven on a loom by interlacing threads. - An embellishment is a decorative detail or feature, such as a silk flower, tassel or bow, added to something to make it more attractive.	- A hem runs along the edge of a piece of cloth or clothing. It is made by turning under a raw edge and sewing to give a neat and quality finish. - Block printing techniques and fabric paint are used to create decorative, repeated patterns on fabrics.	- A collage is artwork made by sticking materials, such as scraps of paper or fabric, onto a background. - A mixed media collage is made using various materials and media, such as ink and paint. - Applique is a technique where pieces of material are attached to another material by stitching or gluing.	- Pinning with dressmaker pins and tacking with quick, temporary stitches hold fabric together in preparation for and during sewing. - Fastenings hold a piece of clothing together. - Types of fastenings include zips, press studs, Velcro and buttons.
	Skills		- Cut and join textiles using glue and simple stitches. - Use gluing, stapling or tying to decorate fabric, including using buttons and sequins. - Shape textiles using templates.	- Use different methods of joining fabrics, including glue and running stitch. - Add simple decorative embellishments, such as buttons, prints, sequins and applique.	- Cut and join wools, threads and other materials to a loom. - Decorate a loom weaving using embellishments, such as natural or silk flowers, tassels and bows. - Select the most appropriate techniques to decorate textiles.	- Hand sew a hem or seam using a running stitch. - Create detailed decorative patterns on fabric using printing techniques. - Understand the need for a seam allowance.	- Combine stitches and fabrics with imagination to create a mixed media collage. - Use applique to add decoration to a product or artwork. - Join textiles with a combination of stitching techniques.	- Pin and tack fabrics in preparations for sewing and more complex pattern work. - Use different methods of fastening for function and decoration, including press studs, Velcro and buttons. - Create objects that employ a seam allowance. - Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles

Electricity	Vocabulary		join, running stitch, stitch, bead, button, glue, sequin, stitch	cut, fabric, fasten, glue, join, needle, running stitch, sew, stitch, textile, thread, tie, applique, button, decorative, embellishment, fabric, printing, sequin, textile	cloth, fabric, interlace, loom, material, thread, warp, weave, weaving, weft, woven, yarn, decorate, embellish, flower, fruit, grass, leaf, pattern, twig	fraying, hem, pinking shears, running stitch, sew, block printing, diamond, pattern structure, trellis,	applique, arrange, embellish, fabric crumb, layer applique, embellishment	
	Core Knowledge	- Many appliances at home and school need electricity to work. - The appliances ned to be attached to electricity through a plug and socket, or use batteries.	- Electricity is a form of energy. - Many household appliances use electricity, such as kettles, televisions and washing machines. - They can be switched on by completing the circuit to allow the flow of electricity or off by breaking the circuit to prevent electricity from flowing. - This can be a switch on the appliance or a wall socket switch.	- A series circuit is made up of an energy source, such as a battery or cell, wires and a bulb. - The circuit must be complete for the electricity to flow.	- An electric circuit can be used in a model, such as a lighthouse. It can be controlled using a switch.	- Components can be added to circuits to achieve a particular goal. - These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronics games, motors for fairground rides and motorised vehicles and switches for lights and televisions.	- Electrical circuits can be controlled by a simple on/off switch, or by a variable resistor that can adjust the size of the current in the circuit. - Real-life examples are a dimmer switch for lights or volume control on a stereo.	- Computer programs can control electrical circuits that include a variety of components, such as switches, lamps, buzzers and motors
	Skills	- Identify products that use electricity to make them work.	- Identify products that use electricity to make them work and describe how to switch them on and off.	- Create an operational, simple series circuit.	- Incorporate a simple series circuit into a model.	- Incorporate circuits that use a variety of components into models or products. - Diagnose faults in battery operated devices.	- Use electrical circuits of increasing complexity in their models or products, showing an understanding of control. - Create series and parallel circuits.	- Understand, create and use electrical circuits that incorporate a variety of components (switches, lamps, buzzers and motors) and use programming to control their products.
	Vocabulary					cell, circuit, coding, complete circuit, component, electricity, incomplete circuit, lamp, LED, light-emitting diode, micro:bit, program, programming, push-to-break switch, push-to-make switch, reed switch, rocker switch, series circuit, toggle switch, wire		
Use of ICT	Core Knowledge	- Digital devices can be used to share information about creations with others.	- Computer-aided design (CAD) is when computers are used to help design products. - It has advantages over paper design in that it will show how finished products will look. - Different colours and texture can also be trialled.	- Computer software can be used to help design or plan a product. - Advantages include identifying and solving problems before the product is made and experimenting with different materials and colours. - Labels can be added to designs for clarity.	- A program is a set of instructions written to perform a specific task on a computer.	- Remote control is controlling a machine or activity from a distance. - Computers can be used to remotely control a device, such as a light, speaker or buzzer.	- Equipment and devices can be controlled by pressing buttons on a control panel, such as on a washing machine or microwave.	- Computer monitoring uses sensors as a scientific tool to record information about environmental changes over time. - Computer monitoring can also log data from sensors and record the resulting information in a table or graph.
	Skills	- Use digital devices to take digital images or recordings of their creations to share with others	- Use design software to create a simple plan for a design.	- Use design software to create a simple labelled design or plan.	- Write a program to make something move on a tablet or computer screen.	- Write a program to control a physical device, such as a light, speaker or buzzer.	- Link a physical device to a computer or tablet so that it can be controlled (such as changing motor speed or turning an LED on and off) by a program.	- Use a sensor to monitor an environmental variable, such as temperature, sound or light.

	Vocabulary	coding, micro:bit, program, programming						
Structures	Core Knowledge	- Different materials have different properties and can be used for different purposes.	- Different materials can be used for different purposes, depending on their properties. - Cardboard is a stronger building material than paper. - Plastic is light and can float. Clay is heavy and will sink.	- Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares. - A broader base will also make a structure more stable.	- Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. - Frame structures are made from thin, rigid component, such as a tent frame. - The rigid frame gives the structure shape and support. - Diagonal struts can strengthen the structure.	- A protype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials. - Shell and frame structures can be strengthened by gluing several layer of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and slues over each joint to straighten and strengthen them).	- Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. - Frameworks can be built using lolly sticks, skewers and bamboo canes.	- Strength can be added to a framework by using multiple layers. - Corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. - Triangular shapes can be used instead of square shapes because they are more rigid. - Frameworks can be further strengthened by adding an outer cover.
	Skills	- Construct simple structures and models using a range of materials.	- Construct simple structures, models or other products using a range of materials.	- Explore how a structure can be made stronger, stiffer and more stable.	- Create shell or frame structures using diagonal struts to strengthen them. - Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products.	- Protype shell and frame structures, showing awareness of how to strengthen, stiffen and reinforce them. - Choose suitable techniques to construct products or to repair items.	- Build a framework using a range of materials to support mechanisms.	- Select the most appropriate materials and frameworks for different structures, explaining what makes them strong. - Develop a range of practical skills to create products (cutting, drilling, screwing, nailing, gluing, filing and sanding)
	Vocabulary		appearance, construction, design, entry point, finish, functionality, joining, model, product, roof, safety, structure, tools, wall, part, test	construct, frame, join, joint, stable, stiff, strengthen, structure	diagonal strut, frame structure, stability, strength, three-dimensional, triangular shape	cone, cube, cuboid, hexagonal prism, net, packaging, prototype, triangular prism	brace, lifting arm, load, stable, strong, structure, strut, sturdy, triangle, column, framework, lintel, post, stability, stiffness, support.	

Mechanisms	Core Knowledge	- Vehicles and machines have wheels and axels to help them move.	- An axel is a rod or spindle that passes through the centre of a wheel to connect two wheels.	- A mechanism is a device that takes one type of motion or force and produces a different one. - A mechanism makes a job easier to do. - Mechanisms include sliders, levers, linkages, gears, pulleys and cams.	- Levers consist of a rigid bar that rotates around fixed point called a fulcrum. - Levers reduce the amount of work needed to lift a heavy object. - Sliders move from side to side or up and down, and are often used to make moving parts in books. - Axels are shafts on which wheels can rotate to make a moving vehicle. - Cams are devices that can convert circular motion into up- and -down motion.	- Mechanisms can be used to add functionality to a model. For example: ➢ sliders or levers an be used in moving pictures, storybooks or simple puppets ➢ linkages in moving vehicles or puppets ➢ gears in motorised vehicles or spinning toys ➢ pulleys in cable cars or transport systems ➢ cams in 3-D moving toys or pictures.	- Pneumatic systems use energy that is stored in compressed air to do work. Such as inflating a balloon to open a model monster's mouth. These effects can be achieved using syringes and plastic tubing.	- Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. - Other mechanisms include pneumatics and hydraulics.
	Skills	- Explore, build and play with a range of resources and construction kits with wheels and axels.	- Use wheels and axels to make a simple moving model.	- Use a range of mechanisms (levers, sliders, wheels and axels) in models or products. - Create products using levers, wheels ad winding mechanisms.	- Explore and use a range of mechanisms (levers, sliders, axels, wheels and cams) in models or products.	- Explore and use a range of mechanisms (levers, axels, cams, gears and pulleys) in models or products. - Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product.	- Use mechanical systems in their products, such as pneumatics.	- Explain and use mechanical systems in their products to meet a design brief. - Convert rotary motion to linear using cams. - Use innovative combinations of electronics/ computing and mechanics in product designs.
	Vocabulary		axle, chassis, connect, move, roll, wheel	bar, component, fixed pivot, force, lever, linkage, machine, mechanism, motion, movement, moving pivot, pivot, pull, push, slider, slider mechanism	automaton toy, axle, cam, component, down, elliptical cam, follower, heart cam, hexagonal cam, lever, linkage, machine, mechanical, mechanism, motion, movement, off-centre cam, pear cam, rotational, slider, snail cam, square cam, up, wheel	axle, compound machine, effort, first class, force, fulcrum, inclined plane, lever, load, pulley, screw, second class, simple machine, third class, wedge, wheel	actuator, air, air pressure, compress, compressor, force, gas, hinge, lever, movement, piston, plunger, pneumatics, pneumatic system, power, reservoir, syringe, valve	

Design and Technology Progression: Cooking and Nutrition

Cooking and nutrition
As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:
Key stage 1
- use the basic principles of a healthy and varied diet to prepare dishes
understand where food comes from.

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As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:
Key stage 2
- 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.

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Core Knowledge	- A recipe is set of instructions for preparing a dish and includes a list of the ingredients. - There are healthy and unhealthy foods. Fruit and vegetables are an important part of a healthy diet. - Food comes from different sources, including from animals, such as meat, fish, eggs and diary, or from plants, such as fruit and vegetables.	- Using non-standard measures is a way of measuring that does not involve reading scales. - Fruit and vegetables are an important part of a healthy diet. - It is recommended that people eat at least five portions of fruit and vegetables every day. - Some foods come from animals, such as meat, fish and dairy products. - Other foods come from plants, such as fruit, vegetables, grains, beans and nuts.	- Some ingredients need to be prepared before they can be cooked or eaten. - There are many ways to prepare ingredients: peeling, grating, chopping, slicing. - A healthy diet should include meat or fish, starchy foods (such as potatoes or rice), some dairy foods, a small amount of fat and plenty of fruit and vegetables. - Food comes from two main sources; animals and plants. - Cows provide beef, sheep provide lamb and mutton and pigs provide pork, ham and bacon. - Examples of poultry include chickens, geese and turkeys. - Examples of fish include cod, salmon and shellfish. - Milk comes mainly from cows but also from goats and sheep. - Most eggs come from chickens. - Honey is made by bees. - Fruit and vegetables come from plants. - Oils are made from parts of plants. - Sugar is made from plants called sugar cane and sugar beet. - Plants can also give us nuts, such as almonds, walnuts and hazelnuts.	- Preparation technique for savoury dishes include peeling, chopping, deseeding, slicing, dicing, grating, mixing and skinning. - There are five main food groups that should be eaten regularly as part of a balanced diet: fruit and vegetables; carbohydrates (potatoes, bread, rice and pasta); proteins (beans, pulses, fish, eggs and meat); dairy and alternatives (milk, cheese and yoghurt) and fats (oils and spreads) - Foods high in fat, salt and sugar should only be eaten occasionally as part of a healthy, balance diet. - The types of food that will grow in a particular area depend on a range of factors, such as the rainfall, climate and soil type	- Cooking techniques include baking, boiling, frying, grilling and roasting. - Healthy snacks include fresh and dried fruit and vegetables, nuts and seeds, rice cakes with low-fat cream cheese, homemade popcorn or chopped vegetables with hummus. - A healthy packed lunch might include a brown or wholemeal bread sandwich containing eggs, meats, fish or cheese, a piece of fresh fruit, a low-sugar yoghurt, rice cake or popcorn and a drink, such as water or semi-skimmed milk. - Particular areas of the world have conditions suited to growing certain crops, (coffee in Peru and citrus fruits in California in the USA.)	- Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. - Savoury dishes usually have a salty or spicy flavour rather than a sweet one. - A balance diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions. - Seasonality is the time of year when the harvest of flavour of a type of food is at its best. - Buying seasonal food is beneficial for many reasons: ➢ the food tastes better ➢ it is fresher because it hasn't been transported thousands of miles ➢ the nutritional value is higher ➢ the carbon footprint is lower, due to reduced transport ➢ it supports local growers ➢ is usually cheaper.	- Ingredients can usually be bought at supermarkets, but specialist shops may stock different items. Greengrocers sell fruit and vegetables, butchers sell meat, fishmongers sell fresh fish and delicatessens usually sell some unusually prepared foods, as well as cold meats and chesses. - Eating a balanced diet is a positive lifestyle choice that should be sustained over time. - Food that is high in fat, salt or sugar can still be eaten occasionally as part of a balanced diet. - Organic produce is food that has been grown without the use of man-made fertilisers, pesticides, growth regulators or animal feed additives. - Organic farmers use crop rotation, animals and plant manures, hand-weeding and biological pest control. - Understand the importance of correct storage and handling of ingredients.

	Skills	- Follow instructions, including simple recipes, that include measures and ingredients. - Suggest healthy ingredients that can be used to make simple snacks. - Understand where food comes from.	- Measure and weigh food items using non-standard measures, such as spoons and cups. - Select healthy ingredients for a fruit or vegetable salad. - Sort foods into groups by whether they are from an animal or plant source.	- Prepare ingredients by peeling, grating, chopping and slicing. - Describe the types of food needed for a healthy and varied diet and apply the principles to make a simple, healthy meal. - Identify the origin of some common foods (milk, eggs, some meats, common fruit and vegetables). - Use the basic principles of a healthy and varied diet to prepare dishes.	- Prepare and cook a simple savoury dish. - Identify the main food groups (carbohydrates, protein, dairy, fruits and vegetables, fats and sugars). - Identify and name foods that are produced in different places. - Understand and apply the principles of a healthy and varied diet.	- Identify and use a range of cooking techniques to prepare a simple meal or snack. - Design a healthy snack or packed lunch and explain why it is healthy. - Identify and name foods that are produced in different places in the UK and beyond.	- Use an increasing range of preparation and cooking techniques to cook a sweet or savoury dish. - Evaluate meals and consider if they contribute towards a balanced diet. Describe what seasonality means and explain some of the reasons why it is beneficial.	- Follow a recipe that requires a variety of techniques and source the necessary ingredients independently. - Plan a healthy daily diet, justifying why each meal contributes towards a balanced diet. - Explain how organic produce is grown. - Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.
	Vocabulary		flavour, fruit, healthy, ingredient, salad, vegetable, animal, dairy product, fish, flower, fruit, leaf, meat, nut, plant, root, seed, source, stem	ingredient, measure, preparation, animal, diet, fish, flower, fruit, leaf, mixed, nut, plant, pulse, root, seed, shellfish, source, stem, vegan, vegetarian	bake, barbecue, boil, chop, cook, deseed, dice, fry, grate, grill, hob, ingredient, method, microwave, mix, oven, peel, prepare, roast, skin, slice, slow cooker, steam, balanced, calcium, carbohydrate, dairy, diet, Eatwell guide, fibre, food group, fruit, healthy, nutrient, nutrition, oil, protein, vegetable, vitamin	bake, blender, chop, chopping board, cool, crush, cut, garlic press, grate, heat, knife, mash, masher, mix, pastry brush, peel, slice, spread, tear, wash, fresh, healthy, snack	blend, boil, brown, chop, cooked, dice, food hygiene, food preparation, grate, healthy and safety, mash, peel, puree, raw, sauté, simmer, steam, carbohydrates, fat, fibre, fresh, fruit, healthy, kilocalorie, kilojoule, mineral, nutrient, nutritional value, protein, salt, saturated fat, seasonal food, soup, sugar, vegetable, vitamin, produce, seasonal fruit, seasonality, seasonal vegetable	

Design and Technology Progression: Evaluate

Key Stage 1 National Curriculum
When designing and making, pupils should be taught to:
Evaluate
- explore and evaluate a range of existing product evaluate their ideas and products against design criteria

Key Stage 2 National Curriculum
When designing and making, pupils should be taught to:
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 events and individuals in design and technology have helped shape the world

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Core Knowledge	- Recognise that it is possible to change and alter their designs and ideas as they are making them. - Aspects of designing and making can be compared with others, including inspiration for making a product and the tools and technique used.	- A strength is a good quality of a piece of work. - A weakness is an area that could be improved. - Two products can be compared by looking at a set of criteria and scoring both products against ach one.	- Finished products can be compared with design criteria to see how closely they match. - Improvements can then be planned. - Products can be compared by looking at particular characteristics of each and deciding which is betters suited to the purpose.	- Asking questions can help others to evaluate their products, such as asking them whether the selected materials achieved the purpose of the model. - Work from different designers can be compared by assessing specific criteria, such as their visual impact, fitness for purpose and target market.	- Evaluation can be done by considering: ➢ whether the product does what it was designed to do ➢ whether it has an attractive appearance ➢ what changes were made during the making process ➢ why the changes were made. - Evaluation also includes suggesting improvements and explaining why they should be made. - A comparison table can be used to compare products by listing specific criteria on which each product can be judged or scored.	- Testing a product against the design criteria will highlight anything that need improvement or redesign. - Changes are often made to a design during manufacture. - A focus group is a small group of people whose reactions and opinions about a product are taken and studied. - Evaluations can be made by asking product users a selection of questions to obtain data on how the product has met its design criteria.	- Design is an iterative process, meaning alterations and improvements are made continually throughout the manufacturing process. - Evaluating a product while it's being manufactured, and explaining these evaluations to others, can help to refine it. - Products and inventions can be using a range of criteria, such as the impact on society, ease of use, appearance and value for money.
	Skills	- Adapt and refine their work as they are constructing and making. - Describe what, why and how something was made and compare with others. - Explore and evaluate a range of existing products.	- Talk about their own and each other's work, identifying strengths or weaknesses and offering support. - Describe the similarities and differences between two products.	- Explain how closely their finished products meet their design criteria and say what they could do better in the future. - Compare different or the same products from the same or different brands.	- Suggest improvements to their products and describe how to implement them, beginning to take the views of others into account. - Explain the similarities and difference between the work of two designers. - Investigate and analyse a range of existing products.	- Identify what has worked well and what aspects of their products could be improved, acting on their own suggestions and those of others when making improvements. - Create and complete a comparison table to compare two or more products.	- Test and evaluate products against a detailed design specification and make adaptations as they develop the product. - Survey users in a range of focus groups and compare results.	- Demonstrate modifications made to a product as a result of ongoing evaluation by themselves and to others - Create a detailed comparative report about two or more products or inventions. - Understand how key events and individuals in design and technology have helped shape the world.

	Vocabulary		change, criteria, difficulty, evaluate, improve, strength, weakness, success compare, different, similar, difference, similarity	change, dislike, evaluate, evaluation, improve, like, success, strength, weakness, design criteria, finish, improvement, product, successful compare, design, different, landmarks, motif, same, spots, stripes, feature, similar	evaluate, evaluation, improve, success, demonstrate, discussion, explain, feedback, finish, improvement, quality, reflect, strength, structure, change, design criteria, effective, findings, observation, suitability biome, compare, conservatory, designer, difference, purpose, similarity, structure, style	evaluation, fulfil design criteria, improve, success, appearance, attractive, design criteria, improvement, purpose, review, feedback, finish, modification, change, evaluate. appearance, colour, compare, component, different, embellishment, function, material, pattern, property, purpose, quality, similar, size, electrical product, manual product, usability	adjust design, analysis, deployment, evaluate, feedback, focus group, improvement, iterative process, problem-solve, product, prototype, success, test, discuss, evaluation, improve difference, similarity

Design and Technology Progression: Inspiration from Designers

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Core Knowledge	- Some products are significant because they have changed the way people live their lives.	- The importance of a product may be that it fulfils its goals and performs a useful purpose	- Many key individuals have helped shape the world. These include engineers, scientists, designers, inventors and many other people in important roles.	- Key inventions in design and technology have changed the way people live.	- Significant designers and inventors can shape the world.	- Many new designers and inventions influenced society. (labour saving devices in the home reduced the amount of housework, which was traditionally done by women. This enabled them to have jobs.)	- The significance of a designer can be measured in various ways. Their work maty benefit society in health, transport, communication, education, the built environment or technology. It may enhance culture in different areas, such as fashion, ceramics or computer games.
	Skills	- Explore significant products. - Suggest improvements to existing designs. - Explore how products have been created.	- Describe why a product is important. - Explore objects and designs to identify likes and dislikes of the designs.	- Explain why a designer or inventor is important	- Describe how key events in design and technology have shaped the world. - Improve upon existing designs, giving reasons for choices. - Disassemble products to understand hot they work.	- Explain how and why a significant designer or inventor shaped the world. - Identify some of the great designers in all areas of study to generate ideas for designs.	- Describe the social influence of a significant designer or inventor. - Create innovative designs that improve upon existing products. - Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices.	- Present a detailed account of the significance of a favourite designer or inventor. - Evaluate the design of products so as to suggest improvements to the user experience.
	Vocabulary		product, taxi, transport, vehicle	brand, Cath Kidston, distinctive, fashion, homeware designer, inspire, textile, vintage	Food Standard Agency	best before, canning, Dr Ruben Rausing, drying, Earl Tupper, freezing, Gerald Thomas, Henry D Thatcher, Jacob Perkins, Kruger Brewing Company, Louis Pasteur, Nicholas Appert, pasteurisation, Peter Durand, pickling, Ralph Wiley, refrigeration, salting, saran wrap, Tetra Pak, Tupperware, TV dinners, use by, William Cullen, William Kellogg, loom, weaver, weaving, Arts and Crafts movement, Morris & Co, textile designer, William Morris	ancient Egyptians, prehistoric builders, Roman builders	

Design and Technology Progression: Safety

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Core Knowledge	- Rules keep us safe when using equipment. Safety rules include always listening carefully and following simple instructions, using equipment only for the tasks they are designed for and washing hands before touching food.	- Rules are made to keep people safe from danger. Safety rules include always listening carefully and following instructions, using equipment only as and when directed, wearing protective clothing if appropriate and washing hands before touching food.	- Hygiene rules include washing hands before handling food, cleaning surfaces, tying long hair back, storing food appropriately and wiping up spills.	- Electrical appliances must only be used under the supervision of an adult. Safety rules must also be followed when using electricity: fingers and other objects must not be put into electrical outlets, anything with a cord or plug should never be used around water and a plug should never be pulled out by its cord.	- Chemicals are used in the home every day. They include cleaning products, such as bleach and disinfectant, but also paints, glues, oils, pesticides and medicines. Most chemical products carry a hazard symbol showing what way the chemical could be harmful. Chemicals should only be used under adult supervision. Appropriate safety precautions, such as wearing goggles and gloves, working in a well-ventilated room, wiping up spills and tying back long hair, should be taken.	- Safety features are often incorporated into products that might cause harm. Some examples include the child-safety caps on medicine bottles, seatbelts in cars, covers for electrical sockets and fingers guards on doors.	- The safety of the user has to be taken into account when designing a new product. Methods to help keep users safe include providing clear instructions for use; clear indication of the age range for which it is designed; safety features (such as child-resistant packaging); warning symbols and electrical safety checks.
Skills	- Follow rules and instructions to keep safe.	- Follow the rules to keep safe during a practical task.	- Work safely and hygienically in construction and cooking activities.	- Use appliances safely with adult supervision.	- Work safely with everyday chemical products under supervision, such as disinfectant hand wash and surface cleaning spray.	- Explain the functionality and purpose of safety features on a range of products.	- Demonstrate how their products take into account the safety of the user.
Vocabulary		safety, tool, hygiene, rule	equipment, safety, tool, hygiene	safety rules, supervision			

What will our pupils go on to learn?

Design and Technology Progression: Programme of Study KS3

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims of the National Curriculum

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of key stage 3, pupils are expected to know, apply and understand the matters, skills and processes specified in the programme of study.
Schools are not required by law to teach the example content in [square brackets].

Design and Technology Progression: Subject Content KS3

Key stage 3

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of domestic and local contexts [for example, the home, health, leisure and culture], and industrial contexts [for example, engineering, manufacturing, construction, food, energy, agriculture (including horticulture) and fashion].

When designing and making, pupils should be taught to:

Design

- use research and exploration, such as the study of different cultures, to identify and understand user needs
- identify and solve their own design problems and understand how to reformulate problems given to them
- develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses
- develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools

Make

- select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

Evaluate

- analyse the work of past and present professionals and others to develop and broaden their understanding
- investigate new and emerging technologies
- test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups

understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

Technical knowledge

- 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 products enable changes in movement and force
- understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]
- apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].

Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

Key stage 3

- understand and apply the principles of nutrition and health
- cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet
- become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes]
- understand the source, seasonality and characteristics of a broad range of ingredients.