Progression of Skills and Knowledge in DT

Humankind

Everyday Products

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skill	Name and explore a range of everyday products and begin to talk about how they are used.	Name and explore a range of everyday products and describe how they are used.	Explain how an everyday product could be improved.	Explain how an existing product benefits the user.	Investigate and identify the design features of a familiar product.	Explain how the design of a product has been influenced by the culture or society in which it was designed or made.	Analyse how an invention or product has significantly changed or improved people's lives.
Knowledge	Everyday products are objects that we use every day. These objects have a specific use.	An axle is a rod that is connected to the centre of a wheel, which allows it to turn. A chassis is the frame of a vehicle. A shelter is a structure designed to give protection from weather or danger.	There are many home products made from fabric. Examples of fabric-based products in the home include cushions, curtains, blinds and carpets. Products can be improved in different ways, such as making them easier to use, more hardwearing or more attractive.	Particular products are designed for specific tasks. For example, designing a product to help grow plants will require certain materials.	Design features are the aspects of a product's design that the designer would like to emphasise. For example, the use of a particular material or a feature that makes the product durable. A switch makes or breaks a circuit. When a switch is closed or 'on', the circuit is complete. When a switch is open or 'off', the circuit is incomplete. A programmable device is a machine that is provided with coded instructions for the automatic performance of a task.	The design of products needs to take into account the culture of the target audience. The ancient Greeks developed the Classical form of architecture that has been copied for thousands of years.	Make Do and Mend was a campaign run by the Ministry of Information during the Second World War to encourage people to recycle and repurpose their old clothes rather than buy new. The Make Do and Mend campaigns aimed to limit the amount of labour and materials used in clothes production, so that it could be used to support the greater war effort. A processed food is changed during preparation and includes processes, such as cooking, freezing, pasteurising, or the addition of ingredients. Processed foods can be convenient and increase availability, but often lack of nutrients and contain unhealthy ingredients when compared to whole foods. Sliced bread is processed. It can contain many more ingredients than homemade bread, including preservatives and artificial ingredients.

							Bridge structures have changed over time. This is due to factors such as technology, design innovation and new and better access to materials.

Staying Safe

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skill	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.
Knowledge	Rules keep us safe when using equipment.	Rules are made to keep people safe from danger. Safety rules include always listening carefully, following instructions and using equipment only when told to.	Hygiene rules include washing hands before handling food, cleaning surfaces, tying long hair back, storing food appropriately and wiping up spills.	Safety rules must 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. Chemicals should only be used under adult supervision.	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 finger guards on doors.	The safety of the user has to be taken into account when designing a new product.

Processes

Mechanisms and Movement

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Explore, build and play with a range of resources and construction kits with wheels and axles.	Use wheels and axles to make a simple moving model.	Use a range of mechanisms (levers, sliders, wheels and axles) in models or products.	Explore and use a range of mechanisms (levers, sliders, axles, wheels and cams) in models or products.	Explore and use a range of mechanisms (levers, axles, cams, gears and pulleys) in models or products.	Use mechanical systems in their products, such as pneumatics.	Explain and use mechanical systems in their products to meet a design brief.
Knowledge	Vehicles and machines have wheels and axles to help them move. Wheels help vehicles move. An axle is a rod that goes through the middle of the wheel to help it stay in place. Vehicles have wheels and axels to help them move.	Most vehicles that move on land have axles and wheels that are fixed to a chassis. An axle fixed to a chassis has freely moving wheels. A freely moving axle has fixed wheels.	People build machines to make their work easier. A machine is made up of different parts that all work together to perform a task. Individual parts of a machine are called components. The part of a machine that brings about movement is called the mechanism. A slider mechanism moves in a straight line. Real-life examples of slider mechanisms include door bolts and drawers. A lever mechanism is a bar that moves around a fixed point called a pivot.	Cams are devices that can convert circular motion into up-and-down motion. The cam is fixed to the axle and the follower sits on the cam. When the axle is rotated, the follower moves up and down, following the shape of the cam. Different shaped cams produce different patterns of movement in the follower.	Simple machines make physical jobs easier by changing the strength or direction of a force. There are six simple machines: pulley, lever, wheel and axle, wedge, inclined plane and screw. Simple machines can be combined to make complex, compound machines. For example, a wheelbarrow combines a lever with a wheel and axle.	A pneumatic system uses compressed air to exert a force. Pneumatic systems can be used to lift heavy loads, raise and lower platforms or soften a force by acting as a shock absorber.	Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. Other mechanisms include pneumatics and hydraulics.

			Real-life uses of levers include scissors and seesaws. A linkage mechanism combines levers and sliders. Real-life uses of linkages include toolboxes and scissor lifts.				

Electricity

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skill	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.	Use electrical circuits of increasing complexity in their models or products, showing an understanding of control.	Understand and use electrical circuits that incorporate a variety of components (switches, lamps, buzzers and motors) and use programming to control their products.
Knowledge	Microwaves, toasters and blenders are machines. Machines need power to make them work.	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 electronic 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.

Creativity

Generation of ideas

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skill	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 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 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.
Knowledge	It is important to share resources and communicate our ideas in order to get on with others.	A product or project is usually guided by a set of design criteria. The project or product must meet the design criteria to be successful.	Ideas can be communicated in a variety of ways, including written work, drawings and diagrams, modelling, speaking and using information and communication technology.	Design criteria are the exact goals a project must achieve to be successful. These criteria might include the product's use, appearance, cost and target user.	Annotated sketches and exploded diagrams show specific parts of a design, highlight sections or show functions. They communicate ideas in a visual, detailed way.	Computer-aided design (CAD) is the use of specialised computer software to design objects. CAD designs can also be made into objects using 3-D printers.	Ideas can be communicated in a range of ways, including through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Structures

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skill	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.	Prototype shell and frame structures, showing awareness of how to strengthen, stiffen and reinforce them.	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.
Knowledge	A bridge is a structure that allows people and vehicles to cross over an open space. There are lots of different types of puppets. Some puppets have moving parts.	Different materials can be used for different purposes, depending on their properties.	Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular	Diagonal struts create triangular shapes within a frame structure. Adding diagonal struts to a frame structure	A prototype 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.	Support, stiffness and stability can be created by using triangular shapes to create strong frameworks, columns to support roofs and	Strength can be added to a framework by using multiple layers or changing its shape. Triangles do not collapse or distort easily

	There are lots of different types of puppets including finger puppets.		shapes rather than squares.	adds strength and stability.		overlapping brickwork patterns. Mechanisms and systems can work together to perform a function. A strong and stable structure is necessary to support mechanisms in a machine.	and so are used in architecture to provide support and stability.

The Use of ICT

	Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
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.
Knowledge	Digital devices can be used to share information about creations with others.	Computer-aided design 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 textures 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 specified task on a computer.	Remote control is controlling a machine or activity from a distance. Computers can be used to remotely control a device.	Equipment and devices can be controlled by pressing buttons on a control panel, such as on a washing machine or microwave.	Many devices that we see in our homes and elsewhere use programmable sensors that monitor environmental variables, such as light, sound, movement and temperature.

Investigation

Investigation

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Choose and explore appropriate tools for simple practical tasks.	Select the appropriate tool for a simple practical task.	Select the appropriate tool for a task and explain their choice.	Use tools safely for cutting and joining materials and components.	Select, name and use tools with adult supervision.	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.
Knowledge	There are different ways to join materials together.. Sewing is stitching things using a needle and thread.	Some foods need to be prepared before eating. Peeling, slicing, chopping, grating, tearing or mashing are different methods of preparing foods.	Tools have characteristics that make them suitable for specific purposes. For example, a knife is good for cutting food because it has a sharp metal edge.	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. For example, 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.	Deconstructing garments identifies how they were made, the materials used and their properties. Hand stitches include running stitch, blanket stitch and whip stitch.

Evaluation

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Skills	Adapt and refine their work as they are constructing and making.	Talk about their own and each other's work, identifying strengths or weaknesses and offering support.	Explain how closely their finished products meet their design criteria and say what they could do better in the future.	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.	Test and evaluate products against a detailed design specification and make adaptations as they develop the product.	Demonstrate modifications made to a product as a result of ongoing evaluation by themselves and to others.	Demonstrate modifications made to a product as a result of ongoing evaluation by themselves and to others
Knowledge	Recognise that it is possible to change and alter their designs and ideas as they are making them.	A strength is something that is good about a piece of work. A weakness is an area that could be improved.	A finished product can be checked against design criteria to see how successfully it has been made or to evaluate how well it works. Improvements can then be planned.	Asking questions can help others to evaluate their products. For example, asking someone whether the materials selected helped achieve the purpose of the model.	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 and why the changes were made. The evaluation process can include suggesting improvements and explaining why they should be made.	Testing a product against the design criteria will highlight anything that needs improvement or redesign.	An iterative process starts with requirements and continues by creating a product, testing it, and revising it before creating a better version. The iterative process is a series of steps that are repeated, improving the product with each cycle.

Materials

Cutting and Joining Textiles

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills		Cut and join textiles using glue and simple stitches.	Use different methods of joining fabrics, including glue and running stitch.	Cut and join wools, threads and other materials to a loom.	Hand sew a hem or seam using a running stitch.	Combine stitches and fabrics with imagination to create a mixed media collage.	Pin and tack fabrics in preparation for sewing and more complex pattern work.
Knowledge		A running stitch is made by passing a needle in and out of fabric. Running stitches are made at equal distances apart.	A running stitch is a basic stitch used to join two pieces of fabric.	Weaving involves interlacing pieces of thread or yarn or other materials.	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.	A collage is artwork made by sticking materials, such as scraps of paper or fabric, onto a background.	Pinning with dressmaker pins and tacking with quick, temporary stitches holds fabric together in preparation for and during sewing.

Materials for purpose

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Select appropriate materials when constructing and making.	Select and use a range of materials, beginning to explain their choices.	Choose appropriate components and materials and suggest ways of manipulating them to achieve the desired effect.	Plan which materials will be needed for a task and explain why.	Choose from a range of materials, showing an understanding of their different characteristics.	Select and combine materials with precision.	Choose the best materials for a task, showing an understanding of their working characteristics.
Knowledge	Different materials are suitable for different purposes, such as construction kits for modelling and ingredients for baking.	Select and use a range of materials, beginning to explain their choices.	Properties of components and materials determine how they can and cannot be used.	Materials for a specific task must be selected on the basis of their properties. For example greenhouses need transparent or translucent materials. Availability and cost have also got to be considered.	Characteristics of materials, such as rigidity, strength and smoothness will affect the success of a working model. Visual qualities of a yarn can include its colour, elasticity, pattern and texture.	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.	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,

					Fabrics can be natural or synthetic. Natural fabrics include cotton, silk and wool. Synthetic fabrics include Lycra, polyester and nylon.		colour, cost and availability.