

Design and Technology – Progression of Skills

Design and Technology (D&T) involves thinking about what products are used for and the needs of those who use them. A good D&T activity has to have sufficient depth and breadth to enable pupils to learn practical skills and provide them with the knowledge to make products that move/ light up/ are structurally sound and don't collapse/ are safe and healthy. Pupils need to be able to test, refine and develop the products they design and make to check that they work and improve them if they do not.

EYFS			
Teachers should:	By looking and talking:	Through playing	By the end of EYFS the children should be able to;
Set up and engage children in learning experiences that help children to explore and combine different media with a purpose in mind. e.g. A chair for teddy. Allow children opportunities to Construct with a purpose in mind, using a variety of Resources Provide children with a variety of learning experiences that develop their use of simple tools and techniques to shape assemble and join materials,	Encourage children to look at and disassemble objects and items Allow them to develop their curiosity about how things have been made and put together. Encourage them to share what they notice and to talk about what they think each part does and how they work.	Give opportunities to manipulate materials and tools safely. To take things apart and to build and rebuild. Get them to tell you about what they are making – encourage them to talk about any changes they have made as it evolves. To select resources and tools that they want to use and to handle transport and store things carefully.	Select and manipulate materials to create a desired outcome Safely handle tools and use some techniques to cut and join materials e.g. Scissors, glue, tape Talk about what they are going to make, chose resources and tools. Talk about what they are making and how they are making it. Talk about what they have made and why
Vocabulary Scissors Stick Join Cut Sew Material Card Strong Weak		Assessment Tell me about what you are making? Why did you choose to use this? How did you join this? What other way could you do this? Is this strong enough? What have you made?	

STRUCTURES				
		Year 1/2 Baby Bear's Chair	Year 3/4 Pavilions	Year 5/6 Playgrounds
Skills	Design	Generating and communicating ideas using sketching and modelling.	Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect.	Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be

		• Learning about different types of structures, found in the natural world and in everyday objects.	• Building frame structures designed to support weight.	used, considering effective and ineffective designs.
	Make	• Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper.	• Creating a range of different shaped frame structures. • Making a variety of free standing frame structures of different shapes and sizes. • Selecting appropriate materials to build a strong structure and cladding. • Reinforcing corners to strengthen a structure. • Creating a design in accordance with a plan. • Learning to create different textural effects with materials.	• Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures.
	Evaluate	• Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of own structure.	• Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.	• Improving a design plan based on peer evaluation. • Testing and adapting a design to improve it as it is developed. • Identifying what makes a successful structure.
Knowledge	Technical	• To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily.	• To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own.	• To know that structures can be strengthened by manipulating materials and shapes.
	Additional	• To know that natural structures are those found in nature. • To know that man-made structures are those made by people.	• To know that a pavilion is a decorative building or structure for leisure activities. • To know that cladding can be applied to structures for different effects. • To know that aesthetics are how a product looks.	• To understand what a 'footprint plan' is. • To understand that in the real world, design, can impact users in positive and negative ways. • To know that a prototype is a cheap model to test a design idea.

		• To know that a product's function means its purpose. • To understand that the target audience means the person or group of people a product is designed for. • To know that architects consider light, shadow and patterns when designing.	
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MECHANISMS

		Year 1/2 Wheels and Axles	Year 1/2 Making Moving Monsters	Year 3/4 Pneumatic Toys	Year 5/6 Automata Toys
Skills	Design	• Thinking about what others might want from a design. • Beginning to recognise how products and designs in the world around us solve certain needs. • Considering who they are designing for - by identifying the user. • Stating what they intend to make and why - by identifying the purpose. • Talking about ideas with purpose and user in mind. • Talking about existing products when generating ideas. • Using basic drawing skills to communicate ideas.	• Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria.	• Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. • Taking part in structured idea blasting sessions. • Coming up with more ideas and considering the feasibility of their ideas in the classroom. • Developing drawing and sketching skills with a focus on clarity and simplicity. • Developing designs by adding detail and justifications about materials, tools, methods. • Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches, cross-sectional diagram, thumbnail sketches and exploded diagrams).	• Noticing wider-reaching problems or needs in the community. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.
	Make	• Planning more than one step ahead. • Choosing between a small number of materials, ingredients or components. • Explaining their choices based on personal experiences.	• Making linkages using card for levers and split pins for pivots. • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. • Cutting and assembling components neatly.	• Selecting equipment required for a series of tasks based on the plan. Explain why each piece is suitable for each stage. • Suggesting simple safety rules based on their understanding of tool dangers. • Participating in discussions about classroom safety procedures.	• Producing lists of equipment, materials and tools that they need for a task. • Selecting materials, components or ingredients based on research or user needs. • Explaining their choices, referring to their research.

		● Requesting equipment appropriate to the purpose (e.g. scissors for cutting and glue for joining). ● Explaining in simple terms why certain tools must be handled carefully. ● Following and recalling simple safety instructions. ● Finding the middle of an object. ● Refining their grip to cut competently and confidently. ● Cutting straight lines and evenly spaced lines. ● Beginning to cut large shapes and thicker materials like card. ● Puncturing holes. ● Recognising the edges of paper and card need to be stuck firmly using a glue stick. ● Using tools, like scissors, to create shapes. ● Beginning to cut large shapes and thicker materials like card. ● Beginning to use controlled painting or colouring techniques to finish a product. ● Adding texture to create visual interest		● Cutting out more complex shapes accurately. ● Handle different sizes and types of scissors with confidence. ● Using PVA glue to join corrugated card and light wood (e.g. balsa wood). ● Choosing shapes to suit the function of a product. ● Painting or colouring precisely to improve the finish. ● Making facades from a range of materials. ● Sealing edges with tape to cover gaps in joins.	Considering which equipment will work well together. ● Choosing from the known range of equipment available to them with little guidance. ● Assessing risks associated with different tools and equipment. ● Understanding and explaining the importance of each safety rule. ● Consistently apply safety instructions. ● Cutting jelutong or other harder wood with a coping saw or a tenon saw in small groups. ● Cutting in a back-and-forth sawing motion where appropriate. ● In supervised groups, using hot glue guns safely. ● Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly.
	Evaluate	● Discussing existing products, saying what they like about them. ● Comparing two products and discussing which is better for a specific purpose. ● Comparing their finished products with their original designs. ● Saying what they like about their peers' designs and products. ● Accepting feedback and understanding it is meant to improve their work.	● Evaluating own designs against design criteria. ● Using peer feedback to modify a final design.	● Analysing why specific products, designers or inventors are successful. ● Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. ● Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements.	● Assessing their designs against a more complex set of design criteria including functionality, aesthetics, user experience, sustainability and cost. ● Providing feedback that is helpful, specific and encouraging. ● Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.
Knowledge	Technical	● Recognising and exploring everyday objects that have mechanisms.	● To know that mechanisms are a collection of moving parts	● Beginning to understand how mechanisms work.	● To know that the mechanism in an automata uses a system of cams, axles and followers.

		• Many things that move have parts inside to help them work. • Mechanisms usually limit unwanted movement. • An axle allows the wheel to turn without falling off.	that work together as a machine to produce movement. • To know that there is always an input and output in a mechanism. • To know that an input is the energy that is used to start something working. • To know that an output is the movement that happens as a result of the input. • To know that a lever is something that turns on a pivot. • To know that a linkage mechanism is made up of a series of levers.	• Recognising pneumatic systems in everyday objects (e.g. car boot, adjustable chair.)	• To know that different shaped cams produce different outputs. • To know which mechanisms are working together to make a mechanical system. • To know that there are different directions of movement. • To know that mechanisms can change one type of movement to another.
	Additional	• To know that the 'user' is the person who will use the product. • To know that different users may want different things from a design. • To know that designers usually design and make something to solve a problem. • To know that existing products can help when deciding what to design. • To know that drawings are a way to explain ideas. • To know that a plan is deciding what to do first and next. • To know that choosing different materials or components will have an effect on what their product does or looks like. • To know the names of common pieces of equipment. • To know that some tools are sharp like scissors and knives. • To know that following instructions helps with safety.	• To know some real-life objects that contain mechanisms.	• To know that a problem or need is something that a designer can help to solve. • To know that extra information on drawings or diagrams can help the user understand a design or idea. • To know that thumbnail sketches are less detailed quick sketches. • To know that a cross-sectional diagram shows the inside of a product. • To know that designers and inventors create products. • To know that choices of materials and equipment can affect the final product. • To know that feedback is ideas and suggestions from other people that can help improve their work. • To understand that a mechanical system can allow us to move something more easily.	• To know that an automata is a hand powered mechanical toy. • To know that a cross-sectional diagram shows the inner workings of a product.

		• To know that some products will be better than others. • To know that their ideas or products can be made better. • To know that their final product might be different to their original idea. • To know that their ideas can make someone else's work better.		• To know that mechanical systems have more than one mechanism that moves to make them work. • To know that mechanical systems are often hidden in products to make them look more appealing. • To know that pushing air can be used to move a mechanism. • To know that pivots can be used to create more movement in the mechanical system. • To know that a combination of mechanisms can improve a product.	
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COOKING AND NUTRITION

		Year 1/2 Smoothies	Year 3/4 Eating Seasonally	Year 5/6 Developing a recipe
Skills	Design	• Designing smoothie carton packaging by-hand. • Learning where and how fruits and vegetables grow. • Designing three wrap ideas.	• Describing how climate affects where foods grow.	• Researching existing recipes. • Suggesting alternative ingredients. • Designing a jar label.
	Make	• Chopping fruit and vegetables safely to make a smoothie. • Juicing fruits safely to make a smoothie. • Identifying if a food is a fruit. • Chopping foods safely to make a wrap. • Constructing a wrap that meets a design brief. • Grating foods to make a wrap. • Snipping smaller foods instead of cutting. • Spreading soft foods to make a wrap. • Identifying the five food groups. • Learning about balanced diet.	• Identifying seasonal ingredients from the UK. • Following the instructions within a recipe. • Tasting seasonal ingredients. • Peeling foods by hand or with a peeler. • Cutting ingredients safely. • Choosing ingredients based on a design brief.	• Writing an alternative recipe. • Understanding cross-contamination. • Using preparation skills. • Making a developed recipe.
	Evaluate	• Tasting and evaluating different food combinations. • Describing appearance, smell and taste. • Suggesting information to be included on packaging. • Comparing their own smoothie with someone else's.	• Describing the texture and flavour of ingredients. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment.	• Explaining the farm to fork process. • Analysing nutritional content.

		• Describing appearance, smell and taste. • Taste and evaluating different food combinations. • Describing the information that should be included on a label.		
Knowledge	Technical	• To know that a blender is a machine which mixes ingredients together into a smooth liquid. • To know that a fruit has seeds and a vegetable does not. • To know that fruits grow on trees or vines. • To know that vegetables can grow either above or below ground. • To know that vegetables is any edible part of a plant. • To know that 'diet' means the food and drink that a person or animal usually eats. • To know what makes a balanced diet. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To know that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that 'ingredients' means the items in a mixture or recipe. • To know how to cut, grate, snip and spread to prepare foods. • To know how to review and give a score to evaluate.	• To know that seasonal means foods that grow in a given season in a given country. • To know some seasonal foods that grow in the UK and what season they grow in. • To know that eating seasonal foods can have a positive impact on the environment. • To know how to describe the flavour and texture of foods. • To know how to cut a peel safely. • To know that the appearance of food is as important as taste. • To know that similar coloured fruits and vegetables often have similar nutritional benefits.	• To know that beef comes from cows reared on farms. • To know that recipes can be adapted to suit nutritional needs and dietary requirements. • To know that nutritional information is found on food packaging. • To know that coloured chopping boards can prevent cross-contamination. • To know that food packaging serves many purposes.

TEXTILES

TEXTILES				
		Year 1/2 Either Pouches or Puppets	Year 3/4 Cross Stitch and Applique	Year 5/6 Stuffed toys
Skills	Design	• Using a template to create a design for a puppet. • Designing a pouch.	• Designing and making a template from an existing cushion and applying individual design criteria.	• Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. • Considering the proportions of individual components.
	Make	• Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet.	• Following design criteria to create a cushion or Egyptian collar.	• Creating a 3D stuffed toy from a 2D design.

		• Sequencing steps for construction. • Selecting and cutting fabrics for sewing. • Decorating a pouch using fabric glue or running stitch. • Threading a needle. • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. • Neatly pinning and cutting fabric using a template.	• Selecting and cutting fabrics with ease using fabric scissors. • Threading needles with greater independence. • Tying knots with greater independence. • Sewing cross stitch to join fabric. • Decorating fabric using appliqué. • Completing design ideas with stuffing and sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars).	• Measuring, marking and cutting fabric accurately and independently . • Creating strong and secure blanket stitches when joining fabric. • Threading needles independently. • Using appliqué to attach pieces of fabric decoration. • Sewing blanket stitch to join fabric. • Applying blanket stitch so the spaces between the stitches are even and regular.
	Evaluate	• Reflecting on a finished product, explaining likes and dislikes. • Troubleshooting scenarios posed by teacher. • Evaluating the quality of the stitching on others' work. • Discussing as a class, the success of their stitching against the success criteria. • Identifying aspects of their peers' work that they particularly like and why.	• Evaluating an end product and thinking of other ways in which to create similar items.	• Testing and evaluating an end product and giving point for further improvements.
Knowledge	Technical	• To know that 'joining technique' means connecting two pieces of material together. • To know that there are various temporary methods of joining fabric by using staples. glue or pins. • To understand that different techniques for joining materials can be used for different purposes. • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. • To know that drawing a design idea is useful to see how an idea will look. • To know that sewing is a method of joining fabric. • To know that different stitches can be used when sewing. • To understand the importance of tying a knot after sewing the final stitch. • To know that a thimble can be used to protect my fingers when sewing.	• To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. • To know that when two edges of fabric have been joined together it is called a seam. • To know that it is important to leave space on the fabric for the seam. • To understand that some products are turned inside out after sewing so the stitching is hidden.	• To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. • To understand that it is easier to finish simpler designs to a high standard. • To know that soft toys are often made by creating appendages separately and then attaching them to the main body. • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely.

DIGITAL WORLD

		Year 3/4 Mindful Timer	Tear 5/6 Monitoring Devices
Skills	Design	• Writing design criteria for a programmed timer (Micro:bit). • Exploring different mindfulness strategies. • Applying the results of my research to further inform my design criteria. • Developing a prototype case for my mindful moment timer. • Using and manipulating shapes and clipart by using computer-aided design (CAD), to produce a logo. • Following a list of design requirements.	• Researching (books, internet) for a particular (user's) animal's needs. • Developing design criteria based on research. • Generating multiple housing ideas using building bricks. • Understanding what a virtual model is and the pros and cons of traditional and CAD modelling. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD.
	Make	• Developing a prototype case for my mindful moment timer. • Creating 3D structures using modelling materials. • Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press.	• Understanding the functional and aesthetic properties of plastics. • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range.
	Evaluate	• Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages. • Evaluating my Micro:bit program against points on my design criteria and amending them to include any changes I made. • Documenting and evaluating my project. • Understanding what a logo is and why they are important in the world of design and business. • Testing my program for bugs (errors in the code). • Finding and fixing the bugs (debug) in my code. • Using an exhibition to gather feedback. • Gathering feedback from the user to make suggested improvements to a product.	• Stating an event or fact from the last 100 years of plastic history. • Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices. • Explaining key functions in my program (audible alert, visuals). • Explaining how my product would be useful for an animal carer including programmed features.
Knowledge	Technical	• To understand what variables are in programming. • To know some of the features of a Micro:bit. • To know that an algorithm is a set of instructions to be followed by the computer. • To know that it is important to check my code for errors (bugs). • To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device.	• To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record. • To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. • To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met.
	Additional	• To understand the terms 'ergonomic' and 'aesthetic'. • To know that a prototype is a 3D model made out of cheap materials, that allows us to test design ideas and make better decisions about size, shape and materials. • To know that an exhibition is a way for companies to showcase products, meet potential new customers and gather feedback from users.	• To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.

ELECTRICAL SYSTEMS

		Year 3/4 Torches	Tear 5/6 Steady Hand Game
Skills	Design	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	• Designing a steady hand game - identifying and naming the components required. • Drawing a design from three different perspectives. • Generating ideas through sketching and discussion. • Modelling ideas through prototypes. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.
	Make	• Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria.	• Constructing a stable base for a game. • Accurately cutting, folding and assembling a net. • Decorating the base of the game to a high quality finish. • Making and testing a circuit. • Incorporating a circuit into a base
	Evaluate	• Evaluating electrical products. • Testing and evaluating the success of a final product.	• Testing own and others finished games, identifying what went well and making suggestions for improvement. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys.
Knowledge	Technical	• To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow. • To know that a switch can be used to complete and break an electrical circuit.	• To know that batteries contain acid, which can be dangerous if they leak. • To know the names of the components in a basic series circuit, including a buzzer.
	Additional	• To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. • To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.	• To know that 'form' means the shape and appearance of an object. • To know the difference between 'form' and 'function'. • To understand that 'fit for purpose' means that a product works how it should and is easy to use. • To know that form over purpose means that a product looks good but does not work very well. • To understand the diagram perspectives 'top view', 'side view' and 'back'