Grimsargh St Michael's CE Primary School

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DESIGN TECHNOLOGY Progression

Vision	Our goal for Design and Technology education is to create 'Agents of Change' through our rigorous and practical DT curriculum. We want our children to be creative thinkers and problem solvers, so we give them opportunities to develop the skills they need to solve real and relevant problems in a variety of contexts through our three 'Big Ideas': Design – I use creativity, experience and experimentation to design new products. Skills – I learn and apply practical skills and technical knowledge in the making process. Evaluate – I evaluate my designs and products to improve them. Through the study of Design and Technology, children combine practical skills with an understanding of aesthetic, social and environmental issues, as well as functions and industrial practices. This allows them to reflect on and evaluate present and past design and technology, its uses and its impacts. Design and Technology helps all our children to become astute and informed future consumers and potential innovators.
Aims	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.

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	SKILLS			**KNOWLEDGE**	
	Design	**Make**	**Evaluate**	**Technical**	**Additional**
EYFS Structures: Junk Modelling	• *Making verbal plans and material choices.* • *Developing a junk model.*	• *Improving fine motor/scissor skills with a variety of materials.* • *Joining materials in a variety of ways (temporary and permanent).* • *Joining different materials together.* • *Describing their junk model, and how they intend to put it together.*	• *Giving a verbal evaluation of their own and others' junk models with adult support.* • *Checking to see if their model matches their plan.* • *Considering what they would do differently if they were to do it again.* • *Describing their favourite and least favourite part of their model.*	• *To know there are a range to different materials that can be used to make a model and that they are all slightly different.* • *Making simple suggestions to fix their junk model.*	
Textiles: Bookmarks	• *Discussing what a good design needs.* • *Designing a simple pattern with paper.* • *Designing a bookmark.* • *Choosing from available materials.*	• *Developing fine motor/cutting skills with scissors.* • *Exploring fine motor/threading and weaving (under, over technique) with a variety of materials.* • *Using a prepared needle and wool to practise threading.*	• *Reflecting on a finished product and comparing to their design*	• *To know that a design is a way of planning our idea before we start.* • *To know that threading is putting one material through an object.*	

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Structures: Boats	• Designing a junk model boat. • Using knowledge from exploration to inform design.	• Making a boat that floats and is waterproof, considering material choices	• Making predictions about, and evaluating different materials to see if they are waterproof. • Making predictions about, and evaluating existing boats to see which floats best. • Testing their design and reflecting on what could have been done differently. • Investigating the how the shapes and structure of a boat affect the way it moves	• To know that 'waterproof' materials are those which do not absorb water.	• To know that some objects float and others sink. • To know the different parts of a boat.
<u>YEAR 1</u> **Autumn** Structures: Stable Structures	● 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 – identifying the user. ● Stating what they intend to make and why – identifying the purpose. ● Talking about ideas, with purpose and user in mind.	● Choosing between a small number of materials, ingredients or components. ● Explaining their choices based on personal experiences. ● Requesting equipment appropriate to the purpose. (e.g. scissors for cutting, glue for joining) ● Beginning to use objects with a fixed width or length to create even spacing of markings or cuts (e.g. a lolly stick). ● Refining their grip to cut competently and confidently.	● Discussing existing products, saying what they like about them. ● Comparing two products and discuss which is better for a specific purpose. ● Saying what they like about their peers' designs and products. ● Accepting feedback and understanding it is meant to improve their work.	● Recognising that different structures are used for different purposes. ● Exploring the features of structures. ● Describing structures as buildings or freestanding structures. ● Making stable structures from card. ● Creating supporting structures to aid stability. ● Using stable objects like cylinders to create structures.	● 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 who they are designing for makes a difference to what they design. ● To know that the purpose is what something is for. ● 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 different equipment does different things.

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	● Talking about existing products when generating ideas. ● Using basic drawing skills to communicate ideas.	● Cutting straight lines and evenly spaced lines. ● Beginning to cut large shapes and thicker materials like card.			● To know the names of common pieces of equipment. ● 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 ideas can makes someone else's work better. ● To know that other people's ideas can help make their work better. ● To know that a structure is something that has been made and put together. ● To know that stable structures do not topple. ● To know that shapes and structures with wide, flat bases or legs are the most stable. ● To know that adding weight to the base of a structure can make it more stable
Spring Textiles: Puppets	• Using a template to create a design for a puppet.	• Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing the steps taken during construction.	• Reflecting on a finished product, explaining likes and dislikes.	• 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.	

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				• 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.	
Summer Cooking and Nutrition: Smoothies	• Designing smoothie carton packaging by-hand. • Learning where and how fruits and vegetables grow.	• Chopping fruit and vegetables safely to make a smoothie. • Juicing fruits safely to make a smoothie. • Identifying if a food is a fruit.	• 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.	• 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	

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YEAR 2 **Autumn** Structures: Baby Bear's Chair	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects	• 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.	• 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.	• 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 know that a 'stiff' structure or material is one which does not bend easily.	• To know that natural structures are those found in nature. • To know that man-made structures are those made by people
Spring Mechanisms: Fairground Wheel	● Conducting simple surveys or discussions to gather opinions on what others need or like in a design. ● Knowing that a survey is used to find out what people like. ● Using a simple design brief that outlines the intended use, target	● Choosing materials, ingredients or components from a wider range of materials, ingredients or components. ● Explaining their choices based on the properties of materials and components. ● Knowing some properties of materials like hard, soft,	● Discussing a range of existing products and saying what they like and dislike about them. ● Evaluating existing products against design criteria. ● Evaluating their ideas and creations against simple design criteria.	● To know everyday objects have mechanisms. ● To know many things that move have parts inside to help them work. ● To know mechanisms usually limit unwanted movement. ● To know everyday objects utilise wheels and axles. ● To know wheels must be able to turn to work effectively.	• To know the features of a fairground wheel include the wheel, frame, pods, a base an axle and an axle holder.

	user, and key features of the product, to create simple design criteria. ● Knowing that a design brief helps to decide what to make. ● Knowing that design criteria are the steps for making a product successful. ● Creating ideas with design criteria in mind. ● Referring to specific parts of existing products when generating ideas. ● Knowing that the design criteria help when thinking of ideas. ● Using labels to explain parts of a design, label materials, etc. ● Using labels to explain parts of a design, label materials, etc. ● Knowing that drawings can help explain how something works. ● Knowing that a label explains part of a drawing.	flexible, waterproof, strong etc. ● Following and recalling simple safety instructions. ● Knowing that some tools are sharp like scissors and knives. ● Choosing known geometric shapes when making. ● Beginning to shape objects to improve how they work. ● Knowing the names of some geometric shapes: triangle, pyramid, square, cube, circle, sphere. ● Considering balance in their finishing, like evenly spaced decoration.	● Knowing that design criteria help to decide if their product is a success. ● Suggesting improvements to their peers' designs and products. ● Knowing that improve means to make something better. ● Knowing that their suggestions can improve someone else's work.	● To know axles allow wheels to turn without falling off.	

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Summer Mechanisms: Making a Moving Monster	• Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria.	• 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	• Evaluating own designs against design criteria. • Using peer feedback to modify a final design.	• To know that mechanisms are a collection of moving parts 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	• To know some real-life objects that contain mechanisms.
<u>YEAR 3</u> **Autumn** Cooking and Nutrition: Easting Seasonally	• Describing how climate affects where foods grow	•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	• Describing the texture and flavour of ingredients. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment.	• 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.	

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				• 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.	
Spring Digital World: Wearable Technology	• Problem solving by suggesting which features on a micro:bit might be useful and justifying my ideas. • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. • Developing design ideas through annotated sketches to create a product concept. • Developing design criteria to respond to a design brief.	• Following a list of design requirements. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.	• Analysing and evaluating wearable technology. • Using feedback from peers to improve design.	• To understand that, in programming, a 'loop' is code that repeats something again and again until stopped. • To know that a micro:bit is a pocket-sized, codeable computer. • To know that a simulator is able to replicate the functions of an existing piece of technology.	•To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'. • To know what a focus group is by taking part in one.
Summer Structures: Constructing a Castle	• Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes	• Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials.	• Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design.	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.	• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. • To know that a façade is the front of a structure.

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Textiles: Cross Stitch and Applique	that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software.		• Suggesting points for modification of the individual designs.		• To understand that a castle needed to be strong and stable to withstand enemy attack. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.
YEAR 4 **Autumn** Structure: Pavilions	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight.	• 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.	•Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.	• 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 a pavilion is a 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 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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Spring Mechanical Systems: Mechanical Cars	• Designing a shape that reduces air resistance. • Drawing a net to create a structure from. • Choosing shapes that increase or decrease speed as a result of air resistance. • Personalising a design.	• Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design.	• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	• To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something (object/person) has by being in motion. • To know that air resistance is the level of drag on an object as it is forced through the air. • To understand that the shape of a moving object will affect how it moves due to air resistance.	• To understand that products change and evolve over time. • To know that aesthetics means how an object or product looks in design and technology. • To know that a template is a stencil you can use to help you draw the same shape accurately. • To know that a birds-eye view means a view from a high angle (as if a bird in flight). • To know that graphics are images which are designed to explain or advertise something. •To know that it is important to assess and evaluate design ideas and models against a list of design criteria.
Summer Electrical Systems: Torches	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	• 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.	• Evaluating electrical products. • Testing and evaluating the success of a final product.	• 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 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.

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				• To know that a switch can be used to complete and break an electrical circuit.	
<u>YEAR 5</u> **Autumn** Electrical Systems: Wobble Bots	● Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. ● Developing more independence in generating ideas. ● Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. ● Using a series of prototypes to refine and improve their designs.	● Producing lists of equipment, materials and tools that they need for a task. ● Creating a step-by-step plan for making. ● Selecting materials, components or ingredients based on research or user needs. ● Explaining their choices, referring to their research. ● Understanding and explaining the importance of each safety rule. ● Consistently apply safety instructions. ● Balancing aesthetics and functionality when creating parts of a design. ● Considering when best to apply finishing effects.	● Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. ● Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. ● Considering alternative materials, tools or techniques that could enhance the product. ● Providing feedback that is helpful, specific, and encouraging. ● Incorporating feedback from peers or users improve their product further, explaining the changes they made and the impact they had.	● Beginning to understand that electricity flows around a circuit. ● Using different components to produce different results from electrical systems. ● Creating working electrical circuits with a wider variety of electrical components. ● Deconstructing electrical systems to understand how they work.	● To know environmental impact is how the product and making the product might affect the environment. ● To know original and innovative ideas are different from what has been made before. ● To know annotations are detailed labels and comments on diagrams. ● To know improving on prototypes can help to improve the final design. ● To know materials and equipment lists help to plan better. ● To know research can help decide which materials are best for both aesthetics and functional properties. ● To know some equipment can work well with other equipment. ● To know risks are things that might go wrong. ● To know the shape of an object can affect both its aesthetics and function. ● To know sustainability means thinking about the materials that were used to make a product and how the product was made.

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					● To know looking at other designers work can help inform designs. ● To know their final product can still be improved by using different materials or techniques. ● To know evaluating their designs in detail will help them understand its successful and less successful parts. ● To know feedback should be positive, helpful and specific. ● To know explaining how they used feedback to improve their design can help them create better products in the future. ● To know an electric motor converts electricity into rotational movement. ● To know a motorised product is one which uses a motor to function. ● To know the names of components that can form an electrical system.

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Spring Mechanical Systems: Making a Pop-Up Book	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book.	• Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result	• Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms.	• To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.
Summer Cooking and Nutrition: Developing a Recipe	• Researching existing recipes. • Suggesting alternative ingredients. • Designing a jar label.	• Writing an alternative recipe. • Understanding cross-contamination. • Using preparation skills. • Making a developed recipe.	• Explaining the farm to fork process. • Analysing nutritional content.	• 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.	
<u>Year 6</u> **Autumn** Textiles: Bags	●Developing annotated sketches to communicate design ideas. ●Creating pattern pieces to use in design.	●Using a ruler to accurately measure and draw lines and marks. ●Using nets to create 3D objects.	●Reflecting on the functionality and aesthetics of products. ●Discussing reasons for design choices.	●Using pins effectively to secure a template to fabric without creases or bulges. ●Threading needles independently. ●Tying knots at the end of thread to secure it.	

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				●To know that nets can be folded to create 3D shapes. ●To know that pattern pieces are like nets/templates. ●To know how designers use pattern pieces when creating textiles products. ●To know that products are sometimes made in parts that are sewn together. ●To know that safety pins can hold fabric in place before sewing. ●To know that there are different types of stitches. ●To know what a running stitch is. ●To know that aesthetics is how something looks. ●To know that consistently sized stitches improve the aesthetic of a product. ●To know that the shape of an object can affect both its aesthetics and function.	
Spring Structures: Playgrounds	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.	• 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.	• 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.	• To know that structures can be strengthened by manipulating materials and shapes.	• 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.

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Summer Digital World: Navigating the World	• Writing a design brief from information submitted by a client • Developing design criteria to fulfil the client's request • Considering and suggesting additional functions for my navigation tool • Developing a product idea through annotated sketches • Placing and manoeuvring 3D objects, using CAD • Changing the properties of, or combine one or more 3D objects, using CAD	• Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo) • Explaining material choices and why they were chosen as part of a product concept • Programming an N,E, S,W cardinal compass	• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool • Developing an awareness of sustainable design • Identifying key industries that utilise 3D CAD modelling and explain why • Describing how the product concept fits the client's request and how it will benefit the customers • Explaining the key functions in my program, including any additions • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch • Demonstrating a functional program as part of a product concept	• To know that accelerometers can detect movement • To understand that sensors can be useful in products as they mean the product can function without human input	• 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

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