

Design Technology at LMS:

Overview of **disciplinary skills** within each of the key areas of learning.

	Design	Make	Evaluate
EYFS Reception	Children plan and create their own bug hotel using junk modelling skills. ELG: Creating with Materials Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	- Children experiment with a range of fabric materials. - Children explore various junk modelling ideas, learning about different types of permanent and temporary joins. Children explore a variety of materials and joining techniques in the junk modelling area. - Children learn about the different features of boats and ships before building their own. ELG: Creating with Materials - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	- Children discussing likes and dislikes. - Children can articulate their ideas & thoughts into well-formed sentences ELG: Creating with Materials Share their creations, explaining the process they have used.
Year 1	Structures: - Learning the importance of a clear design criteria. - Including individual preferences and requirements in a design. Mechanisms: - Designing a vehicle that includes wheels, axles and axle holders - Creating clearly labelled drawings that illustrate movement. Cooking and Nutrition: - Designing packaging by-hand. - Learning where and how fruits and vegetables grow. Textiles: - Using a template to create a design for a puppet.	Structures: - Making stable structures from card. - Following instructions to cut & assemble a structure. - Adding weight to structures. - Cutting evenly and carefully Mechanisms: - Adapting mechanisms to improve how they work after testing their vehicle Cooking and Nutrition: - Chopping fruit and vegetables safely. - Juicing fruits safely to make a smoothie. - Identifying if a food is a fruit. Textiles: - Cutting fabric neatly with scissors. - Using joining methods to decorate a puppet. - Sequencing steps for construction.	Structures: Evaluating a structure according to the design criteria, testing whether it is strong and stable and making alterations - Suggest points for improvements. Mechanisms: Testing wheel and axle mechanisms, recognising that a wheel needs an axle in order to move Cooking and Nutrition: - Tasting and evaluating different food combinations. - Describing appearance, smell and taste and compare with someone else's. - Suggesting information to be included on packaging. Textiles: - Reflecting on a finished product, explaining likes and dislikes.

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Year 2	Structures: - Generating and communicating ideas using sketching and modelling. - Learning about different types of structures, found in the natural world and in everyday objects. Mechanisms: - Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. - Creating clearly labelled drawings that illustrate movement. Cooking and Nutrition: - Designing multiple ideas and making a choice. Textiles: Create a design	Structures: - 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. Mechanisms: - Adapting mechanisms, when: - they do not work as they should. - to fit their vehicle design. - to improve how they work after testing their vehicle Cooking and nutrition: - Chopping, grating, snipping and spreading foods safely to make a product. - Constructing a product that meets a design brief. - Identifying the five food groups. - Learning about balanced diet. Textiles: - Selecting and cutting fabrics for sewing. - Joining fabric using glue or running stitch. - Threading a needle. - Sewing running stitch, with evenly spaced, neat, even stitches to join fabric	Structures: - Comparing the stability of different shapes. - Identifying the weakest part of a structure. - Testing and evaluating the strength, stiffness and stability of own structure. Mechanisms: Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move Cooking and Nutrition: - Describing appearance, smell & taste. - Taste and evaluating different food combinations. - Describing the information that should be included on a label. Textiles: - Evaluating the quality of the stitching on others' work. - Identifying aspects of their peers' work that they particularly like and why.
Key Stage 1 National curriculum progression	Design - Children design purposeful, functional, appealing products for themselves and other users based on design criteria. - Children generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where	Make - Children select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] - Children select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics	Evaluate - Children explore and evaluate a range of existing products - Children evaluate their ideas and products against design criteria

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	appropriate, information and communication technology.		
	<u>Design</u>	<u>Make</u>	<u>Evaluate</u>
Year 3	Electrical Systems: • Carry out research to develop a range of initial ideas. • Generate a final design considering the client's needs and design criteria. • Design an electric poster that fits the requirements of a given brief. • Plan the positioning of the bulb (circuit component) and its purpose. Mechanisms: • Designing a toy which uses a pneumatic system. • Developing design criteria from a design brief. • Generating ideas using thumbnail sketches and exploded diagrams. • Learning that different types of drawings are used in design to explain ideas clearly. Textiles: • Designing and making a template from an existing cushion and applying individual design criteria.	Electrical Systems: • Create a final design for the electric poster. • Mount the poster onto corrugated card to improve its strength. • Measure and mark materials out using a template or ruler. • Fit an electrical component (bulb). • Learn ways to give the final product a higher quality finish Mechanisms: • Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving. Textiles: • Following design criteria to create an Egyptian collar. • 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. • embellishing the collars based on design ideas (Egyptian collars).	Electrical systems: • Learning to give and accept constructive criticism on own work and the work of others. • Testing the success of initial ideas against the design criteria and justifying opinions. • Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs Mechanisms: • Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client Textiles: • Evaluating an end product and thinking of other ways in which to create similar items.
Year 4	Digital world • Writing design criteria for a programmed timer (Micro:bit). • Applying the results of research to further inform the design criteria. • Developing a prototype.	Digital World: • Developing a prototype case. • 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.	Digital World: • Investigating a range of timers. • Evaluating a Micro:bit program against design criteria and amending them to include any changes. • Documenting and evaluating my project.

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	- Using and manipulating shapes and clipart by using CAD to produce a logo. - Following a list of design requirements. Structures: - Design a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. - Build a frame structures designed to support weight. Cooking and nutrition: - Design a biscuit within a given budget. - Conduct market research.	Structures: - Creating a range of different shaped frame structures. - Selecting appropriate materials to build a strong structure and cladding (with different textural effects). - Reinforcing corners to strengthen a structure. - Creating a design in accordance with a plan. Cooking and nutrition: - Following a baking recipe. - Understanding safety and hygiene rules. - Adapting a recipe	- Understanding what a logo is and their importance. - Testing my program for bugs Finding and fixing the bugs in my code. - Gathering feedback Structures: - Evaluating structures made by the class. - Describing what characteristics of a design and construction made it the most effective. - Considering effective and ineffective designs. Cooking and Nutrition: - Evaluating an adapted recipe. - Evaluating and comparing a range of products. - Suggesting modifications.
Year 5	Textiles: - Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. - Considering the proportions of individual components. Electrical Systems: - Evaluate existing products and explain how these would alter the form and function of the product. - Developing design criteria based on findings from investigations. - Developing design criteria that clarifies the target user. Structures: - Designing a stable structure that is able to support weight. - Creating a frame structure with a focus on triangulation	Textiles: - Creating a 3D stuffed toy from a 2D design. - Measuring, marking and cutting fabric accurately and independently. - Creating strong, secure and evenly spaced blanket stitches when joining fabric. - Threading needles independently. - Using appliqué to attach pieces of fabric decoration. - Sewing blanket stitch to join fabric. Electrical Systems: Altering a product's form and function by tinkering with its configuration. - Making a functional series circuit, incorporating a motor. - Constructing a product with consideration for the design criteria. - Breaking down the construction process into steps so that others can make the product. Structures: - Making a range of different shaped beam bridges.	Textiles: - Testing and evaluating an end product and giving point for further improvements. Electrical Systems: - Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. - Determining which parts of a product affect its function and which parts affect its form. - Analysing whether changes in configuration positively or negatively affect an existing product. - Peer evaluating a set of instructions to build a product. Structures: - Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary.

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		• Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support.	• Suggesting points for improvements for own bridges and those designed by others.
Year 6	<u>Digital World:</u> • Writing a design brief and developing design criteria to fulfil a client's request. • Suggesting additional functions for a navigation tool. • Developing an idea through annotated sketches. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combining one or more 3D objects, using CAD. <u>Mechanical Systems:</u> • Noticing wider-reaching problems or needs in the community. • Coming up with a broader range of ideas and deeper innovation, thinking critically about practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. <u>Cooking and nutrition:</u> Writing a recipe, explaining the key steps, method and ingredients. • Including facts and drawings from research undertaken.	<u>Digital World:</u> • Considering materials and their functional properties, especially those that are sustainable and recyclable. • Explaining material choices and why they were chosen as part of a product concept. • Programming an N,E, S, W cardinal compass. <u>Mechanical Systems:</u> • 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. • Assessing risks associated with different tools and equipment and explaining the importance of safety rules. • 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. • In supervised groups, using hot glue guns safely. <u>Cooking and Nutrition:</u> Following a recipe, including using the correct quantities of each ingredient. • Adapting a recipe based on research. • Working to a given timescale. • Working safely and hygienically with independence.	<u>Digital World:</u> • Explaining how my program fits the design criteria. • Developing an awareness of sustainable design. • Identifying key industries that utilise 3D CAD modelling and explaining why. • Describing how the product concept fits the client's request. • Explaining the key functions in the program, how it fits the design criteria and how it would be useful as part of a navigation tool. • Demonstrating a functional program as part of a product concept pitch. <u>Mechanical Systems:</u> • Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. • Providing feedback that is helpful, specific and encouraging. • Incorporating feedback from users to improve their product further, explaining the changes they made and the impact they had. <u>Cooking and Nutrition:</u>

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			• Evaluating a recipe, considering: taste, smell, texture and origin of the food group. • Taste testing and scoring final products. • Suggesting and writing up points of improvements in productions. • Evaluating health and safety in production to minimise cross contamination
Key Stage 2 National Curriculum Progression	<u>Design</u> • Children 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 • Children generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design	<u>Make</u> • Children select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • Children 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.	<u>Evaluate</u> • Children investigate and analyse a range of existing products • Children evaluate their ideas and products against their own design criteria and consider the views of others to improve their work • Children understand how key events and individuals in design and technology have helped shape the world