

LMS Design Technology
Overview of Substantive Knowledge (informed by the NC)

Year 1 and 2: Year A	<u>Mechanisms: Levers</u> Technical knowledge: - Many things that move have parts inside to help them work. - Mechanisms usually limit unwanted movement. - A pivot is the part that a lever moves around.	<u>Textiles: Puppets</u> - 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.	<u>Cooking and Nutrition: Smoothies!</u> Children know: - That a blender is a machine which mixes ingredients together into a smooth liquid. - That a fruit has seeds and a vegetable does not. - That fruits grow on trees or vines. - That vegetables can grow either above or below ground. - That vegetables are any edible part of a plant
Year 1 and 2 Year B	<u>Structures: There's a bear on my chair!</u> Technical knowledge - To know: - A structure is something that has been made and put together. - The shape of a structure affects its strength. - Materials can be manipulated to improve strength and stiffness. - A strong structure is one which does not break easily. - A stiff structure or material is one which does not bend easily.	<u>Mechanisms: Wheels and Axles</u> Technical knowledge: - To know that wheels need to be round to rotate and move. - To understand that for a wheel to move it must be attached to a rotating axle. - To know that an axle moves within an axle holder which is fixed to the vehicle or toy. - To know that the frame of a vehicle (chassis) needs to be balanced Topic knowledge: - To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.	<u>Cooking and Nutrition: Balanced diet -</u> Technical knowledge: - That 'diet' means the food and drink that a person or animal usually eats. - What makes a balanced diet. - That the five main food groups are: carbohydrates, fruits and vegetables, protein, dairy and oils and spreads. - That I should eat a range of different foods from each food group, and roughly how much of each food group. - That 'ingredients' means the items in a mixture or recipe. How to cut, grate, snip and spread to prepare foods. - How to review and give a score to evaluate.
By the end of Key Stage 1: - Children build structures, exploring how they can be made stronger, stiffer and more stable. - Children explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.			

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Year 3	<u>Mechanisms: Pneumatic Toys –</u> Technical Knowledge: • To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air. Topic knowledge: To understand how sketches, drawings and diagrams can be used to communicate design ideas. • To know that exploded-diagrams are used to show how different parts of a product fit together. • To know that thumbnail sketches are small drawings to get ideas down on paper quickly.	<u>Textiles - Egyptian collars</u> Technical knowledge: • 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.	<u>Electrical Systems – Electric Posters</u> Technical knowledge: • To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit. • To understand common features of an electric product (switch, battery or plug, dials, buttons etc.). • To list examples of common electric products (kettle, remote control etc.). • To understand that an electric product uses an electrical system to work (function). • To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits Topic Knowledge: • To understand the importance and purpose of information design. • To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached).
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Year 4	<u>Structures - Pavilions</u> Technical Knowledge: • To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own. Topic knowledge: • 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 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.	<u>Cooking and Nutrition - Adapting a recipe</u> Children know: • That the amount of an ingredient in a recipe is known as the 'quantity'. • That safety and hygiene are important when cooking. • The following cooking techniques: sieving, measuring, mixing/stirring, cutting out and shaping. • The importance of budgeting while planning ingredients for a recipe. • That products often have a target audience.	<u>Digital World – Mindful Moments Timer</u> Technical knowledge: • 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 • To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device. Topic knowledge: • 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.
Year 5	<u>Textile – Stuffed Toys</u> • 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	<u>Electrical Systems – Doodlers</u> Technical knowledge: • To know that series circuits only have one direction for the electricity to flow. • To know when there is a break in a series circuit, all components turn off. • To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • To know a motorised product is one which uses a motor to function. Topic Knowledge: • To know that product analysis is critiquing the strengths and weaknesses of a product. • To know that 'configuration' means how the parts of a product are arranged.	<u>Structures - Bridges</u> Technical knowledge: • To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood. Topic Knowledge: To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely

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Year 6	<u>Mechanical Systems – Automata Toys</u> Technical knowledge: To know that the mechanism in an automata uses a system of cams, axles and followers. • 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. Topic Knowledge: • 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.	<u>Digital World – Navigating the World</u> Technical Knowledge: • 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. Topic knowledge: • 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.	<u>Cooking – Come Dine with Me.</u> • To know that 'flavour' is how a food or drink tastes. • To know that many countries have 'national dishes' which are recipes associated with that country. • To know that 'processed food' means food that has been put through multiple changes in a factory. • To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).
National Curriculum – Technical Knowledge: By the end of Key Stage 2: • Children apply their understanding of how to strengthen, stiffen and reinforce more complex structures • Children understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] • Children understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] • Children apply their understanding of computing to program, monitor and control their products			