Design and Technology Curriculum at Lace Hill Academy

Who are we?

The children at Lace Hill are very eager to learn and communicate well verbally. They are polite and sociable and keen to please.

At Lace Hill Academy we use the National Curriculum and Kapow Primary to bring design and technology opportunities to the classroom. The design and technology curriculum is carefully planned and structured to ensure that current learning builds on previous learning. Topics are informed by the National Curriculum and Kapow, as well as allowing creativity so that children can incorporate their own interests and creativity to projects.

Children enjoy the design and technology curriculum and parents are supportive of this. Parents contribute to the school to help cover the costs of resources so that children can have these learning opportunities and can continue to develop their skills. We also draw on trips in the local area and support from the community with our design and technology curriculum. Our Y4 Bushcraft residential gives children the opportunity to develop their food and nutrition skills when foraging, learning how to gut a fish and starting their own fire to cook their lunch. We have trips to Silverstone museum and Gawcott Solar Farm to provide STEM opportunities and experiences.

What do we need to know? Why?

Design and Technology is an inspiring, rigorous and practical subject. It develops the creative, technical and practical expertise needed to perform everyday tasks confidently. We need to encourage children to take risks, becoming resourceful, innovative, enterprising and capable citizens through exposing them to design and technology opportunities. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Our Design and Technology curriculum offers children the chance to acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. We teach children to build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality products for a wide range of users. Our curriculum reflects the importance of using creativity and imagination to design and make products that consider the intended audience's needs, wants and values.

Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well. Our Design and Technology curriculum enables children to understand and apply the principles of nutrition and healthy eating, and learn how to cook.

There are three main stages of the design process: design, make and evaluate. Each of these stages is underpinned by technical knowledge which encompasses the contextual, historical and technical understanding required for each strand. The design stage includes: research; design criteria; idea generation; idea development; models and prototypes; cross-sectional and exploded diagrams; innovative, fit-for-purpose and functional product solutions to design problems. The make stage allows children to: select and use appropriate tools and equipment; understand and select materials and components based on their aesthetic and functional properties; carry out practical tasks with increasing accuracy and precision; understand the importance of, and follow the health and safety rules. The evaluate stage gives children the opportunity to: explore existing products; evaluate against a list of design criteria; evaluate, investigate and analyse existing products; evaluate their own and others' ideas; understand how key events and individuals have helped to shape the world of D&T; consider feedback to make improvements.

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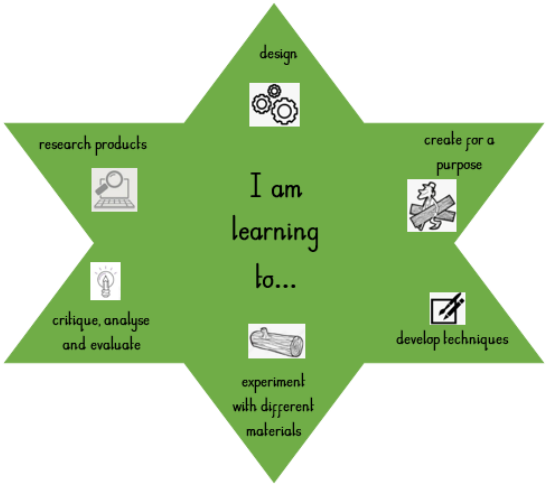
What do we need to experience? Why?	
When a child leaves our school they will…	**I am a Lace Hill designer because…**
• Be a confident person • Be an independent thinker and self-starter • Empathise with others • Have an inquisitive mind • Take risks with their learning • Bounce back and move forward when faced with a challenge • Be proactive and innovative • Have a sense of belonging	• I use my creativity and imagination to design and create products • I can draw on my knowledge and skills to make products for specific audiences and purposes • I am resourceful, innovative and enterprising • I can critique, evaluate and test my own and others' ideas/products • I have the knowledge and expertise to participate in an increasingly technological world
Substantive Concepts	**Disciplinary Concepts**
Cooking and Nutrition Children need to know where food comes from, what a balanced diet looks like, as well as following recipes. They need to have preparation and cooking skills whilst also following kitchen hygiene and safety. **Structures** Our children need to have knowledge of materials and their functional and aesthetic properties, as well as their strength and stability. They will have knowledge of how to stiffen and reinforce structures. **Textiles** With textiles, children need to know how to fasten, sew and use decorative and functional fabric techniques such as cross stitch, blanket stitch and appliqué. **Mechanisms and Mechanical Systems** Children will learn how to mimic natural movements using mechanisms such as cams, followers, levers and sliders. **Electrical Systems** Children will create various electrical products through their knowledge of operational series circuits, circuit components, circuit diagrams and symbols.	• Researching products • Experimenting with different materials • Developing techniques • Creating for a purpose • Designing • Critiquing, analysing and evaluating 

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Our children need to see that Design and Technology goes far beyond classroom and the curriculum. We live in an increasingly technological world and there are many occasions to see design and technology in action. Children are given opportunities to work in a range of relevant contexts (home, school, gardens, playground, local community, industry and wider environment). They enjoy the variety of creative and practical activities under five key areas: **Cooking and Nutrition; Mechanisms/Mechanical Systems; Electrical Systems; Structures; Textiles.**

LHA Design and Technology Journey (Progression)

	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Units covered	Structures; Textiles; Cooking and Nutrition	Structures: Constructing a Windmill; Textiles: Puppets; Cooking and Nutrition: Smoothies	Structures: Chair; Mechanisms: Fairground Wheel; Mechanisms: Making a Moving Monster	Cooking and Nutrition: Eating Seasonally; Textiles: Cross-stitch; Mechanical Systems: Pneumatic toys: Structure: Constructing a Castle	Textiles: Fastenings; Structure: Pavilions; Mechanical Systems: Making a Slingshot Car; Electrical Systems: Torches	Electrical Systems: Doodlers; Mechanical Systems: Pop-up Book; Cooking and Nutrition: Developing a Recipe	Textiles: Waistcoats; Structure: Playgrounds; Cooking and Nutrition: Come Dine with Me
Trips/Visits	Larder Café and Farm						Silverstone Museum Gawcott Solar Farm
Disciplinary Concepts	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating	Researching products Experimenting with different materials Developing techniques Creating for a purpose Designing Critiquing, analysing and evaluating

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Substantive Concepts	Structures, Textiles, Cooking and Nutrition, Digital World	Structures, Textiles, Cooking and Nutrition, Digital World	Structures, Mechanisms, Digital World	Cooking and Nutrition, Textiles, Mechanical Systems, Structures, Digital World	Textiles, Structures, Mechanical Systems, Electrical Systems, Digital World	Cooking and Nutrition, Mechanical Systems, Electrical Systems, Digital World	Cooking and Nutrition, Textiles, Structures, Digital World
LHA Design and Technology Journey (Progression in Knowledge and Skills)							
Cooking and Nutrition	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<u>Nursery</u> **Make** Chop plasticine safely **Evaluate** Describe some of the following when tasting food: look, feel, smell and taste **Technical Knowledge** Know that vegetables are grown Recognise and name some common vegetables Know that eating vegetables is good for us **<u>Reception</u>** **Design**	**Design** Design packaging by hand or an ICT software **Make** Chop fruit and vegetables safely **Evaluate** Taste and evaluate different food combinations Describe appearance, smell and taste Suggest information to be included on packaging **Technical Knowledge** Understand the difference between fruits and vegetables	**Design** Design a healthy dish based on food combinations which work well together **Make** Slice food safely using the bridge or claw grip Construct a dish that meets a design brief **Evaluate** Describe the taste, texture and smell of fruit and vegetables Taste testing food combinations and final products Describe the information that should be included on a label	**Design** Create a healthy and nutritious recipe using seasonal ingredients, considering the taste, texture, smell and appearance of the dish **Make** Know how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination Follow the instructions within a recipe **Evaluate** Establish and use design criteria to	**Design** Design a food product with a given budget, drawing upon previous taste testing judgements **Make** Follow a baking recipe, from start to finish, including the preparation of ingredients Cook safely, following basic hygiene rules Adapt a recipe to improve it or change it to meet new criteria **Evaluate** Evaluate a recipe, considering taste,	**Design** Adapt a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients Design appealing packaging to reflect a recipe **Make** Cut and prepare vegetables safely Use equipment safely, including knives, hot pans and hobs Know how to avoid cross-contamination	**Design** Write a recipe, explaining the key steps, method and ingredients Include facts and drawings from research undertaken **Make** Follow a recipe, including using the correct quantities of each ingredient Adapt a recipe based on research Work to a given timescale Work safely and hygienically with independence **Evaluate**

	Design a recipe as a class Design packaging **Make** Chop vegetables with support **Evaluate** Taste and give opinions Choose their favourite packaging design and explain why **Technical Knowledge** Know that soup is ingredients blended together Know that vegetables are grown Recognise and name some common vegetables Know that different vegetables taste different	Understand that some foods typically known as vegetables are actually fruits Know that a blender is a machine which mixes ingredients together into a smooth liquid Know that a fruit has seeds and a vegetable does not Know that fruits grow on trees or vines Know that vegetables can grow either above or below ground Know that vegetables can come from difference parts of the plant	Evaluate which grip was most effective for slicing foods **Technical Knowledge** Know that diet means the food and drink that a person or animal usually eats Understand what makes a balanced diet Know where to find the nutritional information on packaging Know that the five main food groups are: carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar Understand that nutrients are substances in food that all living things need to make energy, grow and develop	help test and review dishes Describe the benefits of seasonal fruits and vegetables and the impact on the environment Suggest points for improvement when making a seasonal tart **Technical Knowledge** Know that not all fruits and vegetables can be grown in the UK Know the climate affects food growth Know that vegetables and fruit grow in certain seasons Know that cooking instructions are known as a recipe Know that imported food is food which has been brought into the country	smell, texture and appearance Describe the impact of the budget on the selection of ingredients Evaluate and compare a range of food products Suggest modifications to a recipe **Technical Knowledge** Know that the amount of an ingredient in a recipe is known as the quantity Know that it is important to use oven gloves when removing hot food from an oven Know the following cooking techniques: sieving, creaming, rubbing method, cooling	Follow a step by step method carefully to make a recipe **Evaluate** Identify the nutritional differences between different products and recipes Identify and describe healthy benefits of food groups **Technical Knowledge** Understand where meat comes from Know that a recipe can be adapted to make it healthier by substituting ingredients Know that a nutritional calculator can see how healthy a food option is Understand the cross-contamination means bacteria and germs have been passed onto ready-to-eat foods and it	Evaluate a recipe, considering taste, smell, texture and origin of the food group Taste test and score final products Suggest and write up points of improvements when scoring others' dishes and when evaluating own work throughout the planning, preparation and cooking process Evaluate health and safety in production to minimise cross-contamination **Technical Knowledge** Know that flavour is how a food or drink tastes Know that many countries have national dishes which are recipes associated with that country

	Know that eating vegetables is good for us Discuss why different packages might be used for different foods		Know that ingredients means the items in a mixture or recipe Know that I should only have a maximum of five teaspoons of sugar a day to stay healthy Know that many food and drinks we do not expect to contain sugar do; we call these hidden sugars	Know that exported food is food which has been sent to another country Understand that imported foods travel from far away and this can negatively impact the environment Know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre Understand that vitamins, minerals and fibre are as important for energy, growth and maintaining health Know safety rules for using, storing and cleaning a knife safely Know that similar coloured fruits and vegetables often	Understand the importance of budgeting while planning ingredients for a recipe/dish	happens when these foods mix with raw meat or unclean objects	Know that processed food means food that has been put through multiple changes in a factory Understand that it is important to wash fruit and vegetables before eating to remove and dirt and insecticides Understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)

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				have similar nutritional benefits			
Structures	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<u>Nursery</u> **Design** Use knowledge from exploration to inform design **Make** Join different materials together **Evaluate** Describe their favourite and least favourite part of their model **<u>Reception</u>** **Design** Make verbal plans and material choices Use knowledge from exploration to inform design **Make** Improve fine motor/scissor skills with a variety of materials Join materials in a variety of ways	**Design** Learn the importance of a clear design criteria Include individual preferences and requirements in a design **Make** Make stable structures from card, tape and glue Learn how to turn 2D nets into 3D structures Follow instructions to cut and assemble Make functioning axles **Evaluate** Evaluate according to the design criteria, testing the product and altering if needed Suggest points for improvements	**Design** Generate and communicate ideas using sketching and modelling Learn about different types of structures, found in the natural world and in everyday objects **Make** Make a structure according to design criteria Create joints and structures from paper/card and tape Build a strong and stiff structure by folding paper **Evaluate** Explore the features of structures Compare the stability of different shapes Test the strength of own structures	**Design** Design a product with key features to appeal to a specific person/purpose Draw a label a design using 2D shapes, labelling: the 3D shapes that will create the features, the materials needed and their colours Design and decorate on CAD software **Make** Construct a range of 3D geometric shapes using nets Create special features for individual designs Make facades from a range of materials **Evaluate** Evaluate own work and the work of others based on the aesthetic of the	**Design** Design a stable structure that is aesthetically pleasing and selecting materials to create a desired effect Build frame structures designed to support weight **Make** Create a range of different shaped frame structures Make a variety of free standing frame structures of different shapes and sizes Select appropriate materials to build a strong structure and cladding Reinforce corners to strengthen a structure	**Design** Design a stable structure that is able to support weight Create a frame structure with a focus on triangulation **Make** Use triangles to create structures that span a given distance and support a load Build a wooden structure Independently measure and mark wood accurately Select appropriate tools and equipment for particular tasks Use the correct techniques to saw safely Identify where a structure needs	**Design** Design an area featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs **Make** Build a range of structures drawing upon new and prior knowledge of structures Measure, mark and cut wood to create a range of structures Use a range of materials to reinforce and add decoration to structures **Evaluate** Improve a design plan based on peer evaluation

	(temporary and permanent) Join different materials together Describe their model, and how they intend to put it together **Evaluate** Give a verbal evaluation of their own and others' models with adult support Check to see if their model matches their plan Consider what they would do differently if they were to do it again Make predictions about materials Test and reflect on their designs **Technical Knowledge** Know there are a range of different	**Technical Knowledge** Understand that the shape of materials can be changed to improve the strength and stiffness of structures Understand that cylinders are a strong type of structure Understand that axles are used in structures and mechanisms to make parts turn in a circle Being to understand that different structures are used for different purposes Know that a structure is something that has been made and put together	Identify the weakest part of a structure Evaluate the strength, stiffness and stability of own structure **Technical Knowledge** Know that shapes and structures with wide, flat bases or legs are the most stable Understand that the shape of a structure affects its strength Know that materials can be manipulated to improve strength and stiffness Know that a structure is something which has been formed or made from parts Know that a 'stable' structure is one which is firmly fixed and unlikely to change or move	finished product and in comparison to the original design Suggest points for medication of the individual designs **Technical Knowledge** Understand that wide and flat based objects are more stable Understand the importance of strength and stiffness in structures To know that a paper net is a flat 2D shape that can become a 3D shape once assembled To know that a façade is the front of a structure To know that a design specification is a list of success criteria for a product	Create a design in accordance with a plan Learn to create different textural effects with materials **Evaluate** Evaluate structures made by the class Describe what characteristics of a design and construction made it the most effective Consider effective and ineffective designs **Technical Knowledge** Understand what a frame structure is Know that a 'free-standing' structure is one which can stand on its own Know that cladding can be applied to structures for different effects	reinforcement and use card corners for support Explain why selecting appropriate materials is an important part of the design process Understand basic wood functional properties **Evaluate** Adapt and improve own structure by identifying points of weakness and reinforcing them as necessary Suggest improvements for own structure and those designed by others **Technical Knowledge** Understand some different ways to reinforce structures Understand how triangles can be used to reinforce bridges	Test and adapt a design to improve it as it is developed Identify what makes a successful structure **Technical Knowledge** Know that structures can be strengthened by manipulating materials and shapes Understand what a 'footprint plan' is Understand that in the real world, design, can impact users in positive and negative ways Know that a prototype is a cheap model to test a design idea

	materials that can be used to make a model Make simple suggestions to fix their model		Know that a 'strong' structure is one which does not break easily Know that a 'stiff' structure or material is one which does not bend easily		Know that aesthetics are how a product looks Know that a product's function means its purpose Understand that the target audience means the person or group of people a product is designed for Know that architects consider light, shadow and patterns when designing	Know that properties are words that describe the form and function of materials Understand why material selection is important based on properties Understand the material properties of wood Understand how to carry and use a saw safely	
Textiles	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<u>Nursery</u> **Design** Choose from available materials **Make** Explore fine motor/threading and waving with a variety of materials **<u>Reception</u>** **Design** Discuss what a good design needs	**Design** Use a template to create a design **Make** Cut fabric neatly with scissors Use joining methods to decorate Sequence steps for construction **Evaluate**	**Design** Design a product **Make** Select and cut fabrics for sewing Decorate using fabric glue or running stitch Thread a needle Sew running stitch, with evenly spaced, neat, even stitches to join fabric	**Design** Develop and make a template from an existing product and apply individual design criteria **Make** Select and cut fabrics with ease using fabric scissors Thread needles with greater independence	**Design** Write design criteria for a product, articulating decisions made **Make** Make and test a paper template with accuracy and in keeping with the design criteria Measure, mark and cut fabric using a paper template	**Design** Design a product, considering the main component shapes required and creating an appropriate template Consider the proportions of individual components **Make**	**Design** Design an item of clothing in accordance to a specification linked to a set of design criteria Annotate designs to explain decisions **Make** Use a template when cutting fabric to ensure correct shape is achieved

	Design a simple pattern with paper Choose from available materials **Make** Develop fine motor/cutting skills with scissors Explore fine motor/threading and waving with a variety of materials Use a prepared needle and wool to practise threading **Evaluate** Reflect on a finished product and compare to my design **Technical Knowledge** Know that a design is a way of planning an idea before we start Know that threading is putting one material through an object	Reflect on a finished product, explaining likes and dislikes **Technical Knowledge** Know that joining techniques means connecting two pieces of material together Know that there are various temporary methods of joining fabric by using staples, glue or pins Understand that different techniques for joining materials can be used for different purposes Understand that a template or fabric pattern is used to cut out the same shape multiple times Know that drawing a design idea is useful to see how and idea will look	Neatly pin and cut fabric using a template **Evaluate** Troubleshoot scenarios Evaluate the quality of the stitching on others' work Discuss the success of my stitching against the success criteria **Technical Knowledge** Know that sewing is a method of joining fabric Know that different stitches can be used when sewing Understand the importance of tying a knot after sewing the final stitch Know that a thimble can be used to protect my fingers when sewing	Tie knots with greater independence Sew cross stitch to join fabric Decorate fabric using applique Complete design ideas with stuffing and sew the edges or embellish based on design ideas **Evaluate** Evaluate an end product and think of other ways in which to create similar items **Technical Knowledge** Know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces Know that when two edges of fabric have been joined together it is called a seam	Select a stitch style to join fabric Work neatly by sewing small, straight stitches Incorporate a fastening to a design **Evaluate** Test and evaluate an end product against the original design criteria Decide how many of the criteria should be met for the product to be considered successful Suggest modifications for improvement Articulate the advantages and disadvantages of different fastening types **Technical Knowledge** Know that a fastening is	Create a 3D product from a 2D design Measure, mark and cut fabric accurately and independently Create strong and secure blanket stitches when joining fabric Thread needles independently Use applique to attach pieces of fabric decoration Sew blanket stitch to join fabric Apply blanket stitch so the spaces between the stitches are even and regular **Evaluate** Test and evaluate an end product and give point for further improvements **Technical Knowledge** Know that blanket stitch is useful to	Use pins effectively to secure a template to fabric without creases or bulges Mark and cut fabric accurately, in accordance with the design Sew a strong running stitch, making small, neat stitches and following the edge Tie strong knows Attach features using thread Finish a product with a secure fastening Learn different decorative stitches Sew accurately with evenly spaced, neat stitches **Evaluate** Reflect on work continually throughout the design, make and evaluate process

				Know that it is important to leave space on the fabric for the seam Understand that some products are turned inside out after sewing so the stitching is hidden	something which holds two pieces of material together for example a zipper, toggle, button, press stud and Velcro Know that different fastening types are useful for different purposes Know that creating a mock up (prototype) of a design is useful for checking ideas and proportions	reinforce the edges of a fabric material or join two pieces of fabric Understand that it is easier to finish simpler designs to a high standard Know that soft toys are often made by creating appendages separately and then attaching them to the main body Know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing accurately	**Technical Knowledge** Understand that it is important to design clothing with the client/target customer in mind Know that using a template or clothing pattern helps to accurately mark out a design on fabric Understand the importance of consistently sized stitches
Mechanisms/ Mechanical Systems	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Design Explain how to adapt mechanisms, using bridges or guides to control the movement Design a product that includes wheels, axles and axle holders, that when	**Design** Select a suitable linkage system to produce the desire motion **Make** Select materials according to their characteristics Follow a design brief	**Design** Design a product which uses a pneumatic system Develop design criteria from a design brief Generate ideas using thumbnail sketches	**Design** Design a shape that reduces air resistance Draw a net to create a structure from Choose shapes that increase or decrease speed as a result of air resistance	**Design** Design a product using a mixture of structures and mechanisms Name each mechanism, input and output accurately Storyboard ideas	**Design** Experiment with a range of cams, creating a design based on a choice of cam to create a desired movement Understand how linkages change the direction of a force

		combined, allow the wheels to move Create clearly labelled drawings that illustrate movement **Make** Follow a design to create moving models that use levers and sliders Adapt mechanisms when: they do not work as they should; to fit a design; to improve how they work after testing the product **Evaluate** Test a finish product, seeing whether it moves as planned and if not, explain why and how it can be fixed Review the success of a product by testing it with its intended audience Test wheel and axle mechanisms,	Make linkages using card for levers and split pins for pivots Experiment with linkages adjusting widths, lengths and thicknesses of card used Cut and assemble components neatly **Evaluate** Evaluate different designs Test and adapt a design Evaluate own designs against design criteria Use peer feedback to modify a final design **Technical Knowledge** Know that different materials have different properties and are therefore suitable for different uses	and exploded diagrams Learn that different types of drawings are used in design to explain ideas clearly **Make** Create a pneumatic system to create a desired motion Build secure housing for a pneumatic system Use syringes and balloons to create different types of pneumatic systems Select materials due to their functional and aesthetic characteristics Manipulate materials to create different effects by cutting, creasing, folding and weaving **Evaluate** Use the views of others to improve designs	Personalise a design **Make** Measure, mark, cut and assemble with increasing accuracy Make a model based on a chose design **Evaluate** Evaluate the speed of a final product based on the effect of shape on speed and the accuracy of workmanship on performance **Technical Knowledge** Understand that all moving things have kinetic energy Understand that kinetic energy is the energy that something has by being in motion Know that air resistance is the level of drag on an object as it is forced though the air	**Make** Follow a design brief for a product, neatly and with focus on accuracy Make mechanisms and/or structures using slides, pivots and folds to produce movement Use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result **Evaluate** Evaluate the work of others and receive feedback on own work Suggest points for improvement **Technical Knowledge** Know that mechanisms control movement Understand that mechanisms can be used to change one	Make things that move at the same time Understand and draw cross-sectional diagrams to show the inner-workings of my design **Make** Measure, mark and check the accuracy of the jelutong and dowel pieces required Measure, mark and cut components accurately using a ruler and scissors Assemble components accurately to make a stable frame Understand that from the frame to function effectively, the components must be cut accurately and the joints of the frame secured at the right angles

		identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move **Technical Knowledge** Know that a mechanism is the parts of an object that move together Know that a slider mechanism moves an object from side to side Know that a slider mechanism has a slider, slots, guides and an object Know that bridges and guides are bits of card that purposefully restrict the movement of the slider Know that wheels need to be round to rotate and move Understand that for a wheel to move it	Know that mechanisms are a collection of moving parts that work together as a machine to produce movement Know that there is always an input and output in a mechanism Know that an input is the energy that is used to start something working Know that an output is the movement that happens as a result of the input Know that a lever is something that turns on a pivot Know that a linkage mechanism is made up of a series of levers Know that it is important to test my design as I go along so that I can solve	Test and modify the outcome, suggesting improvements Understand the purpose of exploded diagrams through the eyes of a designer and their client **Technical Knowledge** Understand how pneumatic systems work Understand that pneumatic systems can be used as part of a mechanism Know that pneumatic systems operate by drawing in, releasing and compressing air Understand how sketches, drawings and diagrams can be used to communicate design ideas	Understand that the shape of a moving object will affect how it moves due to air resistance Understand that products change and evolve over time Know that a template is a stencil you can use to help you draw the same shape accurately Know that a birds-eye view means a view from a high angle Know that graphics are images which are designed to explain or advertise something	kind of motion into another Understand how to use sliders, pivots and folds to create paper-based mechanisms Know that a design brief is a description of what I am going to design and make Know that designers often want to hide mechanisms to make a product more aesthetically pleasing	Select appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set **Evaluate** Evaluate the work of others and receive feedback on own work Apply points of improvements to a product Describe changes made if the product were made again **Technical Knowledge** Understand that the mechanism in an automata uses a systems of cams, axles and followers Understand that different shaped cams produce different outputs Know that an automata is a hand

		must be attached to a rotating axle Know that an axle moves within an axle holder which is fixed to the product Know that the frame needs to be balanced	any problems that may occur	Know that exploded diagrams are used to show how different parts of a product fit together Know that thumbnail sketches are small drawings to get ideas down on paper quickly			powered mechanical toy Know that a cross-sectional diagram shows the inner workings of a product Understand how to use a bench hook and saw safely Know that a set square can be used to help mark 90° angles
Electrical Systems	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Design Carry out research based on a given topic to develop a range of initial ideas Generate a final design with consideration to the client's needs and design criteria Plan the positioning of a circuit component and its purpose **Make** Create a final design	**Design** Design an electrical product, giving consideration to the target audience and create both design and success criteria focusing on features of individual design ideas **Make** Make a product with a working electrical circuit and switch Use appropriate equipment to cut and attach materials	**Design** Identify factors that could be changed on existing products and explain how these would alter the form and function of the product Develop design criteria based on findings from investigating existing products Develop design criteria that clarifies the target user	**Design** Design an electrical system, identify and name the components required Draw a design from three different perspectives Generate ideas through sketching and discussion Model ideas through prototypes

				Mount onto corrugated card to improve strength and allow the product to withstand the weight of the circuit on the rear Measure and mark materials out using a template or ruler Fit an electrical component Learn ways to give the final product a higher quality finish **Evaluate** Learn to give and accept constructive criticism on own work and the work of others Test the success of initial ideas against the design criteria and justify opinions Revisit the requirements of the client to review developing design	**Evaluate** Evaluate electrical products Test and evaluate the success of a final product **Technical Knowledge** Understand that electrical conductors are materials which electricity can pass through Understand that electrical insulators are materials which electricity cannot pass through Know that a battery contains stored electricity that can be used to power products Know that an electrical circuit must be complete for the electricity to flow Know that a switch can be used to	**Make** Alter a product's form and function by tinkering with its configuration Make a functional series circuit, incorporating a motor Construct a product with consideration for the design criteria Break down the construction process into steps so that others can make the product **Evaluate** Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses Determine which parts of a product affect its function and which parts affect its form	Understand the purpose of products, including what is meant by 'fit for purpose' and 'form over function' **Make** Construct a stable base Make and test a circuit Incorporate a circuit into a base **Evaluate** Test own and others' electrical systems, identifying what went well and making suggestions for improvement Gather images and information about existing products Analyse a selection of existing products **Technical Knowledge** Know that batteries contain acid, which

				ideas and check that they fulfil their needs **Technical Knowledge** Understand that an electrical system is a group of components that work together to transport electricity round a circuit Understand common features of an electric product List examples of common electric products Understand that an electric product uses an electrical system to function Know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits Understand the importance and purpose of information design	complete and break an electrical circuit	Analyse whether changes in configuration positively or negatively affect and existing product Peer evaluate a set of instructions to build a product **Technical Knowledge** Know that series circuits only have one direction for the electricity to flow Know when there is a break in a series circuit, all components turn off Know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin Know a motorised product is one which uses a motor to function	can be dangerous if they leak Know the names of the components in a basic series circuit, including a buzzer Know that form means the shape and appearance of an object 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 Know that form over purpose means a product looks good but does not work very well To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind

				Understand how material choices can improve a product to serve its purpose		Know that product analysis is critiquing the strengths and weaknesses of a product Know that configuration means how the parts of a product are arranged	To understand the diagram perspectives ‘top view’, ‘side view’ and ‘back’