



Thursby Primary School



Progression of Knowledge and Skills – Design and Technology

Structures					
SKILLS		EYFS Unit: Junk modelling	Year 1 and 2 Unit: Constructing a windmill	Year 3 and 4 Unit: Earthquake resistant pavilions	Year 5 and 6 Unit: Model bridges
	Design	<ul style="list-style-type: none"> • Making verbal plans and material choices. • Developing a junk model. 	<ul style="list-style-type: none"> • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. 	<ul style="list-style-type: none"> • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight. 	<ul style="list-style-type: none"> • Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.
	Make	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Making stable structures from card. • Following instructions to cut and assemble the supporting structure of a windmill. • Making functioning turbines and axles which are assembled into a main supporting structure. • Finding the middle of an object. • Puncturing holes. • Adding weight to structures. • Creating supporting structures. • Cutting evenly and carefully. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Making a range of different shaped beam bridges. • 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. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.
	Evaluate	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't. • Suggest points for improvements. 	<ul style="list-style-type: none"> • Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs. 	<ul style="list-style-type: none"> • Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.
	Technical	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). 	<ul style="list-style-type: none"> • To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own. 	<ul style="list-style-type: none"> • To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges.



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KNOWLEDGE			<ul style="list-style-type: none"> • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together. • To know that the sails or blades of a windmill are moved by the wind. • To know that a structure is something built for a reason. • To know that stable structures do not topple. • To know that adding weight to the base of a structure can make it more stable. 		<ul style="list-style-type: none"> • 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.
	Additional	N/A	<ul style="list-style-type: none"> • To know that design criteria is a list of points to ensure the product meets the clients needs and wants. • To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. • To know that windmill turbines use wind to turn and make the machines inside work. • To know that a windmill is a structure with sails that are moved by the wind. • To know the three main parts of a windmill are the turbine, axle and structure. • To know that windmills are used to generate power and were used for grinding flour. 	<ul style="list-style-type: none"> • 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 is 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. 	<ul style="list-style-type: none"> • 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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Mechanisms / mechanical systems					
SKILLS		Year 1 and 2 Unit: Wheels and axels	Year 1 and 2 Unit: Making a moving monster	Year 3 and 4 Unit: Making a slingshot car	Year 5 and 6 Unit: Automata toys
	Design	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Noticing wider-reaching problems or needs in the community. • Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. • Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.
	Make	<ul style="list-style-type: none"> • Adapting mechanisms, when: <ul style="list-style-type: none"> - they do not work as they should. - to fit their vehicle design. - to improve how they work after testing their vehicle. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. 	<ul style="list-style-type: none"> • 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. • Considering which equipment will work well together. • Choosing from the known range of equipment available to them with little guidance. • Assessing risks associated with different tools and equipment. • Understanding and explaining the importance of each safety rule. • Consistently apply safety instructions. • Cutting jelutong or other harder wood with a coping saw or a tenon saw in small groups. • Cutting in a back-and-forth sawing motion where appropriate. • In supervised groups, using hot glue guns safely. • Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly.
Evaluate	<ul style="list-style-type: none"> • Testing wheel and axle mechanisms, identifying what stops the wheels from 	<ul style="list-style-type: none"> • Evaluating own designs against design criteria. • Using peer feedback to modify a final 	<ul style="list-style-type: none"> • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. 	<ul style="list-style-type: none"> • Assessing their designs against a more complex set of design criteria that includes 	



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		turning, and recognising that a wheel needs an axle in order to move.	design.		functionality, aesthetics, user experience, sustainability and cost. <ul style="list-style-type: none"> • Providing feedback that is helpful, specific and encouraging. • Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.
KNOWLEDGE	Technical	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.
	Additional	<ul style="list-style-type: none"> • To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles. 	<ul style="list-style-type: none"> • To know some real-life objects that contain mechanisms. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.



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Electrical Systems (KS2 only)			
SKILLS		Year 3 and 4 Unit: Torches	Year 5 and 6 Unit: Steady hand game
	Design	<ul style="list-style-type: none"> Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. 	<ul style="list-style-type: none"> Noticing wider-reaching problems or needs in the community. Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.
	Make	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. Considering which equipment will work well together. Choosing from the known range of equipment available to them with little guidance. Assessing risks associated with different tools and equipment. Understanding and explaining the importance of each safety rule. Consistently apply safety instructions. Cutting jelutong or other harder wood with a coping saw or a tenon saw in small groups. Cutting in a back-and-forth sawing motion where appropriate. In supervised groups, using hot glue guns safely. Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly.
	Evaluate	<ul style="list-style-type: none"> Evaluating electrical products. Testing and evaluating the success of a final product. 	<ul style="list-style-type: none"> 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 peers or users to improve their product further, explaining the changes they made and the impact they had.
KNOWLEDGE	Technical	<ul style="list-style-type: none"> To understand that electrical conductors are materials which electricity can pass through. To understand that electrical insulators are materials which electricity cannot pass through. To know that a battery contains stored electricity that can be used to power products. To know that an electrical circuit must be complete for electricity to flow. To know that a switch can be used to complete and break an electrical circuit. 	<ul style="list-style-type: none"> 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.
	Additional	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.



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Cooking and nutrition

		EYFS Unit: Soup	Year 1 and 2 Unit: Strive for 5	Year 1 and 2 Unit: Bag a breakfast	Year 3 and 4 Unit: A healthy lunch	Year 5 and 6 Unit: Eatwell
SKILLS	Design	<ul style="list-style-type: none"> Designing a soup recipe as a class. Designing soup packaging. 	Design purposeful, functional, appealing products for themselves and other users based on design criteria. <ul style="list-style-type: none"> Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. 	<ul style="list-style-type: none"> Design purposeful, functional, appealing products for themselves and other users based on design criteria. Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. 	<ul style="list-style-type: none"> 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. Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. 	<ul style="list-style-type: none"> 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. Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.
	Make	<ul style="list-style-type: none"> Chopping plasticine safely. Chopping vegetables with support. 	<ul style="list-style-type: none"> Select from and use a range of tools and equipment to perform practical tasks (for example cutting, shaping, joining and finishing). Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. 	<ul style="list-style-type: none"> Select from and use a range of tools and equipment to perform practical tasks (for example cutting, shaping, joining and finishing). Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. 	<ul style="list-style-type: none"> Select from and use a wider range of tools and equipment to perform practical tasks (for example cutting, shaping, joining and finishing) accurately. 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. 	<ul style="list-style-type: none"> Select from and use a wider range of tools and equipment to perform practical tasks (for example cutting, shaping, joining and finishing) accurately. 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.
	Evaluate	<ul style="list-style-type: none"> Tasting the soup and giving opinions. Describing some of the following when tasting food: look, feel, smell and taste. Choosing their favourite packaging design and explaining why. 	<ul style="list-style-type: none"> Explore and evaluate a range of existing products. Evaluate their ideas and products against design criteria. 	<ul style="list-style-type: none"> Explore and evaluate a range of existing products. Evaluate their ideas and products against design criteria. 	<ul style="list-style-type: none"> Investigate and analyse a range of existing products. Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. 	<ul style="list-style-type: none"> Investigate and analyse a range of existing products. Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
	Technical	<ul style="list-style-type: none"> To know that soup is ingredients (usually vegetables and liquid) blended together. To know that vegetables are grown. 	<ul style="list-style-type: none"> Use the basic principles of a healthy and varied diet to prepare dishes. Understand where food comes from. 	<ul style="list-style-type: none"> Use the basic principles of a healthy and varied diet to prepare dishes. Understand where food comes from. 	<ul style="list-style-type: none"> Understand and apply the principles of a healthy and varied diet Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. Understand seasonality, and know 	<ul style="list-style-type: none"> Understand and apply the principles of a healthy and varied diet. Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. Understand seasonality, and know



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KNOWLEDGE		<ul style="list-style-type: none">• To recognise and name some common vegetables.• To know that different vegetables taste different.• To know that eating vegetables is good for us.• To discuss why different packages might be used for different foods.			where and how a variety of ingredients are grown, reared and caught and processed.	where and how a variety of ingredients are grown, reared and caught and processed.
	Additional	N/A	N/A	N/A	N/A	N/A



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Textiles					
		EYFS Unit: Bookmarks	Year 1 and 2 Unit: Puppets	Year 3 and 4 Unit: Cushions	Year 5 and 6 Unit: Roman shoes
SKILLS	Design	<ul style="list-style-type: none"> Discussing what a good design needs. Designing a simple pattern with paper. Designing a bookmark. Choosing from available materials. 	<ul style="list-style-type: none"> Using a template to create a design for a puppet. 	<ul style="list-style-type: none"> Designing and making a template from an existing cushion and applying individual design criteria. 	<ul style="list-style-type: none"> Designing a roman sandal, considering the main component shapes required and creating an appropriate template. Considering the proportions of individual components.
	Make	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Cutting fabric neatly with scissors. Using joining methods to decorate a puppet (staples, glue and safety pins). Sequencing steps for construction. 	<ul style="list-style-type: none"> Following design criteria to create a cushion. Selecting and cutting fabrics with ease using fabric scissors. Threading needles with greater independence. Tying knots with greater independence. Sewing a running stitch to join fabric. Decorating fabric using appliqué. Completing design ideas with stuffing and sewing the edges (Cushions). 	<ul style="list-style-type: none"> Creating a 3D roman sandal from a 2D design. Measuring, marking and cutting fabric accurately and independently. Creating strong and secure cross stitch and blanket stitch when joining fabric. Threading needles independently. Using appliqué to attach pieces of fabric decoration. Sewing cross stitch and blanket stitch to join fabric. Applying cross stitch and blanket stitch so the spaces between the stitches are even and regular.
	Evaluate	<ul style="list-style-type: none"> Reflecting on a finished product and comparing to their design. 	<ul style="list-style-type: none"> Reflecting on a finished product, explaining likes and dislikes. 	<ul style="list-style-type: none"> Evaluating an end product and thinking of other ways in which to create similar items. 	<ul style="list-style-type: none"> Testing and evaluating an end product and giving point for further improvements.
KNOWLEDGE	Technical	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> To understand that it is important to design clothing with the client/ target customer in mind. To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. To understand the importance of consistently sized stitches.
	Additional	N/A	N/A	N/A	N/A



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Digital world (KS2 only)			
SKILLS		Year 3 and 4 Unit: Wearable technology	Year 5 and 6 Unit: Navigating the world
	Design	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 combining one or more 3D objects, using CAD.
	Make	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.
	Evaluate	<ul style="list-style-type: none"> • Analysing and evaluating wearable technology. • Using feedback from peers to improve design. 	<ul style="list-style-type: none"> • 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 explaining 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 pitch.
KNOWLEDGE	Technical	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.
	Additional	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.