Design Technology
Progression in Skills at Fawkham CEP School
DISCIPLINARY AND SUBTANTIVE KNOWLEDGE SKILLS

STRUCTURES

EYFS Junk modelling	Year 1/2 (Cycle A) Constructing a windmill	Year 1/2 (Cycle B) Baby Bears Chair	Year 3/4 (Cycle A) Constructing a castle	Year 3/4 (Cycle B) Pavilions	Year 5/6 (Cycle A)	Year 5/6 (Cycle B) Playgrounds
DESIGN • Making verbal plans and material choices. • Developing a junk model. **MAKE** • Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways (temporary and permanent). • Joining different materials together.	**DESIGN** • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. **MAKE** • Making stable structures from card, tape and glue . • Learning how to turn 2D nets into 3D structures. • Following instructions to cut and assemble the supporting structure of a windmill. • Making functioning turbines and axles which are assembled	**DESIGN** • Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. **MAKE** • 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.	**DESIGN** • Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software. **MAKE**	**DESIGN** • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight. **MAKE** • Creating a range of different shaped frame structures. • Making a variety of free standing frame structures of different shapes and sizes. • Selecting appropriate materials		**DESIGN** • Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. **MAKE** • Building a range of play apparatus structures drawing upon new and prior knowledge of structures.

• Describing their junk model, and how they intend to put it together. **EVALUATE** • 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. **KNOWLEDGE-TECHNICAL** • To know there are a range to different	into a main supporting structure. **EVALUATE** • 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. **KNOWLEDGE TECHNICAL-** • To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). • To understand that axles are used in structures and	**EVALUATE** • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of own structure. **KNOWLEDGE TECHNICAL-** • To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and	• Constructing a range of 3D geometric shapes using nets • Creating special features for individual designs. • Making facades from a range of recycled materials. **EVALUATE** • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. • Suggesting points for modification of the individual designs. **KNOWLEDGE TECHNICAL-** • To understand that wide and flat based objects are more stable. • To understand the importance of strength	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. **EVALUATE** • Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs. **KNOWLEDGE TECHNICAL-** • To understand what a frame structure is • To know that a 'free-standing' structure is one which can stand on its own		• Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. **EVALUATE** • Improving a design plan based on peer evaluation. • Testing and adapting a design to improve it as it is developed. • Identifying what makes a successful structure. **KNOWLEDGE TECHNICAL-** • To know that structures can be strengthened by manipulating materials and shapes. **ADDITIONAL**

materials that can be used to make a model and that they are all slightly different. • Making simple suggestions to fix their junk model.	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. **ADDITIONAL** • To know that a client is the person I am designing for. • 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	stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily. • To know that a 'stiff' structure or material is one which does not bend easily. **ADDITIONAL** • To know that natural structures are those found in nature. • To know that man-made structures are those made by people.	and stiffness in structures. **ADDITIONAL** • To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. • To know that a façade is the front of a structure. \• To understand that a castle needed to be strong and stable to withstand enemy attack. \• To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.	**ADDITIONAL** • To know that a pavilion is a a decorative building or structure for leisure activities. • To know that cladding can be applied to structures for different effects. • To know that aesthetics are how a product looks. • To know that a product's function means its purpose. • To understand that the target audience means the person or group of people a product is designed for. • To know that architects consider light, shadow and patterns when designing.		• To understand what a 'footprint plan' is. • To understand that in the real world, design , can impact users in positive and negative ways. • To know that a prototype is a cheap model to test a design idea.

	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.					

Mechanisms/ Mechanical Systems						
EYFS	**Year 1/2 (Cycle A)**	**Year 1/2 (Cycle B) Making a moving monster and Fairground Wheel**	**Year 3/4 (Cycle A)**	**Year 3/4 (Cycle B) Making a slingshot car**	**Year 5/6 (Cycle A) Making a pop up book**	**Year 5/6 (Cycle B)**
		DESIGN • Selecting a suitable linkage system to produce the desired motion. • Designing a wheel. **MAKE** • Selecting materials according to their characteristics. • Following a design brief. **EVALUATE** • Evaluating different designs. • Testing and adapting a design. **KNOWLEDGE-TECHNICAL** • To know that different materials have different properties and are		**DESIGN** • 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. **MAKE** • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. **EVALUATE** • Evaluating the speed of a final product based on: the effect of shape on speed and	**DESIGN** • Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book. **MAKE** • Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement.	

		therefore suitable for different uses. **ADDITIONAL** • To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. • To know that it is important to test my design as I go along so that I can solve any problems that may occur. **DESIGN** • Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria. **MAKE** • Making linkages using card for levers and split pins for pivots.		the accuracy of workmanship on performance. **KNOWLEDGE-TECHNICAL** • 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. **ADDITIONAL** • To understand that products change and evolve over time. • To know that aesthetics means how an object or product	• Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. **EVALUATE** • Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement. **KNOWLEDGE-TECHNICAL** • To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use	

		• Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. • Cutting and assembling components neatly. **EVALUATE** • Evaluating own designs against design criteria. • Using peer feedback to modify a final design. **KNOWLEDGE-TECHNICAL** • 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		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.	sliders, pivots and folds to create paper-based mechanisms. **ADDITIONAL** • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.	

		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. **ADDITIONAL** • To know some real-life objects that contain mechanisms.				

Design Technology
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Electrical Systems

EYFS	Year 1/2	Year 1/2	Year 3/4 (Cycle A)	Year 3/4 (Cycle B) Torches	Year 5/6 (Cycle A)	Year 5/6 (Cycle B)
				DESIGN • Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. **MAKE** • 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. **EVALUATE** • Evaluating electrical products.	**DESIGN** • Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. • Developing design criteria based on findings from investigating existing products. • Developing design criteria that clarifies the target user. **MAKE** • Altering a product's form and function by	

				• Testing and evaluating the success of a final product. **KNOWLEDGE TECHNICAL** • 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. **ADDITIONAL**	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. **EVALUATE** • 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.	

				• 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.	• Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product. **KNOWLEDGE TECHNICAL** • 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. **ADDITIONAL** • 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.	

Design Technology
Progression in Skills at Fawkham CEP School

Cooking and Nutrition

EVERY OCTOBER – every class participates in a Roots to Food – Food Technology lesson with a chef, this includes learning about Food/Nutrition and Cooking either an item of food in Reception or cooking a full main course meal in KS1 and KS2

EYFS Soup	**Year 1/2 (Cycle A)** Fruit and Vegetables	**Year 1/2 (Cycle B)**	**Year 3/4 (Cycle A)** Eating Seasonally	**Year 3/4 (Cycle B)**	**Year 5/6 (Cycle A)** What could be healthier?	**Year 5/6 (Cycle B)**
DESIGN • Designing a soup recipe as a class. • Designing soup packaging. **MAKE** • Chopping plasticine safely. • Chopping vegetables with support **EVALUATE** • Tasting the soup and giving opinions. • Describing some of the following when	**DESIGN** • Designing smoothie carton packaging by-hand or on ICT software. **MAKE** • Chopping fruit and vegetables safely to make a smoothie. • Identifying if a food is a fruit or a vegetable. • Learning where and how fruits and vegetables grow. **EVALUATE** • Tasting and evaluating different food combinations.		**DESIGN** • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish. **MAKE** • Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination.		**DESIGN** • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing	

tasting food: look, feel, smell and taste. • Choosing their favourite packaging design and explaining why. **KNOWLEDGE** • To know that soup is ingredients (usually vegetables and liquid) blended together. • To know that vegetables are grown. • To recognise and name some common vegetables. • To know that different vegetables taste different. • To know that eating vegetables is good for us.	• Describing appearance, smell and taste. • Suggesting information to be included on packaging. **KNOWLEDGE-** • Understanding the difference between fruits and vegetables. • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber). • To know that a blender is a machine which mixes ingredients together into a smooth liquid. • To know that a fruit has seeds and a vegetable does not. • To know that fruits grow on trees or vines. • To know that vegetables can grow either above or below ground.		• Following the instructions within a recipe. **EVALUATE** • Establishing and using design criteria to help test and review dishes. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment. • Suggesting points for improvement when making a seasonal tart. **KNOWLEDGE** • To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons.		packaging to reflect a recipe. **MAKE** • Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step by step method carefully to make a recipe. **EVALUATE** • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups.	

• To discuss why different packages might be used for different foods.	• To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).		• To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country.. • To understand that imported foods travel from far away and this can negatively impact the environment. • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre. • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. • To know safety rules for using, storing		**KNOWLEDGE** • To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • To know that I can adapt a recipe to make it healthier by substituting ingredients. • To know that I can use a nutritional calculator to see how healthy a food option is. • To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods	

			and cleaning a knife safely. • To know that similar coloured fruits and vegetables often have similar nutritional benefits.		mix with raw meat or unclean objects.	

Design Technology
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Textiles

EYFS Bookmarks	Year 1/2 (Cycle A) Puppets	Year 1/2 (Cycle B)	Year 3/4 (Cycle A)	Year 3/4 (Cycle B)	Year 5/6 (Cycle A)	Year 5/6 (Cycle B) Waistcoats
DESIGN • Discussing what a good design needs. • Designing a simple pattern with paper. • Designing a bookmark. • Choosing from available materials. **MAKE** • Developing fine motor/cutting skills with scissors. • Exploring fine motor/threading and weaving (under, over technique) with a	**DESIGN** • Using a template to create a design for a puppet. **MAKE** • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing the steps taken during construction. **EVALUATE** • Reflecting on a finished product, explaining likes and dislikes. **KNOWLEDGE-**					**DESIGN** • Designing a waistcoat in accordance to a specification linked to set of design criteria. • Annotating designs, to explain their decisions. **MAKE** • Using a template when cutting fabric to ensure they achieve the correct shape. • Using pins effectively to secure a template to fabric without creases or bulges. • Marking and cutting fabric accurately, in

variety of materials. • Using a prepared needle and wool to practise threading. **EVALUATE** • Reflecting on a finished product and comparing to their design. **KNOWLEDGE** • 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.	• 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.					accordance with their design. • Sewing a strong running stitch, making small, neat stitches and following the edge. • Tying strong knots. • Decorating a waistcoat, attaching features (such as appliqué) using thread. • Finishing the waistcoat with a secure fastening (such as buttons). • Learning different decorative stitches. • Sewing accurately with evenly spaced, neat stitches. **EVALUATE** • Reflecting on their work continually throughout the design, make and evaluate process. **KNOWLEDGE-**

						• 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.

Design Technology
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Digital World

EYFS	Year 1/2 (Cycle A)	Year 1/2 (Cycle B)	Year 3/4 (Cycle A)	Year 3/4 (Cycle B)	Year 5/6 (Cycle A)	Year 5/6 (Cycle B)
			DESIGN • 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. **MAKE** • Following a list of design requirements.			**DESIGN** • 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**

			• Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm. **EVALUATE** • Analysing and evaluating wearable technology. • Using feedback from peers to improve design. **KNOWLEDGE TECHNICAL** • 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			• 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** • 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.

			of an existing piece of technology **ADDITIONAL** •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.			• 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**

						• 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** • 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.