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GOLDEN THREAD		Mechanisms	Cooking and Nutrition	Structures	Textiles	Digital World	Electrical Systems
Unit Focus	**Golden Thread**	**EYFS Framework/ National Curriculum**	**Knowledge**	**Skills – Design, make and evaluate**			**Key vocabulary**
Nursery							
Making soup		Begin to safely use and explore a variety of tools and techniques.	• Soup is ingredients (usually vegetables and liquid) blended together. • Vegetables are grown. • Recognise and name some common vegetables. • Different vegetables taste different.	• Designing a soup recipe as a class. • Chopping plasticine safely. • Chopping vegetables with support. • Tasting the soup and giving opinions. • Describing some of the following when tasting food: look, feel, smell and taste.			Vegetables Knife Handle Chop Slice Cut Saucepan Chopping board Mix
Range of seasonal projects		Begin to experiment with colour, design, texture, form and function. Begin to share their creations, explaining the process they have used.	Linked to the project/the children's interests.	• Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Develop their small motor skills so that they can use a range of tools competently, safely and confidently.			Wide range of vocabulary linked to the project.

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Reception					
Junk Modelling		Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Share their creations, explaining the process they have used. Make use of props and materials when role playing characters in narratives and stories.	• 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.	• Making verbal plans and material choices. • Developing a junk model. • 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. • 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.	Join Stick Cut Bend Slot Scissors Measure Materials Fix
Bookmarks			• 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.	• Discussing what a good design needs. • Designing a simple pattern with paper. • Designing a bookmark. • Choosing from available materials. • 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. • Reflecting on a finished product and comparing to their design.	Thread Weave Pattern Sew Sewing needle Embroider Design Evaluate
Boats			• To know that 'waterproof' materials are those which do not absorb water. • To know that some objects float and others sink. • To know the different parts of a boat.	• Designing a junk model boat. • Using knowledge from exploration to inform design. • Making a boat that floats and is waterproof, considering material choices. • Making predictions about, and evaluating different materials to see if they are waterproof. • Making predictions about, and evaluating existing boats to see which floats best. • Testing their design and reflecting on what could have been done differently. • Investigating the how the shapes and structure of a boat affect the way it moves.	Waterproof Absorb Prediction Variable Experiment Investigation Float Sink Junk

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Year One					
Constructing a windmill		Build structures, exploring how they can be made stronger, stiffer and more stable.	• To understand that cylinders are a strong type of structure • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • 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 stable structures do not topple. • To know that adding weight to the base of a structure can make it more stable.	• Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. • 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. • 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.	Axle Base Centre Design Evaluation Equal Evaluate Middle Rotate Rotor Rotor Blades Sails Same Stable Strong Structure Test Weak Wind Windmill
Puppets		Design purposeful, functional, appealing products for themselves and other users based on design criteria.	• 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.	• Using a template to create a design for a puppet. • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing steps for construction. • Reflecting on a finished product, explaining likes and dislikes.	Decorate Design Fabric Glue Model Hand puppet Safety pin Staple Stencil Template

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		Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.	• 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.		
Smoothies		Select from and use a range of tools and equipment to perform practical tasks. Explore and evaluate a range of existing products. Use the basic principles of a healthy and varied diet to prepare dishes	• To know that a blender is a machine which mixes ingredients together into a smooth liquid. • To know that a fruit has seeds. • To know that fruits grow on trees or vines. • To know that vegetables can grow either above or below ground. • To know that vegetables is any edible part of a plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).	• Designing smoothie carton packaging by-hand. • Chopping fruit and vegetables safely to make a smoothie. • Juicing fruits safely to make a smoothie. • Tasting and evaluating different food combinations. • Describing appearance, smell and taste. • Suggesting information to be included on packaging. • Comparing their own smoothie with someone else's.	Blender Fruit Healthy Ingredients Recipe Smoothie Vegetable Seed Root Leaf Stem Flavour Design Juice Table knife Juicer Plant Bush Vine Chopping board Compare

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Year Two					
Baby Bear's Chair		Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology Build structures, exploring how they can be made stronger, stiffer and more stable.	• Shapes and structures with wide, flat bases or legs are the most stable. • The shape of a structure affects its strength. • Materials can be manipulated to improve strength and stiffness. • Structure is something which has been formed from parts. • A 'stable' structure is one which is firmly fixed and unlikely to change or move. • A 'strong' structure is one which does not break easily. • A 'stiff' structure or material is one which does not bend easily.	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. • 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. • 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.	Function Man-made Mould Natural Stable Stiff Strong Structure Test Weak
Fairground Wheel		Explore and use mechanisms in their products. Select from and use a wide range of materials and	• Different materials have different properties and are therefore suitable for different uses. • The features of a ferris wheel include the wheel, frame, pods, a base an	• Selecting a suitable linkage system to produce the desired motion. • Designing a wheel. • Selecting materials according to their characteristics. • Following a design brief. • Evaluating different designs. • Testing and adapting a design.	Axle Decorate Evaluation Ferris wheel Mechanism Stable Strong Test Waterproof

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		components, including construction materials, textiles and ingredients, according to their characteristics.	axle and an axle holder. • It is important to test my design as I go along so that I can solve any problems that may occur.		Weak
Making a Moving Monster		Design purposeful, functional, appealing products based on design criteria. Explore and use mechanisms in their products. Select from and use a range of tools and equipment to perform practical tasks. Evaluate their ideas and products against design criteria.	• Mechanisms are a collection of moving parts that work together as a machine to produce movement. • There is always an input and output in a mechanism. • 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.	• Creating a class design criteria for a moving monster. • Designing a moving monster for a specific audience in accordance with a design criteria. • 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. • Evaluating own designs against design criteria. • Using peer feedback to modify a final design.	Evaluation Input Lever Linear motion Linkage Mechanical Mechanism Motion Oscillating motion Output Pivot Reciprocating motion Rotary motion Survey

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Year Three					
Eating Seasonably		Understand where food comes from. Prepare and cook a variety of mainly savoury dishes using a range of cooking Techniques. Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.	• Not all fruits and vegetables can be grown in the UK. • Climate affects food growth. • Vegetables and fruit grow in certain seasons. • Cooking instructions are known as a 'recipe'. • Imported food is food which has been brought into the country. • Exported food is food which has been sent to another country. • Eating seasonal foods can have a positive impact on the environment. • Similar coloured fruits and vegetables often have similar nutritional benefits.	• Designing a recipe for a savoury tart. • Following the instructions within a recipe. • Tasting seasonal ingredients. • Selecting seasonal ingredients. • Peeling ingredients safely. • Cutting safely with a vegetable knife. • 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.	Arid Climate Complementary Country Export Import Mediterranean Mock-up Mountain Peel Polar Seasonal Seasons Snip Temperate Texture Tropical Weather
Wearable Technology		Apply their understanding of computing to program, monitor and control their products.	• To understand that, in programming, a 'loop' is code that repeats something again and again until stopped.	• 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.	Analogue Analyse Annotate Badge CAD Control Design criteria

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		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.	• 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.	• 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. • Analysing and evaluating wearable technology. • Using feedback from peers to improve design	Digital Digital revolution Digital world Electronic Fastening Feature Feedback Form Function Initiate Micro:bit Net Product concept Program Sense Simulator Technology
Constructing a castle		Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. Evaluate their ideas and products against their own design criteria and consider the views of others.	• Wide and flat based objects are more stable. • The importance of strength and stiffness in structures. • That a castle needed to be strong and stable to withstand enemy attack. • A paper net is a flat 2D shape that can become a 3D shape once assembled. • A design specification is a list of success criteria for a product.	• 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. • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. • 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.	2D shapes 3D shapes Castle Design criteria Evaluate Facade Feature Flag Net Recyclable Scoring Stable Structure Tab

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Year Four					
Pavilions		Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. Understand how key events and individuals in design and technology have helped shape the world	• What a frame structure is. • A 'free-standing' structure is one which can stand on its own. • A pavilion is a decorative building or structure for leisure activities. • Cladding can be applied to structures for different effects. • Aesthetics are how a product looks. • A product's function means its purpose. • The target audience means the person or group of people a product is designed for. • Architects consider light, shadow and patterns when designing.	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight. • 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. • Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs.	Aesthetic Cladding Design criteria Evaluation Frame structure Function Inspiration Pavilion Reinforce Stable Structure Target audience Target customer Texture Theme
Making a slingshot car		Understand and use mechanical systems in their products. Select from and use a wider range of	• All moving things have kinetic energy. • Kinetic energy is the energy that something (object/ person) has by being in motion. • Air resistance is the level of drag on an	• 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. • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	Aesthetic Air resistance Chassis Design Design criteria Function Graphics Kinetic energy Mechanism

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		tools and equipment to perform practical tasks.	object as it is forced through the air. • The shape of a moving object will affect how it moves due to air resistance.		Net Structure
Torches		Understand and use electrical systems in their products. Investigate and analyse a range of existing products. 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.	• Electrical conductors are materials which electricity can pass through. • Electrical insulators are materials which electricity cannot pass through. • A battery contains stored electricity that can be used to power products. • An electrical circuit must be complete for electricity to flow. • A switch can be used to complete and break an electrical circuit.	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. • 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. • Evaluating electrical products. • Testing and evaluating the success of a final product.	Battery Bulb Buzzer Cell Component Conductor Copper Design criteria Electrical item Electricity Electronic item Function Insulator Series circuit Switch Test Torch Wire

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Year Five					
Doodlers		Understand and use electrical systems in their products. Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.	• Series circuits only have one direction for the electricity to flow. • When there is a break in a series circuit, all components turn off. • An electric motor converts electrical energy into rotational movement. • A motorised product is one which uses a motor to function. • Product analysis is critiquing the products strengths and weaknesses. • 'Configuration' means how the parts of a product are arranged.	• 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. • Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • Breaking down the construction process into steps so that others can make the product. • Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • Determining which parts of a product affect its function and which parts affect its form. • Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product.	Circuit component Configuration Current Develop DIY Investigate Motor Motorised Problem solve Product analysis Series circuit Stable Target user
Making a Pop Up Book		Understand and use mechanical systems in their products. Evaluate their ideas and products against their own design	• Mechanisms control movement. • Mechanisms can be used to change one kind of motion into another. • How to use sliders, pivots and folds to create paper-based mechanisms. • A design brief is a description of what I	• 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. • 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. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. • Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.	Aesthetic Computer-aided design (CAD) Caption Design Design brief Design criteria Exploded-diagram Function Input Linkage Mechanism

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		criteria and consider the views of others to improve their work.	am going to design and make. • Designers often want to hide mechanisms to make a product more aesthetically pleasing.		Motion Output Pivot Prototype Slider Structure Template
Developing a Recipe		Understand and apply the principles of a healthy and varied diet. 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.	• where meat comes from - learning that beef is from cattle and how beef is reared and processed. • Recipes can be adapted to suit nutritional needs and dietary requirements. • I can use a nutritional calculator to see how healthy a food option is. • 'Cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. • Coloured chopping boards can prevent cross-contamination. • Nutritional information is found on food packaging.	• 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 packaging to reflect a recipe. • Researching existing recipes to inform ingredient choices. • 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. • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups.	Abattoir Adaptation Balanced Beef Brand Cook Cross-contamination Develop Enhance Equipment Farm Label Measure Nutrient Nutrition Nutritional value Preference Press Process Safety Theme

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Year Six					
Waistcoats		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.	• 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.	• Designing a waistcoat in accordance to a specification linked to set of design criteria. • Annotating designs, to explain their decisions. • 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 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. • Reflecting on their work continually throughout the design, make and evaluate process.	Accurate Adapt Annotate Design Design criteria Detail Fabric Fastening Knot Properties Running-stitch Seam Sew Shape Target audience Target customer Template Thread Unique Waistcoat Waterproof
Playgrounds		Apply their understanding of how to strengthen, stiffen and reinforce more complex Structures. Select from and use a wider range of tools and	• To know that structures can be strengthened by manipulating materials and shapes. • To understand what a 'footprint plan' is. • To understand that in the real world, design , can impact users in positive and negative ways.	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. • Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. • 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.	Adapt Apparatus Cladding Coping saw Dowel Jelutong Mark out Modify Natural materials Plan view Prototype Reinforce Structure

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		equipment to perform practical tasks.	• To know that a prototype is a cheap model to test a design idea.		Tenon saw Texture User Vice
Navigating the World		Apply their understanding of computing to program, monitor and control their products. Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.	• 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. • 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.	• 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. • 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. • 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.	3D CAD Application (apps) Biodegradable Boolean Cardinal compass Client Convince Corrode Duplicate Environment friendly Finite Function Functional GPS tracker If statement Infinite Investment Manufacture Mouldable Navigation Non-recyclable Product lifecycle Product lifespan Sustainable design Variable Workplane