



## Progression of Knowledge and Skills- Design and Technology

Mechanisms/Mechanical Systems					
		Year 1	Year 2	Year 2	Year 4
		Sliders	Fairground Wheel	Making a Moving Monster	Making a slingshot engine (WW2 Tanks)
Skills	Design	Explaining how to adapt mechanisms, using bridges or guides to control the movement. Designing a moving story page for a given audience.	Selecting a suitable linkage system to produce the desired motion. Designing a wheel.	Creating a class design criteria for a moving monster. Designing a moving monster for a specific audience in accordance with a design criteria.	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	Following a design to create moving models that use levers and sliders.	Selecting materials according to their characteristics. Following a design brief.	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.	Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design.
	Evaluate	Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. Reviewing the success of a product by testing it with its intended audience.	Evaluating different designs. Testing and adapting a design.	Evaluating own designs against design criteria. Using peer feedback to modify a final design.	Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.
Knowledge	Technical	To know that a mechanism is the parts of an object that move together. To know that a slider mechanism moves an object from side to side. To know that a slider mechanism has a slider, slots, guides and an object. To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.	To know that different materials have different properties and are therefore suitable for different uses.	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 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.

				To know that a linkage mechanism is made up of a series of levers.	
	Additional	To know that in Design and technology we call a plan a 'design'.	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.	To know some real-life objects that contain mechanisms.	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
	Vocabulary	Assemble • Design • Evaluation • Mechanism • Model • Sliders • Stencil • Target audience • Template • Test	Axle • Decorate • Evaluation • Ferris wheel • Mechanism • Stable • Strong • Test • Waterproof • Weak	Evaluation • Input • Lever • Linear motion • Linkage • Mechanical • Mechanism • Motion • Oscillating motion • Output • Pivot • Reciprocating motion • Rotary motion • Survey	Aesthetic • Air resistance • Chassis • Design • Design criteria • Function • Graphics • Kinetic energy • Mechanism • Net • Structure

**Electrical Systems KS2 only**

Year 4

Torches

Skills	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. 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	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.
	Vocabulary	Battery • Bulb • Buzzer • Cell • Component • Conductor • Copper • Design criteria • Electrical item • Electricity • Electronic item • Function • Insulator • Series circuit • Switch • Test • Torch • Wire

**Structures**

		EYFS	EYFS	Year 1	Year 2
		Junk modelling	Boats	Constructing a windmill	Thrones
Skills	Design	Making verbal plans and material choices. Developing a junk model.	Designing a junk model boat. Using knowledge from exploration to inform design.	Learning the importance of a clear design criteria. Including individual preferences and requirements in a 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	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.	Making a boat that floats and is waterproof, considering material choices	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 into a main supporting structure.	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.
	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.	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	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	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 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.	To know that 'waterproof' materials are those which do not absorb water.	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 mechanisms to make parts turn in a circle.	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 stiffness. To know that a structure is something which has been formed or made from parts. To know that a 'stable' structure is

				<p>To begin to understand that different structures are used for different purposes.</p> <p>To know that a structure is something that has been made and put together.</p>	<p>one which is firmly fixed and unlikely to change or move.</p> <p>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.</p>
	Additional		<p>To know that some objects float and others sink.</p> <p>To know the different parts of a boat.</p>	<p>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.</p> <p>To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity.</p> <p>To know that windmill turbines use wind to turn and make the machines inside work.</p> <p>To know that a windmill is a structure with sails that are moved by the wind.</p> <p>To know the three main parts of a windmill are the turbine, axle and structure.</p>	<p>To know that natural structures are those found in nature.</p> <p>To know that man-made structures are those made by people.</p>
	Vocabulary	<p>Join • Stick • Cut • Bend • Slot</p> <p>• Scissors • Measure • Materials • Fix</p>	<p>Waterproof • Absorb • Prediction • Variable • Experiment • Investigation • Float • Sink • Junk</p>	<p>Client • Design • Evaluation • Net • Stable • Strong • Test • Weak • Windmill • Axle • Sails</p>	<p>Function • Man-made • Mould • Natural • Stable • Stiff • Strong • Structure • Test • Weak</p>

## Structures

		Year 3	Year 4
		Castles	Anglo Saxon Homes (based on Pavilions planning)
Skills	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.	Designing a stable structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight.
	Make	Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a range of recycled materials.	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.
	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.	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 that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures	To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own.
	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.	To know that the Anglo Saxons built their homes from wooden frames and most had thatched roofs. 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.
	Vocabulary	2D shapes • 3D shapes • Castle • Design criteria • Evaluate • Facade • Feature • Flag • Net • Recyclable • Scoring • Stable • Strong • Structure • Tab • Weak	Aesthetic • Cladding • Design criteria • Evaluation • Frame structure • Function • Inspiration • Reinforce • Stable • Structure • Target audience • Target customer • Texture • Theme

Textiles

Textiles				
		EYFS	Year 1	Year 3
		Bookmarks	Puppets	Cross stitch and Appliqué-Egyptian Collars
Skills	Design	Discussing what a good design needs. Designing a simple pattern with paper. Designing a bookmark. Choosing from available materials	Using a template to create a design for a puppet.	Designing and making a template from an existing cushion and applying individual design criteria.
	Make	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	Cutting fabric neatly with scissors. Using running stitch to join two pieces of fabric together Using joining methods to decorate a puppet. Sequencing the steps taken during construction.	Following design criteria to create an Egyptian collar. Selecting and cutting fabrics with ease using fabric scissors. Threading needles with greater independence. Tying knots with greater independence. Sewing cross stitch to join fabric. Decorating fabric using appliqué. Embellishing the collars based on design ideas (Egyptian collars)
	Evaluate	Reflecting on a finished product and comparing to their design.	Reflecting on a finished product, explaining likes and dislikes.	Evaluating an end product and thinking of other ways in which to create similar items.
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.	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
	Vocabulary	Thread • Weave • Pattern • Sew • Sewing needle • Embroider • Design • Evaluate	Decorate • Design • Fabric • Glue • Model • Hand puppet • Safety pin • Staple • Stencil • Running stitch • Template	Accurate • Applique • Cross-stitch • Decorate • Detail • Fabric • Patch • Running-stitch • Seam • Stencil • Stuffing • Target audience • Target customer • Template

**Cooking and Nutrition**

		EYFS	Year 1	Year 3
		Soup	Fruit and Vegetables	Eating Seasonally
Skills	Design	Discussing a soup recipe as a class.	Designing smoothie carton packaging by-hand or on ICT software.	Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.
	Make	Chopping plasticine safely. Chopping vegetables with support.	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.	Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. Following the instructions within a recipe.
	Evaluate	Tasting the soup and giving opinions. Describing some of the following when tasting food: look, feel, smell and taste.	Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging.	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 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. To discuss why different packages might be used for different foods.	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. To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).	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. 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 and cleaning a knife safely. To know that similar coloured fruits and vegetables often have similar nutritional benefits.



	<b>Vocabulary</b>	Fruit • Vegetables • Safety • Knife • Blade • Tool • Edge • Handle • Chop • Slice • Cut • Saucepan • Blender • Chopping board • Hob • Boil • Blend • Mix • Packaging • Recyclable • Metal • Plastic • Reusable	Blender • Carton • Fruit • Healthy • Ingredients • Peel • Peeler • Recipe • Slice • Smoothie • Stencil • Template • Vegetable	Climate • Dry climate • Exported • Imported • Mediterranean climate • Nationality • Nutrients • Polar climate • Recipe • Seasonal food • Seasons • Temperate climate • Tropical climate
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