DESIGN TECHNOLOCY KNOWLEDGE, SKILLS AND VOCABULARY PROGRESSION

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

KS1 pupils should be taught to:

- 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
- 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
- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria
- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

KS2 pupils should be taught to:

- 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
- 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
- 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
- understand how key events and individuals in design and technology have helped shape the world
- apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of computing to program, monitor and control their products

All pupils should be taught how to cook and apply the principles of nutrition and healthy eating.

In Key Stage 1, pupils should be taught to:

- use the basic principles of a healthy and varied diet to prepare dishes
- understand where food comes from.

In Key stage 2, pupils should be taught to:

- 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 where and how a variety of ingredients are grown, reared, caught and processed.

Key Concept/ Theme		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Machines & Mechanisms  	**Topic(s)**	*Emergency Vehicles* *Safari*	*Taxi* *Push and Pull*		*Making It Move* *Tomb Builders*		*Moving Mechanisms*	
	NC Coverage (Development Matters EYFS)	Return to and build on their previous learning, refining ideas and developing their ability to represent them.	explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products		understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]			
	Skills Progression	Explore, build and play with a range of resources and construction kits with wheels and axles.	Use wheels and axles to make a simple moving model.	Use a range of mechanisms (levers, sliders, wheels and axles) in models or products.	Explore and use a range of mechanisms (levers, sliders, axles, wheels and cams) in models or products.	Explore and use a range of mechanisms (levers, axles, cams, gears and pulleys) in models or products.	Use mechanical systems in their products, such as pneumatics.	Explain and use mechanical systems in their products to meet a design brief.
	Knowledge	Vehicles and machines have wheels and axles to help them move. Vehicles have wheels and axles to help them move.	Most vehicles that move on land have axles and wheels that are fixed to a chassis. An axle fixed to a chassis has freely moving wheels. A freely moving axle has fixed wheels. People build machines to make their work easier. A machine is made up of different parts that all work together to perform a task. Individual parts of a machine are called components. The part of a machine that brings about movement is called the mechanism. A slider mechanism moves in a straight line.		Cams are devices that can convert circular motion into up-and-down motion. The cam is fixed to the axle and the follower sits on the cam. When the axle is rotated, the follower moves up and down, following the shape of the cam. Different shaped cams produce different patterns of movement in the follower. Simple machines make physical jobs easier by changing the strength or direction of a force. There are six simple machines: pulley, lever, wheel and axle, wedge, inclined plane and screw. Simple machines can be combined to make complex,		A pneumatic system uses compressed air to exert a force. Pneumatic systems can be used to lift heavy loads, raise and lower platforms or soften a force by acting as a shock absorber. Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. Other mechanisms include pneumatics and hydraulics.	

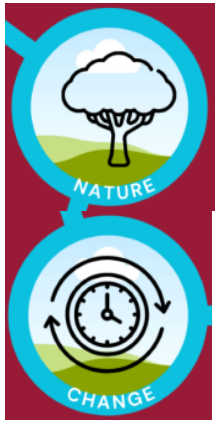
			Real-life examples of slider mechanisms include door bolts and drawers. A lever mechanism is a bar that moves around a fixed point called a pivot. Real-life uses of levers include scissors and seesaws. A linkage mechanism combines levers and sliders. Real-life uses of linkages include toolboxes and scissor lifts.	compound machines. For example, a wheelbarrow combines a lever with a wheel and axle.	
	Vocabulary		axle, fixed axle, moving axle, chassis, design criteria, bar, fixed pivot, guide, lever, linkage, machine, mechanism, moving pivot, slider.	axle, cam, circular cam, design criteria, follower, heart cam, lever, linkage, machine, mechanism, pear cam, rotation, slider, snail cam, wheel, compound machine, effort, first-class lever, force, friction, fulcrum, inclined plane, lever, load, prototype, pulley, screw, second-class lever, simple machine, third-class lever, wedge.	actuator, compress, compressor, deflate, force, gas, inflate, jack, lever, liquid, piston, plunger, pneumatic system, pneumatics, pressure, syringe, system, valve, hydraulics, sliders, linkages, gears, pulleys and cams.

Structures	Topic(s)	*Starry Night*	*Shade and Shelter* *Beach Hut*		*Greenhouse* *Fresh Food, Good Food*		*Moving Mechanisms* *Engineer* *Architecture*	
	NC Coverage (Development Matters EYFS)	Return to and build on their previous learning, refining ideas and developing their ability to represent them.	build structures, exploring how they can be made stronger, stiffer and more stable		apply their understanding of how to strengthen, stiffen and reinforce more complex structures			
	Skills Progression	Construct simple structures and models using a range of materials.	Construct simple structures, models or	Explore how a structure can be made stronger,	Create shell or frame structures using	Prototype shell and frame structures, showing	Build a framework using a range of materials to	Select the most appropriate materials and frameworks for different structures,

			other products using a range of materials.	stiffer and more stable.	diagonal struts to strengthen them.	awareness of how to strengthen, stiffen and reinforce them.	support mechanisms.	explaining what makes them strong.
	Knowledge	A bridge is a structure that allows people and vehicles to cross over an open space	Different materials can be used for different purposes, depending on their properties. Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares		Diagonal struts create triangular shapes within a frame structure. Adding diagonal struts to a frame structure adds strength and stability. A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials.		Support, stiffness and stability can be created by using triangular shapes to create strong frameworks, columns to support roofs and overlapping brickwork patterns. Mechanisms and systems can work together to perform a function. A strong and stable structure is necessary to support mechanisms in a machine. Strength can be added to a framework by using multiple layers or changing its shape. Triangles do not collapse or distort easily and so are used in architecture to provide support and stability.	
	Vocabulary		den, design criteria, durable, fabric, flexible, glass, material, metal, permanent, plastic, shade, shelter, stone, strong, tarpaulin, temporary, waterproof, wood, cladding, butt joint, frame structure, mitre joint, strengthen, triangular corner		butt joint, design criteria, diagonal strut, frame structure, plastic, rigid, stability, strength, triangular corner, packaging, prototype, tetra-pak, layers.		abutment, arch, beam, compression concertina, iron, steel, support pier, suspension, truss, tension,	

Materials	Topic(s)	*Starry Night,* *On the Beach*	*Shade and Shelter* *Beach Hut* *Cut, Stitch and Join* *Push and Pull*	*Making It Move* *Greenhouse* *Fresh Food, Good Food* *Warp and Weft (Art)* *Functional and Fancy Fabrics* *Tomb Builders*	*Moving Mechanisms* *Engineer* *Architecture* *Make Do and Mend*
	NC Coverage	Create collaboratively,	select from and use a wide range of materials and components, including	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	

	(Development Matters EYFS)	sharing ideas, resources and skills.	construction materials, textiles and ingredients, according to their characteristics					
	Skills Progression	Select appropriate materials when constructing and making.	Select and use a range of materials, beginning to explain their choices.	Choose appropriate components and materials and suggest ways of manipulating them to achieve the desired effect.	Plan which materials will be needed for a task and explain why.	Choose from a range of materials, showing an understanding of their different characteristics.	Select and combine materials with precision.	Choose the best materials for a task, showing an understanding of their working characteristics.
	Knowledge	Different materials are suitable for different purposes, such as construction kits for modelling and ingredients for baking.	Different materials are suitable for different purposes, depending on their specific properties. For example, glass is transparent, so it is suitable to be used for windows. Properties of components and materials determine how they can and cannot be used.		Materials for a specific task must be selected on the basis of their properties. For example, greenhouses need transparent or translucent materials. Availability and cost have also got to be considered. Characteristics of materials, such as rigidity, strength and smoothness will affect the success of a working model. Visual qualities of a yarn can include its colour, elasticity, pattern and texture. Fabrics can be natural or synthetic. Natural fabrics include cotton, silk and wool. Synthetic fabrics include Lycra, polyester and nylon.		Materials should be cut and combined with precision. For example, pieces of fabric could be cut with sharp scissors and sewn together using a variety of stitching techniques. It is important to understand the characteristics of different materials to select the most appropriate material for a purpose. This might include flexibility, waterproofing, texture, colour, cost and availability.	
	Vocabulary	Art straws, join, bendy, straight, fix,	absorbent, clay, design criteria, durable, fabric, flexible, glass, material, metal, permanent, plastic, shade, shelter, stone, strong, tarpaulin, temporary, waterproof, wood, transparent, opaque, improve		cold frame, conservatory, design criteria, greenhouse, plastic, hot glue gun, rigid, stability, strength, translucent, transparent, assemble, review		Seam unpicker, sewing machine, evaluate	

Food (cooking)	Topic(s)	*Festival Food* *Oliver's Fruit Salad*	*Chop, Slice and Mash* *Remarkable Recipes*		*Cook Well, Eatwell* *Fresh Food, Good Food*		*Eat the Seasons* *Food for Life*	
	**NC Coverage** **(Development Matters EYFS)**	Create collaboratively, sharing ideas, resources and skills.	Use the basic principles of a healthy and varied diet to prepare dishes.		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			
	Skills Progression	Follow instructions, including simple recipes, that include measures and ingredients. Mix dry and wet ingredients. Peel/grate/chop with an adult.	Measure and weigh food items using non-standard measures, such as spoons and cups. Prepare ingredients by peelinggrating chopping and slicing.	Prepare ingredients by peeling, grating, chopping and slicing more independently. Use heat safely.	Prepare and cook a simple savoury dish.	Identify and use a range of cooking techniques to prepare a simple meal or snack.	Use an increasing range of preparation and cooking techniques to cook a sweet or savoury dish.	Follow a recipe that requires a variety of techniques and source the necessary ingredients independently.
	Knowledge	When people celebrate they sometimes eat special food. A recipe is a set of instructions that tells us how to make food. Recipes show us how to make meals and snacks.	Fruits and vegetables can be mixed to make a healthy salad. Salad dressings can improve the flavour of salads. Some ingredients need to be prepared before they can be cooked or eaten. There are many ways to prepare ingredients: peeling skins using a vegetable peeler, such as potato skins; grating hard ingredients, such as cheese or chocolate; chopping vegetables, such as onions and peppers and		Preparation techniques for savoury dishes include peeling, chopping, deseeding, slicing, dicing, grating, mixing and skinning. Cooking techniques include baking, boiling, frying, grilling and roasting.		Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. Savoury dishes usually have a salty or spicy flavour rather than a sweet one. Ingredients can usually be bought at supermarkets, but specialist shops may stock different items such as specialist vegetables or coffees. Greengrocers sell fruit and vegetables, butchers sell meat, fishmongers sell fresh fish and delicatessens usually sell some unusual prepared foods, as well as cold meats and cheeses.	

			slicing foods, such as bread and apples.		
	Vocabulary	Recipe, full, empty, more, less, mix, stir, chop.	Ingredients, peel, grate, blend, heat, melt, slice,	Pulse, bake, roast, fry, grill, roast, boil, deseed, skin, savoury	Specialist, prepare, timing, menu, complimentary, bitter, sour, sweet, tart,

Food (nutrition)	**Topic(s)**		Chop, Slice and Mash Remarkable Recipes		Cook Well, Eatwell Fresh Food, Good Food		Eat the Seasons Food for Life	
	NC Coverage		use the basic principles of a healthy and varied diet to prepare dishes understand where food comes from.		understand and apply the principles of a healthy and varied diet understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.			
	Skills Progression	Suggest healthy ingredients that can be used to make simple snacks.	Select healthy ingredients for a fruit or vegetable salad.	Describe the types of food needed for a healthy and varied diet and apply the principles to make a simple, healthy meal.	Identify the main food groups (carbohydrates, protein, dairy, fruits and vegetables, fats and sugars).	Design a healthy snack or packed lunch and explain why it is healthy.	Evaluate meals and consider if they contribute towards a healthy diet.	Plan a healthy daily diet, justifying why each meal contributes towards a balanced diet.
	Knowledge	Fruit and vegetables are healthy foods. We need to eat at least five portions of fruit and vegetables a day. Heating food can change its appearance, taste, texture and colour. Fruit and vegetables are healthy food.	Fruit and vegetables are an important part of a healthy diet. It is recommended that people eat at least five portions of fruit and vegetables every day. A healthy diet should include meat or fish, starchy foods (such as potatoes or rice), some dairy foods, a small amount of fat and plenty of fruit and vegetables.		There are five main food groups: fruit and vegetables; carbohydrates (potatoes, bread, rice and pasta); proteins (beans, pulses, fish, eggs and meat); dairy and alternatives (milk, cheese and yoghurt) and fats (oils and spreads). Foods high in fat, salt and sugar should only be eaten occasionally as part of a healthy, balanced diet. Foods need packaging to keep them fresh, safe to eat and free from damage. Food packaging also provides nutritional information about the food inside.		A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions. Eating a balanced diet is a positive lifestyle choice that should be sustained over time. Food packaging provides important nutritional information about the food inside.	
	Vocabulary	Fruit Vegetable Food, meal, breakfast, lunch, dinner, snack, water, full, empty	Eatwell plate, balanced, healthy, starch, dairy, energy, grams, kilograms, pounds, ounces, portions, ingredients		Carbohydrates, proteins, fats, dairy, hydration, kiojoules, calories, proportions, calcium, nutrition,		Sodium, fibre, nutrients, vitamins, minerals,	

Textiles (sewing)	**Topic(s)**	*Sea Puppets*	*Cut, Stitch and Join*		*Functional and Fancy Fabrics*		*Make Do and Mend* *Mixed Media (Art)*	
	NC Coverage		select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics		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			
	Skills Progression		Cut and join textiles using glue and simple stitches.	Use different methods of joining fabrics, including glue and running stitch.	Cut and join wools, threads and other materials to a loom.	Hand sew a hem or seam using a running stitch.	Combine stitches and fabrics with imagination to create a mixed media collage.	Pin and tack fabrics in preparation for sewing and more complex pattern work.
	Knowledge		A running stitch is made by passing a needle in and out of fabric. Running stitches are made at equal distances apart. A running stitch is a basic stitch used to join two pieces of fabric.		Weaving involves interlacing pieces of thread or yarn or other materials A hem runs along the edge of a piece of cloth or clothing. It is made by turning under a raw edge and sewing to give a neat and quality finish.		A collage is artwork made by sticking materials, such as scraps of paper or fabric, onto a background. Pinning with dressmaker pins and tacking with quick, temporary stitches holds fabric together in preparation for and during sewing.	
	Vocabulary	needle thread join	Running stitch Weave, knot		Embroidery Back stitch Hem Loom Tie off		Cross stitch Sewing machine overlocking	