Reffley Design and Technology curriculum

Contents

Overview

The DT curriculum has been designed as follows: -

1. Learning is sequential across the following areas – construction; cooking and nutrition; textiles; mechanisms; electrical and mechanical components.
2. Within each project, learning focuses on design, make, evaluate and technical knowledge.
3. Children are introduced to designers and inventors and the contributions that they have made.
4. Design and Technology has been designed to be a stand-alone subject with teaching sequences, specialised teaching resources and assessment.
5. An adapted PlanBee teaching scheme is used to support teachers with planning and delivery.

Intent, Implementation and Impact

Intent	Implementation	Impact
1. Our DT curriculum is based on the National Curriculum. Knowledge is taught through five main themes: - • Technical knowledge – to develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world. • Design and make – to 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. • Evaluate – to critique, evaluate and test their ideas and products and the work of others. • Cooking and nutrition – to understand and apply the principles of nutrition and learn how to cook. • The impact of invention – to introduce pupils to a range of famous inventors, their products and the impact of those on daily life and the wider world. 2. Children will be taught progressive knowledge, skills and vocabulary in the areas of: - ○ textiles ○ mechanisms ○ construction ○ electrical and mechanical components ○ cooking & nutrition. Expose the children to a range of work from various engineers, architects, inventors and chefs.	• DT lessons are taught in blocks, in order for the children to focus on a particular strand. • Lessons are well-planned, using the adapted PlanBe resources alongside our progression of skills document. • Knowledge Organisers are shared with children and parents at the beginning of a unit of work – they identify the knowledge, skills and vocabulary to be taught. • Medium Term Plans for each unit of work are produced, which breaks down the unit into steps. These steps show the learning objectives that are to be achieved and the success criteria that are needed to be met. • Work is recorded in children's learning books. Record of practical work may take the form of photographs and notes from the children and adults. • Teacher assessment for DT takes place and is recorded at the end each block taught. This is written as a list of children who are working towards expected, those that are at expected and those who are at greater depth.	**Know more** • Children are taught age-related content and skills. • Children are taught about a range of engineers, inventors, architects and chefs, both male and female • Knowledge Organisers set out the knowledge, skills and vocabulary for a unit of work. **Do more** • Children use the work of famous engineers, inventors, architects and chefs to influence their own designs. • Children are explicitly taught a wide range of techniques and given the opportunities to apply them. • Children are expected, to apply the skills/techniques they have learnt when producing their own work. **Remember more** • Children build upon knowledge and skills from Reception to Year 6 (DT Progression document). • Knowledge is developed through five key strands – ○ Textiles ○ Mechanisms ○ Construction ○ electrical and mechanical components ○ cooking and nutrition, • Knowledge and skills will be recapped at the beginning of each new unit of work. Children will be encouraged to make connections to other subjects (e.g nutrition and electricity in Science) Children will use knowledge organisers, which contain key vocabulary and information.

Overview of what is taught

	Design and Technology Projects			
EYFS	1. Design and Technology takes place through 'Free Flow Continuous Provision'. Some examples of specific working in this area include: • Pupils are taught to use a range of tools - scissors, hole punches, staplers, stampers, different types of glue etc • Pupils are taught the following skills and given opportunities to apply them through continuous provision: - cutting, scrunching, linking, attaching, ripping, fringing, labelling, stapling, curling, sticking, folding, collaging, designing, planning… • Pupils are taught how to design, plan, build, risk assess, place and fit together, balance, shape and size awareness. 2. Areas set up to support Design and Technology: - • Outside construction which contains large blocks, tyres, planks, tubes, crates • The Workshop – there is a range of recycled and collaging materials on offer and a range of tools to work with e.g. boxes, cartons, yoghurt pots, buttons, string, cellotape, masking tape, pasta etc. • Inside construction – this space provides pupils with the opportunity to plan, make, manipulate, follow instructions and pictures, deign using construction kits such as small blocks, mobile, straws, duplo, stickle bricks 3. Adult led activities include making cards, cooking, decorating, making Divas from clay, making Christmas decorations from salt dough or card, making Easter treasure boxes.			
Year				
Y1	Moving Pictures	Making Christmas decorations	Eating more fruit and veg	Playgrounds
	• Explore sliders, levers, pivots and wheel mechanisms • Making pictures move using mechanisms.	• Explore different kinds of decorations • Using simple stitches • Making a Christmas bauble using fabric and sewing	• Healthy eating • Exploring a variety of fruits and vegetables • Preparing fruits and vegetables • Designing, making and evaluating a salad of fruit smoothie	• Looking at different types of playground equipment, what they are made of and how they move. • Different ways of joining materials. • Make models of playground equipment
Y2	Stable structures	Making a fire engine	Making puppets	Seaside snacks
	• Create own structures • Follow and adapt plans • Considering 'purpose' of a structure	• Learning about wheels, axles and a chassis • Looking at fire engines and their features • Design, make and evaluate own model fire engines.	• Looking at puppets and how they are made • Cutting out fabric and using simple stitches. • Design, make and evaluate own hand puppets.	• Texture, flavour and colour of food • What is a balanced meal? • Designing and making a seaside picnic
Y3	Seasonal stockings	Moving monsters	Photograph frames	Sandwich snacks
	• Learn different sewing techniques • Joining and decorating fabric • Design and make own Christmas stocking	• Learn about pneumatic systems • Create own monster with moving parts	• Explore the materials used and components of photo frames • Learn how to use tools and techniques. • Design, make and evaluate own photo frame.	• Learn about food groups • Taste and test a range of bread and sandwich fillings • Design, make and evaluate a healthy sandwich.
Y4	Pencil cases	American food	British inventors	Making mini greenhouses

	• Different materials and ways pencil cases are opened and closed • Variety of stitches – running, whip and back • Decorating own pencil cases	• The history of American food • Food preparation techniques • Following recipes	• Learn about some British inventors and their revolutionary inventions	• The purpose of a greenhouse and how it works • How structures are made and made stable. • Appropriate materials. • Design, make and evaluate own mini greenhouses.
Y5	Funky furnishings	Moving toys	Burgers	Building bridges
	• Analyse, design, make and evaluate cushion covers • Sewing techniques, joining and decorating fabric	• Learning about cams • Create a sturdy structure • Design, make and evaluate own toy with a cam mechanism	• Burger recipes • Design, cook, taste and evaluate own burgers • Combining flavours to make healthy and tasty meals	• Different types of bridges • Structures that support bridges • Building own bridges Add bridge designers
Y6	Great British Dishes	Fairgrounds	Fashion and Textiles	Shelters
	• Explore sweet and savoury national dishes • Explore how cuisine is influenced • Plan and shop for a meal, Add great British chefs – Delia, Fanny Craddock, Heston Bloomentall, Jamie Oliver	• Examine rotating fairground rides. • Design, make and evaluate own ride using an electrical motor	• Exploring fashion and textiles • Making a drawstring bag	• Using different materials to create free standing objects • Reinforcing structures • Suitable materials • Design, make and evaluate own structures

Progression of Knowledge and skills

Design and Technology - progression document – EYFS and KS1			
	EYFS	Y1	Y2

Design	Pupils are taught how to design and plan.
	
	Within the classroom there is a construction area and resources. Children are encouraged to plan models and make simple picture designs of things they want to make.
		• Can identify the key features of an existing product	• Can evaluate an existing product by saying
			  ○ How it is useful
			  ○ How it works
			  ○ Whether they like it and why.
			• Can name and describe the features and functions of an existing design (fire engine)

		• Can generate ideas for different ways of using a lever mechanism • Can generate ideas for different ways of strengthening models to make them sturdy • Can say whether their models are strong or not. • Can generate ideas for different decorations	• Can investigate ways to combine wheels, axles & chassis • Can investigate and plan to make the features of a fire engine (i.e. body, ladder, hose) • Can investigate how materials can be made stronger e.g folding, layering and rolling paper and card and testing them for strength
		• Can make a plan of an existing product & label it • Can make a plan of a picture with a mechanism using pictures and labels • Can make a labelled plan of their design	• Can make a plan for a structure that is stable • Can make a design for a fire engine that includes wheels, axles, chassis and a body
		Can explain their own idea	Can communicate their ideas and plan by describing them to someone else including what the purpose is.
		Can make a list of materials they will need	Can list and select the appropriate materials and explain their choices
Working with tools and equipment	• Can cut shapes using scissors and modelling tools • Know how to cut, scrunch, link, attach, rip, fringe, label, staple, curl, stick and fold.	• Can cut out using scissors • Join 2 pieces of paper/card together with glue & tape • Join two pieces of fabric together using a needle and thread	• Can join card and paper using glue and selloptape. • Can join dowelling and straws using glue and tape (sellotape/masking tape) and threading through.
	Can name and use different tools (tape, scissors, string, hole punch etc	Can select appropriate and tools and use them safely	• Can use tools such as ruler, scissors, hack-saw, glue spreaders, tape dispensers accurately and safely • Can thread a needle and tie a piece of thread
Making	• To build simple structures and sculptures • To be able to do a simple stitch • To be able apply simple decorations to a piece of fabric <u>Adult led activities</u> include making cards, decorating, using clay, making decorations and boxes. <u>Continuous provision</u>: -	• Can sew fabric together using the running stitch to make a Christmas bauble • Can cut out fabric along a line using scissors • Can attach a button to a piece of fabric.	• Can join textiles together using the running stitch to make a puppet • Can cut fabric • Use simple finishing techniques – sewing on a button

	○ large blocks, tyres, planks, tubes and crates are available in the outside construction area. ○ Construction kits (small blocks, mobile, straws, duplo, stickle bricks) are available in the inside construction area. ○ Recycled materials (boxes, cartons, pots, buttons, string, cellotape, masking tape, pasta etc) and a range of tools are avaible in the inside 'worskop area'. • Can make a model using construction kits by following instructions and pictures	• Can follow a design to make a product which moves • Can combine and join materials to make a lever mechanism • Can cut out and join components to make a wheel mechanism	• Can follow a design to create a fire engine that moves
		• Can join materials together to make a sturdy structure	• Can join, fold or roll to make a structure stronger • Can fold, roll & layer to make a sturdy structure • Can make a (toy) garage that is stable
Evaluation	Talk about what they have made and the materials that they have used.	• Say what they like & feel about their own work • Can say what they like about others' work & give positive feedback (I like X about your product)	• Can use like and dislike when evaluating their product (garage/fire engine)
		• Can identify what has gone well with their product. • Can say how they could improve their work	• Can recognise what they have done well and talk about what could be improved • Can assess how well their product works • Can predict how changes will improve the finished product
Technical knowledge - Textiles		• Know that a decoration is an item that you put on something else to make it look more attractive. • Know that sewing with a needle and thread can be used to join two pieces of fabric together • Can recognise the running stitch and overstitch.	• To know that a template is a shaped piece of paper that is used as a pattern for cutting out. • To know that a running stitch is a line of small even stitches that do not overlap.
Technical knowledge - Mechanisms		• Know that a pivot is a central point that something moves around • Know that a lever is a bar that is attached to a pivot that is used to move a load • Know that mechanism moves because force is put on a lever which is attached to a pivot	• To know that a wheel is a circular object that revolves on an axle • To know that an axle is a rod that passes through the centre of a wheel • To know that a chassis is the base frame of a wheeled vehicle. • To know that there are two ways of attaching a wheel to an axle: - ○ Fixed (the axle and wheel move together) ○ Rotating (the wheel rotates separately to the axle)
Technical knowledge - Construction	Know that construction means to make/build something	• Know that to make a structure more stable it needs reinforcing e.g., more tape to hold it together	• Know that materials have different properties including rigidity, flexibility, length, width, thickness • Know that to make a structure more stable it can be reinforced through rolling, folding, layering, gluing and taping

Design and Technology - progression document – Key Stage 2				
	Y3	**Y4**	**Y5**	**Y6**
Design	• Can compare photo frames and talk about their features: - o the frame – made of 4 sides o glass front o the backboard o a stand o the artwork or picture inside the frame • Can discuss and assess how functional an existing design is- Christmas stocking - o Can it hold presents? o Does it look attractive? o Can it hang? o Which do you prefer and why?	• Identify the features of existing products that make them fit for purpose: <u>Pencil cases: -</u> o Shape o Material it has been made from o How it has been put together o How it opens and closes <u>Waterproof coat -</u> o lightweight, waterproof, o flexible etc. <u>Greenhouse:</u> o Stable frame o Transparent panes o Ventilation & air tight seals o Access • Are able to create design criteria and use these to evaluate existing products	• Can compare, contrast and analyse existing product in detail: Cushions o specific purpose, o fabric used o How functional it is o How appealing it is o The type of fastening • Can assess and talk about the advantages and disadvantages of different types of fastenings. Can identify which fastening would be the most suitable for a particular product?	Can compare different shelters using the following criteria: - o Type and purpose o Materials/components used o Function of each part o Temporary/permanent Can compare different fairground rides using the following criteria: - o What are they like o How they move o How are the components joined together o What mechanism turns the ride
		• To know that invention and design have affected how people relate to one another and how cultures have expanded or ended. • Technology impacts on how cities grow, where people live, and who owns what. • Technologies are the reason that our lives are more comfortable than in the past, people are more social and that teaching and learning is changing		• Fashion designers develop design criteria by undertaking research: o Current trends o Work of other designers o Sketch or paint their ideas o Compare fabric samples and threads o Drape fabric over a dummy • Most products made by fashion designers consist of several flat pieces of fabric that are joined together in different ways. • Fashion designers turn sketches into real products by: o Taking measurements o Drawing each piece on large sheets of paper to make pattern pieces o Seams and hem lines are added to each pattern piece before they are cut out o Pattern pieces are pinned to fabric and used as a guide to measure, mark and cut

Design	• Can identify: - ○ how everyday free-standing objects have been made stable e.g. a wide base • familiar products which use air to make them work (e.g. bicycle pump, nerf gun).	• Can carry out a range of investigations: - ○ ways of making paper more water resistant using by adding something to paper: - wax crayons, oil pastels, sticky-back plastic, hair spray, polypockets, sellotape etc. ○ ways of making 3D structures stable and allow maximum amount of sunlight to enter. • identify materials that are suitable for a mini greenhouse (e.g., lolly sticks, dowelling, plastic wallets, clingfilm, straws, pipe cleaners and explain how they can be joined (glue, tape, staples)	• Can investigate and discuss: - ○ which stitch is the best one for a particular purpose ○ the choice of fabric, use of adornments (such as buttons, beads, ribbons, bows, tassels and frills) and skill of appliqué are used to make a cushion cover visually attractive. ○ examples of cam toys and explain how they work. ○ how different shaped cams change the movement of the follower. ○ the effectiveness of different beam designs by constructing two identical beams which can support a flat card deck. ○ the effectiveness of arches of different shapes and sizes in spreading the load on bridges. • Can make suggestions how different cams could be used for different kinds of toys (steam engines – circular, carousel pear shaped etc.)	• Investigate and analyse items made using textiles: ○ Materials used and its properties ○ Sewing patterns used and how the pieces are joined ○ Design details and fasteners ○ What the labels says • Can use electrical components to investigate and describe ways of creating replica fairground rides, considering the following: ○ What needs to be attached to the motor? ○ What different kinds of rotating parts could we have? ○ How could pulley and belt systems can be used to transfer movement from one axle to another. • Can experiment with different techniques to gather ideas for use in their own work: - ○ how best to join materials together to create a structure ○ how to reinforce these structures to make them stronger • Can experiment with different techniques to gather ideas for fairground ride frameworks considering: ○ Materials used ○ Joining techniques ○ Strengthening methods ○ Whether it is free standing ○ How the prototype could be used for a fairground ride. • Can carry out tests to determine whether different fabrics are suitable for a shelter? ○ are they water resistant ○ are they strong enough ○ are they easy to attach to other materials
	• Can apply what they know about a product to create –	• Can design a product for a particular purpose or person (pencil case, waterproof boat, greenhouse))?	• Can use knowledge of joining techniques, decorative sewing skills and understanding of how to create	• Can apply research and knowledge to design a draw string bag made using textiles:

	○ a design for an attractive seasonal stocking ○ a design that has a simple pneumatic system (e.g syringe, plastic tube, balloon) that works ○ a photograph frame that has a stable structure	• Can design a product with design criteria: - <u>Mini Greenhouse</u> ○ to grow small plants/seeds in ○ Stable and transparent ○ Can be accessed for watering ○ Ventilated and has an air tight seal <u>Boat</u> ○ Water resistant and floats • Can design a new creation intended to solve an everyday problem • Can suggest ways in which a material can be reinforced (e.g., by adding rods to it)	fastenings to design a cushion cover for a particular user and purpose. • Can create a design for a moving toy with a cam that: ○ has a clear purpose and audience ○ has a moving part ○ has a sturdy structure as the base for the toy. • Can describe how they will construct their toy and what materials and tools they will need. • Can design a prototype for a new bridge based on a design brief: - ○ 100:1 scale ○ must span a gap of 50m ○ must allow traffic to pass in both directions ○ must have a clearance of at least 20m ○ must be strong ○ must be attractive ○ prototype must be made using only scissors, paper/card, sticky tape, glue, paper straws and string	○ Draw pattern pieces, adding details such as seam allowances ○ Incorporate a range of sewing techniques ○ Choose the most appropriate stitches ○ The bag must be suitable for the recipient • Can use a range of information to inform their design for a shelter for a particular purpose. Design to state: - ○ What kind of shelter ○ Who it is for ○ Purpose of the shelter ○ How it will be made ○ Materials, joining and strengthening techniques ○ Precise measurements • Can apply research and knowledge to design a fairground ride with a rotating part. The design to show: ○ Kind of ride (and audience) ○ Which part will rotate ○ An appropriate electrical circuit ○ How movement will be controlled ○ Type of framework and how it will be made sturdy ○ Materials needed • Can articulate that they have considered the use of the product when selecting materials • Can talk through how they will construct their design, justifying choice, stating the following: ○ Materials needed ○ Steps to take and in what order ○ How the shelter will be made as per the plan ○ How a sturdy and strong shelter will be achieved ○ What you will do if something goes wrong. ○ How you will ensure that the shelter is made to a high standard.
	• Can identify areas that could be improved upon in their design	• Can identify possible challenging parts of their design and talk through possible solutions.	• Can suggest some alternative designs and discuss the benefits/drawbacks • Can identify the parts of the process that will be easy and more challenging. • Identify how they can overcome challenges (ask for help).	

<table>
<tr>
<td></td>
<td>• Can create an accurate labelled diagrams</td>
<td>• Can create a detailed plan with relevant drawing and labels, including the materials they will use.
• Can identify the sequence of steps needed to make their pencil case/mini greenhouse.</td>
<td>• Can create a detailed plan, recording how the design meets the needs of the user, the purpose; the fastenings, stitches and decorations to be used.
• Can list equipment needed and the order of work for the making process.
• Can explain their design, the reasons for it, the techniques they will use and the process they will need to undertake to make their product</td>
<td>Can draw scaled diagrams</td>
</tr>
<tr>
<td rowspan="3">Working with tools and equipment</td>
<td>To thread a needle and secure the thread with a knot</td>
<td>To thread a needle and secure the thread with a knot.</td>
<td>• Can thread a needle, & secure the first stitch with a knot (hidden/ visible).
• Can complete & secure the last stitch.</td>
<td>• Can thread a needle, & secure the first stitch with a knot (hidden or visible).
• Can complete and secure the last stitch.</td>
</tr>
<tr>
<td>Measure and cut out using centimetres</td>
<td>Measure in cm, cut & assemble accurately</td>
<td>Measure and cut precisely to millimetres</td>
<td>Measure and cut out in precise detail.</td>
</tr>
<tr>
<td>Can select the most appropriate materials, tools and techniques to use and can use them safely (syringe, balloon, piping, straws)</td>
<td>• Can use equipment and tools with increased accuracy and safety e.g: -
<table>
<tr><td>Equipment</td><td>wax crayons, oil pastels, sticky-back plastic, hair spray, polypockets, sellotape, lolly sticks, dowelling, plastic wallets, cling film, straws, pipe cleaners, string, glue, tape</td></tr>
<tr><td>Tools</td><td>needles, pins, staplers and scissors.</td></tr>
</table>
• Explain how they can be joined</td>
<td>• Can independently organise appropriate equipment and materials needed.
• Can use a range of tools and equipment with good accuracy and effectiveness, within established safety parameters e.g.,
<table>
<tr><td>Equipment</td><td>Fabric snap fasteners, buttons, VELCRO, thread, fabric marker pencil
Thick card, paper, art straws,
Dowelling, tubing, cams, wood
Glue, sticky tape, string
Sets of weights, toy cars</td></tr>
<tr><td>Tools</td><td>Needles, pins, staplers, saw, scissors.</td></tr>
</table>
• Can experiment with a variety of materials, tools and techniques</td>
<td>• Can choose appropriate tools and equipment and use them effectively:
<table>
<tr><td>Equipment</td><td>Paper, card, straws, boxes
Sculpture wire, pipe cleaners,
Fabrics, old clothing, buttons, ribbon, sequins, cord, eyelets, thread
Dowelling, cotton reels
Wire, batteries, motors, switches
Sticky tape, blu-tack, string, elastic bands, string, glue</td></tr>
<tr><td>Tools</td><td>scissors, staplers, magnifying glasses needles, pins, dressmaker’s chalk/pencils, pattern pieces, sharp scissors, eyelet tool</td></tr>
</table>
• Can use a variety of materials and components accurately
• Work within health and safety rules when working with materials such as scissors and other sharp objects</td>
</tr>
</table>

Making		Can use a template to investigate how stable different shapes are.	• Can use template to investigate: -
			  ○ the way different cams affect the movement of the follower
			  ○ trusses in bridge building
			• Can make improvements from design suggestions
				• How to measure, draw and cut pattern pieces
				• To use a pattern to make a product
				• Make separate elements of a model before combining into the finished article

	• Can join two pieces of material using a stitch (overstitch, running stitch and back stitch)
	• Be able to use running stitch, back stitch and overstitch to make a product.
	• Can use finishing techniques like embroidery and applique
	• Can sew a button, bead, sequin and ribbon onto fabric accurately
	• Can follow their design to make a seasonal stocking that looks appealing and holds a present
		• Can join two pieces of fabric together using a backstitch, running stitch and whip stitch
		• Can create the following secure fastenings: - button, popper, toggle
		• Can securely add buttons, beads and sequins to felt
		• Can use the whip stitch to attach ribbons and fabric offcuts to felt
		• Can use a range of sewn finishing techniques, showing an awareness of the audience: - buttons, appliqué, beads, ribbons, sequins
		• Can follow their design accurately to make a pencil case using securely sewn: -
		  ○ seams,
		  ○ fastenings
		  ○ embellishments
			• Can use and join two pieces of fabric together using a range of stitches (back stitch, running stitch, zig-zag stitch, over stitch, blanket stitch).
			• When using hidden stitches, can turn their work inside out so the right sides of the fabric is visible.
			• To know how to sew the following cushion cover fastenings - the envelope fold, snap fasteners and buttons with button holes
			• Can sew on accurately, buttons, beads, ribbons, tassels and frills to add interest and texture.
			• Can embroider a shape onto fabric
			• Can attach smaller pieces of fabric onto bigger pieces to make a design (applique).
			• Can independently follow their design to make a successful, decorative cushion:
			  ○ To combine a range of stitches and decorative skills
			  ○ A functional cushion that is appealing
			  ○ Has a fastening that is secure, durable and (if part of the design) is aesthetically pleasing.
			• Is for a specific purpose and user.
				• Can use a range of sewing techniques to join and decorate products made using textiles: -
				  ○ Sew a basting stitch
				  ○ Sew a running stitch (straight stitch)
				  ○ Sew a whip stitch
				  ○ Sew a hem
				  ○ Sew a backstitch
				  ○ Sew a button
				  ○ Sew an applique decoration
				  ○ Sew an initial using a backstitch
				• Can make a drawstring bag:
				  ○ Use pattern pieces to mark (wrong side of the fabric)
				  ○ Cut fabric according to a pattern
				  ○ Add design elements according to their own design to the cut pieces (before joining)
				  ○ Join fabric pieces together by hand sewing using a double-threaded needle.
				  ○ Can pin and sew a hem.
				  ○ Can make a drawstring closing using the top hem as a channel for a draw-string cord and eyelets.
				• Can ensure products are carefully finished

	• To create a stable structure with paper/card using strengthening techniques e.g. rolling, twisting, layering, folding
	• Can follow a design to make a functional and decorative photo frame.
	• To create accurate joins using glue and tape.
		• Can consider which materials are fit for purpose and join them appropriately
		• Can strengthen joins and corners in a variety of ways using tape, glue, string, staples Can create a mini greenhouse that has: -
		  ○ A frame strong enough to keep the structure stable
			• Know a range of techniques to make a structure sturdier:
			  ○ use a cardboard triangle to reinforce corners
			  ○ for a wooden frame, use pieces of wood to create a triangular reinforcement
			  ○ double up card or cardboard to make it stronger
				• Can follow their design to create a shelter: -
				  ○ working appropriately with a range of materials and techniques
				  ○ using finishing techniques to ensure that their finished product is as good as it can be
				• Can work within constraints
				• Can demonstrate how their product is

		○ Transparent sections within the frame • Can combine materials to add water resistance to paper • Can create a waterproof boat that floats and is water resistant	○ create feet at the base of the structure so it is easier to balance • Can build a range of strengthened bridges with specific criteria using trusses, arches and a suspension bridge.	strong and fit for purpose
	• To create an air tight seal by: ○ using tape, ○ pushing a tube on to a syringe hub • Can follow a design to make a monster that moves by a pneumatic system.		• Can independently follow their design to make a successful, moving toys that: ○ has a cam mechanism that works effectively ○ is sturdy ○ is appropriate for the intended audience ○ looks like the design	Can follow a design to create a fairground ride with a rotating part ○ working appropriately with arrange of tools, techniques and electrical components ○ finished product matches the design ○ Product has a stable framework ○ using finishing techniques to ensure that their finished product is of a high quality • Can work within constraints • Can demonstrate how their product is strong and fit for purpose
Evaluation	• Look at a range of existing products – talk about what makes them successful. • Be able to identify familiar products which use air to make them work.	• Investigate and analyse a range of existing products as a source of ideas – pencil cases, greenhouses.	• Can develop own designs through reflection and evaluation of others products	• Test and evaluate commercial/other products using criteria: - ○ Is it fit for purpose? ○ What would improve it? ○ Would different resources have improved their product? ○ Would they need more or different information to make it even better? ○ Does their product meet all design criteria? • Can say how they are going to use this information in their own designing.

	• Recognise what has gone well, but suggest further improvements for the finished article • Suggest which elements they would do better in the future • Can assess how well their product works in relation to the purpose	• Can explain what has gone well and how their product could be improved. • Can identify problems faced and talk through how they were overcome. • Can assess how well their product works in relation to the design criteria and the intended purpose: o Does your pencil case look like your design? o Does your pencil case hold pencils securely? o Are your stitches strong and neat? o Is the greenhouse stable? o Does it allow sufficient light in for plants to grow? o Are seals air tight? o Can it be ventilated? o Can it be accessed? • Can devise a set of criteria for water resistant paper e.g. waterproof, flexible, foldable	• Can identify what works well and what might be improved using these prompts: o Which parts of the making process went well. o What are you particularly pleased with? o Did you encounter any problems in the making process? How did you overcome them? o Did you change any part of your design during the making process, if so why? o How well does your product fit the design criteria and the intended purpose? o Would you change anything about your finished product if you were to make it again? • Can analyse a prototype by asking questions that are based on the design criteria i.e., • Does the bridge span a gap of 50cm? • Does it have a clearance of at least 20cm beneath it? • Does it have a deck which allows two toy cars to pass each other? • Is it strong and attractive	• Can share models and objectively evaluate them using these prompts: o How well does your product fit the design criteria and the intended purpose? o Is it sturdy/attractive/functional? o Are the joins secure? o How well does the rotating part of your fairground ride work? o What is successful about it? o Is there anything that could be improved upon for next time? • Understand that all finished products, no matter how good, can be improved in some way.
Technical knowledge **Textiles**	• To know that a backstitch is a method of sewing with overlapping stitches to form a solid line. • To know that an overstitch is a stitch made over an edge. • To know that applique is pieces of fabric sewn on to a larger piece to form a picture or pattern • To know that embroidery is decorating fabric using stitches to apply thread or yarn to a piece of material	• To know that fabric pencil cases can be fastened in different ways: zip (most common), buttons, Velcro, poppers, lids and hinges (closed with a catch) • Know that a zip is difficult to secure without a sewing machine. • Know that there are different stitches that are used to join fabric together: - o Backstitch – a line of overlapping stitches o Running stitch - a simple stitch consisting of a line of small even that do not overlap. o Whip stitch - a line of parallel	• To know that functional means that a product has a practical use and aesthetic refers to how appealing the product is to look at • To know that the 'right side' of the fabric is the side that you want to be seen on the finished product. • To know that the 'wrong side' of the fabric is the surface that you do not want to be facing outwards on the finished design. • To know that fabric can be plain, patterned or textured. • To sew two pieces of fabric together, we need to: -	• To know that cotton is grown in countries with warm climates such as USA, Brazil, India and China. • Cotton lint is drawn and twisted by machines to make yarn. The yarn can be dyed different coolours before it is woven to make fabric on a loom. • Cotton lint can be woven into synthetic, man-made fibres. These can help make fabrics lighter, stronger or stretchier. • Products which are woven are called textiles. They are made from synthetic, plant or animal fibres • Different textiles have different properties depending on what they are

		line stitches that often goes around the edge. • Know that the backstitch gives the most secure join • Know that there are different ways of adding embellishments to fabric: - ○ Buttons (practical and embellishment), ○ Appliqué (pieces of material are sewn onto a larger piece to create a picture or pattern) ○ Beads, ribbons, sequins (to add detail and decoration) • Embellishment can be attached to fabric by sewing or sticking them on using glue. • Sewing is a much more secure way of adding embellishments.	○ make sure that both pieces of fabric are the same size ○ join the fabric together using hidden or visible stitches. • Hidden stitches are stitches that cannot be seen on the finished product – running stitch, back stitch and zig zag stitch can be used. • Visible stitches are seen on the finished product e.g., overstitch and blanket stitch • To know that cushions have a re-sealable opening on one side, where a filling/stuffing can be added or removed. They can be fastened with zips, Velcro, laces, poppers, safety pins, buttons and an envelope fold.	for. • Hats, clothes and bags are made by joining together pieces of fabric. • Most products made from textiles are joined by sewing. Sewing machines are normally used although some products are hand-sewn. • Textiles may also be joined by gluing, riveting or with fasteners such as zips and laces • Lots of the clothes sold in the UK are made in Bangladesh, Cambodia and Shri-Lanka. • The following basic sewing stitches are used to join pieces together: ○ Basting stitches (or tacking stitch) – used to temporarily join two pieces together. They can be pulled out easily ○ Running stitch (straight stitch) – quick and easy to sew ○ Back stitch – these are strong and look neat ○ Whip stitch – can be used to finish edges ○ Hems – make a strong, neat edge • Backstitch and whip stitches can be used to decorate items with patterns or applique • Two pieces of materil can be joined with a back stitch. The join between two pieces of material is called the seam. • Fasteners such as zips and buttons can be attached to material by machine or hand sewing • Pattern pieces are drawings that are the exact shape and size of the sections of textiles used to make a product such as a dress or a bag. They have detailed information to help when making the product • Pattern pieces can be used again and again. They are used to transfer a design to cloth or other textiles.

				• Hand-sewing with a double thread makes seams stronger. • Knotting the thread stops it coming off the needle. • When the thread is too short to carry on sewing, tie a knot to stop the seam coming apart, then cut the loose end off. • Hems are made by folding over the edge piece of fabric and stitching it in place.
Technical knowledge Mechanisms (Year 1-3) **Mechanical and electrical components Year 5-6)**	• Pneumatic is used to describe a mechanical device that is moved by air pressure (compressed air). • In pneumatics, an object moves or a sound is made because compressed air is pushed through a tube by a force.		• A cam mechanism is a linkage system which has a follower to convert rotary movement (moving round and round) to linear movement (moving up and down). • As the cam is rotated by the dowelling, the follower is lifted up and down because of the shape of the cam • The shape of the cam affects the movement of the follower. • Lots of children's toys have objects attached to the follower to create a fun moving toy	• Electrical circuits and motors are used to make objects rotate. Fairgrounds and other everyday objects (vacuum cleaner, electric fan) use electrical circuits for rotation. • The components of an electrical circuit are – battery, wire, switch, motor. The circuit needs to be complete for the motor to work. • Motors can be attached to pulley and belt systems so that other objects can be rotated as well as the motor itself • Belt and pulley systems are used to transfer movement from one axel to another.
Technical knowledge Construction	• A wide base makes free standing objects more stable. • Paper and card can be strengthened by: - o Rolling to create poles. Short poles are stronger than long poles o Layering and gluing to the required thickness o Twisting into tight folds o Folding repeatedly to make a strip.	• For a structure to be stable and unlikely to collapse, it needs to be steady, strong and safe. • The stability of a structure depends on its shape and the materials it is made from. • The weight of a structure needs to be evenly spread on the base for it to be stable. • The wider the base of a structure, the more stable it will be. • If the sides or walls of a structure have some parts missing, the structure will be less stable and more likely to collapse or fall down. • Glass and plastic sheeting are less stable than wood, metal, plastic tubing.	• A beam is a length of sturdy material that has been cut and shaped to span a gap or support a floor or roof • Beams are formed into different shapes for different purposes. • The deck is the flat surface of a bridge. A smooth, flat deck allows wheeled vehicles to cross. • Side sections of bridges (parapets) make the bridge more sturdy • Pillars allows bridge builders to span bigger gaps. When a bridge spans a river, the pillars stand on man-made islands so they do not wash away. • Steel and concrete are often used in the construction of modern bridges. Beams and pillars made of these materials can be made much bigger,	• Know the following strengthening methods: - o inserting sculpture wire or pipe cleaners into a straw before using it o creating a triangle shape in corners o rolling paper into tubes • Know how to reinforce frameworks: o Create a triangle out of the corners. o Creating diagonals in the frame o Making 'beams' across shapes

		• A greenhouse frame needs to be strong and stable and stop the structure from collapsing; the sections within the frame need to be transparent.	longer and stronger • Steel girders are often used in bridge construction. Tubular steel in different shapes is also used frequently • The Millennium Footbridge in London stands on foundations called piers • A truss is made up of several beams connected together in different ways. Trusses enable longer, stronger bridges. • A bridge deck runs through, or on top of the trusses • Gravity is a downward force acting on bridges. This downward force pulls down on the beams and decks, causing them to squeeze, stretch, twist and bend • Trusses help strengthen bridges by distributing the weight along its length and transferring the compression forces down through the pillars and abutments • Lattice truss, Warren truss and Pratt truss are commonly used in bridge design. • Until developments in technology and engineering meant that engineers could construct large beams made of iron, long bridges were made with brick or stone arches. • In the past, stone arches were used to build long bridges. Arches help to spread the load by changing the direction of the compression forces caused by the weight of the bridge itself and the weight of the objects crossing • Suspension bridges are different to many other bridge designs because they spread out the weight of the bridge and the traffic crossing it in a different way. Suspension bridges use tension forces, pulling rather than	

			pushing. • Modern engineering means that huge suspension bridges can be built. Thick, heavy, twisted steel cables transfer the weight of the bridge to the vertical columns. Their weight means they have to hang in long loops between the columns. The cables are anchored at either side of the bridge deep into hard rock or into tonnes and tonnes of poured concrete. Because the columns of suspension bridges can withstand huge compression forces, they can be built with long decks and big gaps between them. Another advantage is that the deck can be hung high above the gap it is spanning, unlike other bridge designs • Technical drawings and models are often drawn and built to a scale that is smaller than the final product.	
Technical knowledge Designers		• Concrete is a very versatile material for building with. It is strong and can be shaped and moulded into lots of different shapes. • Know that concrete has been used for thousands of years. The Roman Empire used it to make the Colosseum. • Know that concrete can be in bricks, slabs or in special designs to make it stronger. • W B Wilkinson noticed that concrete would crack under heavy pressure, weight or tension. In 1853 he thought of a way to reinforce the concrete by setting steel bands within the concrete • Know that reinforce means to make something stronger. • Know that things can be reinforced by adding materials to support them, or strengthen them or by layering		

		materials to be stronger • Know that reinforced concrete has steel rods placed into the concrete before it dries. • Know that reinforced concrete meant that new, bigger and more imaginative buildings could be built e.g. Sydney Opera House, Burj Khalifa, Millau Viaduct. Main Act • Charles Macintosh was able to find a way of making waterproof fabric by layering fabric with natural rubber. This kept the material flexible enough to make clothing out of, but made sure it was no longer absorbent • Know some other British designers and their inventions: o James Dewar (vacuum flask), o Christopher Cockerell (hovercraft), o John Baird (television), Keith Campbell and Ian Wilmut (cloning Dolly the sheep).		

Progression of Knowledge and Skills – Cooking and Nutrition

Progression document – KS1			
	EYFS	Year 1 – Fruit and Veg	Year 2 – seaside snacks
Cooking skills	Can use a range of cooking tools safely.	Can use some simple equipment – sharp knife, peeler and grater.	Use a knife, scales, skewers and rolling pin safely
		Can explain that some ingredients need to be washed or peeled before they can be eaten.	Can cut and arrange fruits and vegetables into a finished dish
		Can combine fruits or vegetables.	Know what is meant by 'combine' (join more than one thing to form one substance) and how to combine ingredients
	Can wash hands before food preparation.	Can work hygienically by washing hands, food and surfaces.	Can explain the hygiene and safety rules, which need to be followed before, during and after cooking.
Nutrition	Understand that food is needed for us to grow and be active.	Can understand that we need food to grow, be active and keep healthy.	• Know that healthy means that your body is in a good physical and mental condition and that eating fruit is healthy. • Can explain that fruit and vegetables have nutritional value and are an important part of our diet.
	Can sort foods into healthy & unhealthy groups.	Know that a healthy diet means eating a variety of foods that give you nutrients to keep healthy, feel good and have energy.	• Know that a balanced meal means having a plate that covers the three main food groups. • Can put together a balanced picnic by choosing foods from different food groups.
Food knowledge	• Can talk about a range of fruits and vegetables. • That you can grow food or buy it from shops.	• Can identify a wide variety of fruit and vegetables • Know that fruits and vegetables taste and smell differently • That different parts of the vegetables and fruit are called – skin, flesh and seeds.	• Know the following vegetables - sweet potato, courgette/zucchini, bell pepper, aubergine, avocado and know how and where they are grown. • Know the following fruits – oranges, kiwi fruit, starfruit, pear, banana, pineapple, strawberries, mango, cantaloupe melon. Know how and where they are grown.
Enjoying food	• Enjoying food • Are willing to try new food	Can express a preference including like/dislike	Can experience a range of food and explain their opinion.

Progression document – KS2				
KS2	3 Sandwich snacks	4 American Food	5 - Burgers	6 British Dishes
Cooking skills	How to cut (with a knife), chop (with a vegetable knife), spread (with a knife) and grate safely.	• How to cut out, shape and mould pastry. • How to snip (with scissors), cut (with a knife) and shred (with grater) safely.	• Can weigh and measure accurately. • How to shape and make a burger	How to cut and chop vegetables using the bridge hold and claw grip.
		To be able to select scales to measure, a sieve to sift, a spoon to mix and a jug to pour.	Can measure and mix ingredients correctly.	How to combine ingredients (mixing together)
	• How to design and make a healthy sandwich. • Can select own ingredients	• To be able to follow a recipe (read and do what is stated) step by step • How to modify a simple recipe by changing ingredients.	Can follow a recipe step by step.	• Know how to follow a simple recipe by following each instruction and doing what it says. • Know how to modify recipes.
	How to present food that looks appealing by using fresh ingredients, arranging products neatly, ensuring the plate is clean.	.		To know how to plan a meal by choosing what is to be made, list the ingredients needed and put a price next to each of those things to determine the overall cost.
	How to work safely and appropriately with food by washing hands before handling food; ensure work areas are clean; wearing an apron; being sensible with knives and graters.	Know how to use a hob safely: ○ Using a hob at the back, ○ Using a pan that is not too small for the hob with the handle inwards. ○ Watching what is happening so the heat is not too hot for the pan and what is being cooked. ○ Turning the hob off when the pan is to be moved. ○ Not leaving an empty pan on the hob.		Give general kitchen health and safety advice: ○ Get everything ready that is needed. ○ Wash hands and keep surfaces clean. ○ Use the correct equipment safely ○ Don't lick or taste food unless checking with an adult. ○ Follow instructions. ○ Tidy up.
Nutrition	That food can be divided into groups ○ carbohydrates - they contain sugars that give us energy		• That fat is a natural oil substance that helps prevents disease in our bodies.	

	○ fruit and vegetables are low in fat and contain natural sugars to give us energy. ○ proteins help our body to grow and repair itself ○ dairy products contain calcium to keep our bones and teeth strong ○ Fats and sugars are necessary but in small amounts.		• That proteins are large molecules that assists with muscle and hair growth in our bodies. • That carbohydrates are a nutrient that changes into sugar and provides energy for our organs.	
	A 'food pyramid' shows the proportions of different foods that should be eaten.		• That the nutritional facts label gives detailed information about the proteins, carbohydrates, sugars, fats and salts in the food and how many calories it has. • That there are guidelines to tell us if a food is high in fat, sugar and salt.	Know that nutrition labels include information on energy (kJ/kcal), fat, saturates (saturated fat), carbohydrate, sugars, protein and salt.
	• Can understand that a variety and balance of food and drink is needed in a healthy diet. • Junk foods taste nice but do not contain many nutrients and eating too many is unhealthy.		• That energy in food is measured in calories. • The amount of calories our bodies need to power our brain and organs depends on our age, height and weight.	Can recognise that the amount of energy and nutrients provided by food depends on the portion eaten.
Food Knowledge	• Vegetarians replace meat and fish with eggs, beans, lentils and soya. • That different combinations of ingredients affect the taste and texture of the product.	• Know about American food and how its customs and culture can affect the food people eat. Apple pie is a dish that is a traditional American dish. • Know that food around the world is prepared in different ways, sometimes because of culture, customs and religion. • Chillies are a key ingredient in Mexican food. • Tex-Mex dishes are easy to eat on the go. • Fast food is convenient and tastes good but it contains lots		• That a national dish consists of food that is strongly associated with a particular country, they are made from locally available foodstuffs, and are an important part of the country's identity. • That a savoury dish is food that has a salty/spicy flavour. • Fried Breakfast, Roast Dinner, Toad in the Hole, Fish and Chips, Cornish pasty and Cottage pie are traditional national English dishes. • Cottage pie is made with meat and mashed potato. It was first made at the end of 18th century when poorer people in Britain (living in

		of fat and sugars. It should only be eaten in small quantities. • That several changes take place when food is cooked. Cooking makes food soft and easy to eat and digest. • That food can be preserved by smoking or drying it. • That 'Veggie Jerky' is made by drying vegetables in an oven.		cottages), started using potatoes as an everyday food. • The Scottish climate is perfect for growing oats and has been a staple in Scotland since the Middle Ages. • Oatmeal, Haggis, Cranachan, Oatcakes, Neeps and Tatties, Stovies, Rumbledethumps and Tablet are traditional Scottish dishes. • Oatcakes have existed since the time of the Roman Conquest at the end of the 1st Century. • Know that different fruits and vegetables are ripe and harvested at different times in the year – this is called 'seasonal food'. • To know that a food product's 'shelf life' is the recommended maximum amount of time that it should be stored before needing to be eaten or thrown away.

Appendix 1 – National Curriculum for Design and Technology

Key stage 1

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment]. When designing and making, pupils should be taught to:

Design

- 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 & communication technology

Make

- 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

Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

Technical knowledge

- 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.

Key stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment]. When designing and making, pupils should be taught to:

Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining a
- nd finishing], accurately
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate

- 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

Technical knowledge

- 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.

Design and technology – Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life. Pupils should be taught to:

Key stage 1

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

Key stage 2

- 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