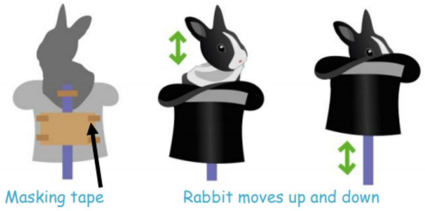
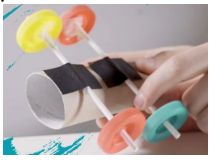
ENGINEERING
(Design and Technology)
Breadth of Study

History National Curriculum coverage

Article 24: Every child has the right to the best possible health… nutritious food… stay healthy.

	Autumn	Spring	Summer
REC	Construct with a purpose in mind, using a variety of resources Use simple tools and techniques competently and appropriately Build and construct with a wide range of objects, selecting appropriate resources and adapting their work when necessary Select the tools and techniques they need to shape, assemble and join materials they are using		

Year 1	Autumn	Spring	Summer
	National Curriculum 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 Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products Cooking and Nutrition: Use basic principles of a healthy and varied diet to prepare dishes	**National Curriculum** Explore and evaluate a range of existing products Design purposeful, functional, appealing products for themselves and other users based on design criteria Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics Cooking and Nutrition: Understand where food comes from	**National Curriculum** Build structures, exploring how they can be made stronger, stiffer and more stable Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
	Mechanisms: Make moving pictures **Skill**: Look at examples of moving pictures. Model how the lever works. Try out levers **Design:** Design moving picture **Make:** Moving picture  	**Textiles: Puppets** **Design and make a puppet** **Research and evaluate:** Explore and evaluate a range of existing puppets. **Design and make:** Design a purposeful, functional, appealing puppet based on design criteria **Evaluate:** Evaluate puppet against design criteria **Skill**: Joining techniques (staples, pins, glue) Decide which joining method is most suitable for the desired outcome.	**Structures: Constructing a windmill** **Evaluate + design**: Look at windmills. What do they do? How do they work? Design windmill. **Make:** Make a stable structure. Understand the shape of materials can be changed to improve the strength and stiffness of structures and that cylinders are a strong type of structure **Evaluate**: Test it's strength and stability and reinforce it if necessary. Test that the turbine turns in the structure and alter the parts if it doesn't.
	Cooking: Making a smoothie **Science Link – Plants** **Discuss** how to determine if a food is a fruit or a vegetable.Taste and compare fruits and vegetables, Describe their appearance, feel, smell and select fruits and vegetables for a smoothie.  Make and Evaluate	**Cooking: Making pancakes** **RE Link Shrove Tuesday** **Discuss** where the ingredients for pancakes come from. E.g. Cows/milk, hens/eggs, sugarcane/sugar etc What parts of the recipe are healthy/unhealthy? Why?  Make and Evaluate	**Mechanism: Wheels and axles** **Explore**: How do wheels move? Identify what stops a wheel from turning. **Design:** Design a moving vehicle and label the design using the appropriate vocabulary **Make and evaluate**: Build a moving vehicle, featuring a wheel and axle mechanism and evaluating the design to make it improve it. 

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Year 2	Autumn	Spring	Summer
	National Curriculum 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, mockups and, where appropriate, information and communication technology Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. Cooking and Nutrition: Use basic principles of a healthy and varied diet to prepare dishes	**National Curriculum** Generate, develop, model and communicate their ideas through talking, drawing, templates, mockups 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 Cooking and Nutrition: Understand where food comes from	**National Curriculum** 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, mockups 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] Evaluate their ideas and products against design criteria
	<u>Mechanism:</u> **<u>Making a moving monster</u>** **Explore:** Identifying mechanisms (pivots, levers and linkages) in everyday objects. **Design and make**: Design and make monster with linkages to create motion **Skill:** Explain the importance of using a ruler to draw the lines as aesthetics are important and uneven linkages will affect the mechanics of linkage system **Evaluate** 	**<u>Textiles</u>: <u>Pouch</u>** **Research**: Evaluate ready made pouches and purses. Look at types of fabrics /materials needed for a pouch **Evaluate:** Test different materials for ability to keep contents of pouch from leakages and rain **Design and make**: Create a pouch and decorate using the materials provided **Skill**: Thread a needle and sew a running stitch 	**<u>Structure</u>:** **<u>Design and make a new chair for baby bear (Science link materials)</u>** **Explore/Evaluate:** Use playdough to create the shapes (pyramid, cylinder, sphere, cuboid) and then test the stability of the shape. Discover low-rise pyramid or cuboid are the most stable and the sphere and cylinder are the least stable. Evaluate different types of chairs around school for stability **Design and make:** Design and make a structure according to design criteria. Creating joints and structures from paper/card and tape **Evaluate:** Produce a finished strong, stiff and stable structure. Evaluate it. Explain how they made it strong, stiff and stable and how to improve it
	<u>Cooking: A balanced diet-making a healthy wrap</u> Learning what makes a balanced diet and that there are five food groups. Learn where to find the nutritional information on a drinks container. Taste test food combinations. Experience food through touch and smell and understand that the ideal ingredient combinations for a dish will contain foods from more than one food group **Design**: Wrap based on food combinations which work well together. **Skill**: Learn how to slice food safely using the bridge or claw grip **Make and Evaluate:**Making a healthy wrap, preparing the food safely andreviewing the final design 	**<u>Cooking – Vegetable Cous Cous</u>** **<u>Science (plants)</u>** **Science** – Look at different plants in the school garden that can be used in couscous (peppers, fennel, coriander, tomatoes). Pick vegetables **Cooking** – Cook a vegetable couscous as a class. **Recipes**: Write their own recipe based on previous cooking, focusing on including key details (cooking time, exact measurements…) **Make and Evaluate** Use food vocabulary e.g. taste, smell, texture and feel when evaluating. 	**<u>Cooking: Baking wholemeal bread</u>** Map the the production of flour. <u>http://www.foodafactoflife.org.uk/VideoActivity.aspx?siteId=0&sectionId=66&contentId=163&titleId=169</u> Discuss why wholemeal bread may be healthier than white bread? Research ingredients for healthy loaf.Where do the ingredients come from? <u>https://www.youtube.com/watch?v=Fx9qYNGDduE</u> 

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Year 3	Autumn	Spring	Summer
	National Curriculum 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 piece sand 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 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 Cooking and Nutrition: Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed	**National Curriculum** 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, develp, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic Investigate and analyse a range of existing products qualities Cooking and Nutrition: Understand and apply principles of a healthy and varied diet	**National Curriculum** 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 Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work Understand and use electrical systems in their products Cooking and Nutrition: Prepare and cook variety of predominantly savoury dishes using a range of cooking techniques
	<u>Mechanical systems: Make a pneumatic toy</u> **Explore:**How pneumatic systems work. Understanding that mechanisms are a system of parts that work together to create motion **Design:** A toy from recycled materials which uses one of three pneumatic systems using thumbnail sketches and exploded diagrams **Make and evaluate:** Toy using a pneumatic system to achieve a desired motion and secure housing for the system. 	**<u>Textiles: Designing and assembling a cushion</u>** **Skill:** Sewing cross stitch and appliqué **Evaluate and design:** Evaluate a range of cushions and design one ensuring it satisfies design criteria **Make**: Using cross stitch and appliqué, decorate cushion **Assembling and evaluating:**Complete cushion, sewing edges, stuffing them and decorating 	**Electrical Systems: Static Electricity** Introduction to static electricity based on scientific understanding of positive and negative charges. Observe the effects of static electricity on objects such as plastic straws, tissue paper and glitter. Use static electricity as part of a game **Make:** Electrostatic game and test it against the original design criteria **Evaluate:** Reflect on what makes a successful game, give ideas of what should be included in the success criteria and justify opinions using examples 
	<u>Cooking: Making use of British seasonal food</u> (science link plants) **Research and discuss:** How climate affects food growth and that not all fruits and vegetables can be grown in the UK. Understand that food is sometimes imported from other countries when not in season. Understand imported food will have travelled from far away. **Make and evaluate:** Create a healthy and nutritious recipe using seasonal vegetables. Know what foods are currently in season and that each fruit and vegetable gives us nutritional benefits	**<u>Cooking: Making tarts</u>** **Make and evaluate:** Make tart safely following a recipe, know how to prepare themselves and a kitchen to cook in, understand the basic rules of food contamination and use, store and clean a knife safely 	**<u>Cooking: Making dahl or chapattis</u>** **RE Link Sikhism** <u>Discuss</u> the types of food that Sikhs eat at the Ghudwara. What does vegetarian mean? Why do they only eat vegetarian food? Where do these foods come from? Plan a Ghudwara meal. <u>Buy or grow</u> some of the ingredients. <u>http://www.bbc.co.uk/education/clips/z8cd2hv</u> 

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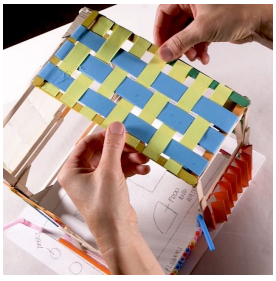
			Make and Evaluate

Year 4	Autumn	Spring	Summer
	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 Understand how key events and individuals in design and technology have helped shape the world	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 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 their ideas and products against their own design criteria and consider the views of others to improve their work Apply their understanding of how to strengthen, stiffen and reinforce more complex structures Cooking and Nutrition: Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed	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 Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately 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 Understand how key events and individuals in design and technology have helped shape the world Investigate and analyse a range of existing products
	<u>Mechanical Systems: Making a Slingshot Car</u> Transform lollipop sticks, wheels, dowels and straws into a moving car. Use glue gun to construct the materials making the launch mechanism, designing and also making body for the vehicle **Research and design:** Understand the shape of the car can increase or decrease speed as a result of air resistance. Design car body to cover their chassis **Make:** Make net for the car based on design, adding graphics and tabs that will attach to chassis **Evaluate:** Carry out test and trials to compare cars 	**<u>Structure Pavilions</u>** **<u>Explore:</u>** Pavilions structure. Look at what they are used for and investigate how to create strong stable structures **Skill:** Programming using tilt sensors (computing lessons) **Design**: Own pavilion with cladding **Make:** A frame structure, select appropriate materials, reinforce corners to strengthen the structure **Evaluate**: Compare final pavilion to design ; then, as a class, discuss 	**<u>Electrical systems</u>** **<u>Design and assemble a torch</u>** Apply scientific understanding of electrical circuits to create torch **Explore:** Differences between electrical and electronic. Linked to science **<u>Evaluate:</u>** A range of different torches and identify features (housing, reflector, circuit, switch) **Make:** Design and assemble torch **Test and evaluate** 
	<u>Cooking: Adapting a biscuit recipe</u> Evaluate a product, giving consideration to: taste, smell, texture, appearance, packaging and target audience and follow a recipe to make a biscuit. Follow basic hygiene rules and adapt the recipe to create new versions, evaluate and compare a range of biscuit prototypes  Evaluate biscuits	**<u>Cooking: Make vegetable soup.</u>** <u>Research</u> vegetarian recipes for soups from around the world. What are some of the ingredients? Are they similar/different to the types of food you eat ? Explain. In groups select a vegetarian recipe.  Track route from field to bowl	**<u>Textiles: Fastening</u>** Design and create a book sleeve; exploring a variety of fastening. Identifying the features, benefits and disadvantages of a range of fastening types Assemble the case, sew with a stitch of own choosing, use small, neat stitches and reinforce  <u>Make and Evaluate</u>

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Year 5	Autumn	Spring	Summer
	National Curriculum 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 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 and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] Cooking and Nutrition: Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed	**National Curriculum** 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 Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately Apply their understanding of how to strengthen, stiffen and reinforce more complex structures Cooking and Nutrition: Prepare and cook variety of predominantly savoury dishes using a range of cooking techniques	**National Curriculum** 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 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 Cooking and Nutrition: Understand and apply principles of a healthy and varied diet
	Electrical Systems: Electric Greetings Card **Explore**: How circuits can be adapted to suit different purposes. Explore flat circuits using graphite or tape. **Design and make**: Light up greeting cards in accordance with own design criteria **Evaluate**: discuss with the other children on their tables any modifications that they would make to improve their cards, this may be to make them work more reliably, to make them look nicer or to incorporate another type of electronic device, eg: buzzer to create sound 	**Structures: Bridges** Develop understanding of secure structures. Measure, saw and join wood accurately Explore: How different shapes affect the strength of the structure **Build**: Use saws and wood to build bridges **Design**: Through medium of spaghetti, learn how triangulation reinforces joins. Then design bridge 	**Mechanical systems: Making a Pop-up Book for younger children** Choosing a simple story, make a four page pop up story book design, incorporating a range of mechanisms **Research and Design**: Explore pop up books and make notes on mechanisms they will use and resulting movement they envisage. Then design own book **Make**: Create book with pop up features. Give books professional finish using layers and spacers **Evaluate:** Share with year 1 children, evaluate and adapt 
	Cooking: Making bolognese Understanding where food comes from, learning how beef is reared and processed and the ethical issues around cattle farming. Understanding what constitutes a balanced diet. Using keywords to research alternative ingredients for a dish and making suggestions for healthy substitutions and additions Make and evaluate	**Cooking: Make guacamole** Who is the modern day Mayans? (E.g inhabitants of parts of Mexico  Research popular Mexican dishes –eg tacos, guacamole and enchiladas. How could you make it healthier? Make and evaluate	**Cooking: Vegetarian pasta** **Skills:** Estimating measurements Look at pasta recipes and discuss which ingredients can be estimated. Model how to estimate. Reading labels. Show where labels give key cooking guidance Cooking: Use garden to get some ingredients for pasta. Children to use estimating to measure and cook completely independently using labels on key ingredients for cooking time.

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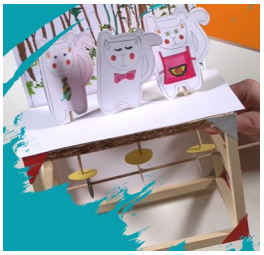
Year 6	Autumn	Spring	Summer
	Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	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 Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work Apply their understanding of how to strengthen, stiffen and reinforce more complex structures	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 Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
	<u>Mechanical Systems: Automata Toy</u> Use woodworking materials and skills to construct window display using automata mechanism **Skill:** Measure and cut materials using engineers square, assemble frame choosing cams **Design**: Design toy **Make**: Cut the pieces for the automata frame and assemble it **Finishing touches and evaluate**: Make background, Secure cams with glue gun and attach followers with tape  **Cooking-Design a three course meal,** research a recipe by ingredient, listing the required ingredients and equipment and reading the method. Safely prepare a meal following a recipe, describing the process of 'Farm to Fork' for a given ingredient and contributing a recipe to a class cookbook	**<u>Structure: Design and make a new playground</u>** **Design and make:** Design and create a model of a new playground featuring five new five apparatus made from different structures **Skill:** Create a footprint as a base, practise visualising objects in plan view Make: Once they have mastered basic stitch, explore different ones. **Evaluate:** Evaluate each others playground and make adjustments 	**<u>Textiles: Design and assemble a waistcoat</u>** Select fabrics, use templates, pin decorate and stitch to create a waistcoat for a person or a purpose of own choice **Design:** Drawing inspiration from famous waistcoat wearers, design waistcoat **Skill**: Use template to mark outline of waistcoat panels on fabric before cutting and pinning Make: Sew panels to make waistcoat **Evaluate:** Add decoration and have a class fashion show. Evaluate each others waistcoat