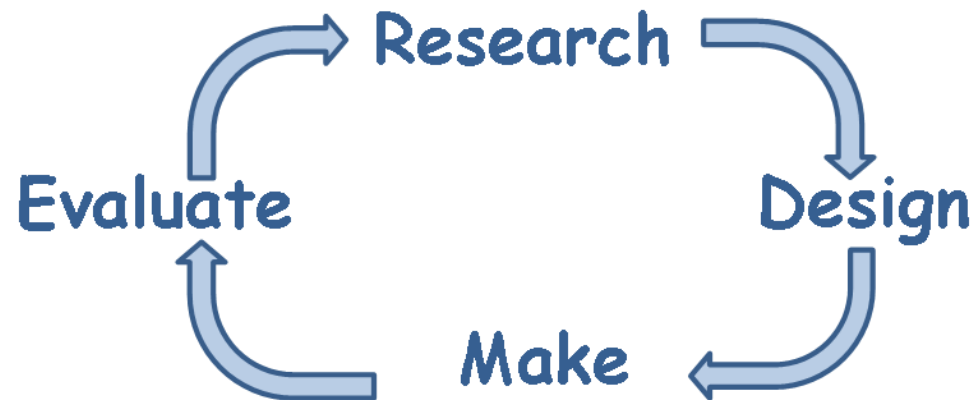


DT Curriculum

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



Overview of DT Content

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS		Food Raising aspirations			Mechanisms Exploring sounds	
Year 1			Textiles Templates and Joining Techniques			Mechanisms Wheels and Axles
Year 2		Mechanisms Sliders and Levers		Food Preparing Fruit and Veg		Structures Free Standing Structures
Year 3		Mechanisms Pneumatics	Textiles 2D shapes to 3D product			Structures Shell Structures using computer aided design (CAD)
Year 4		Mechanisms Levers and linkages	Electrical Systems Simple circuits and switches	Food Healthy and Varied Diet		Structures Shell Structures
Year 5		Structures Frame Structures	Mechanisms Pulleys or Gears		Textiles Combining different fabric shapes	
Year 6			Electrical Systems Complex circuits and switches			Food Celebrating culture and seasonality

EYFS – Expressive Arts & Design

3 & 4 Year Olds

Physical Development

- Know the names of key tools and resources, e.g. glue and scissors, and what they are used for.
- Know the correct grip to use when holding scissors, pencils and other one-handed tools

Expressive Arts and Design

- Have a knowledge of natural, made and imaginative environments and use this knowledge to inspire their own ideas, in small world play, such as a city with different buildings and a park.
- Know how to connect pieces together such as Lego or bricks.
- Know the names of some different materials, including food, and their basic properties, i.e. what they would be good for.
- Know what they want to and could make, and which materials would work well.
- Know what some different shapes look like and how to create them, in order to create drawings to record their design ideas

Reception

Physical Development

- Know techniques to help them move carefully and with control.
- Know the names of a range of tools.
- Know how to hold and use a range of tools for a desired outcome, e.g. tape and glue used to build a structure.
- Know the safety rules when using certain tools, resources and equipment.

Expressive Arts and Design

- Know the names of different feelings.
- Know that art and design can inspire feelings and emotions, and vice versa.
- Know the names of a range of artistic effects, e.g. colouring, collage, etc. and what these look like. Know that these effects can be used to improve the appearance of something.
- Know that they can return to and build on their previous learning, and know who to ask for help when needed.
- Know that it is okay to make mistakes, and have some techniques for using these situations as opportunities to build their own resilience.
- Know techniques for working collaboratively with adults and other children, sharing ideas, resources and skills

Early Learning Goals

Physical Development

- Know how to use a range of small tools, including scissors, paintbrushes and cutlery.

Expressive Arts and Design

- Know how to safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
- Know that they can share their creations, explaining the process they have used.

Term:	Y1 – Spring 1	Key Text(s):	
Unit Title:	<p>Textiles: Templates and Joining techniques</p> <p><u>National Curriculum objectives:</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Design a functional and appealing product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology. <p><u>Make</u></p> <ul style="list-style-type: none"> • Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. • Select from and use textiles according to their characteristics. <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • Explore and evaluate a range of existing products • Evaluate their ideas and products against design criteria <p><u>Technical Knowledge</u></p> <ul style="list-style-type: none"> • Understand how simple 3-D textile products are made, using a template to create two identical shapes. • Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. • Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons. • Know and use technical vocabulary relevant to the project. <p><u>Context for Study:</u></p> <p>This unit follows on from Reception where children had experiences of threading beads and laces. This unit is a pre-cursor of Textiles in Year 3 where children will practise cutting fabric, seam allowance and a range of stitches. Also, in Year 5, children will be creating a soft toy with a fastening and will learn more complex stitches.</p> <p>End of Unit Outcome: To join two pieces of material together to make a 3D hand puppet.</p>		
Key Vocabulary for the Unit:			
<p>Design: to generate, develop and communicate ideas for a product.</p> <p>Embroider: to decorate fabric with stitches.</p> <p>Evaluate: to judge how a product meets chosen criteria.</p> <p>Fray: to unravel or become worn at the edge.</p>			

Glove puppet: a glove puppet fits over the hand, and the fingers operate its head and arms.

Mock-up: a model which allows children to try out ideas using cheaper materials and temporary joints.

Seam: a row of stitches joining two pieces of fabric.

Sew: to join pieces of fabric with stitches.

Template: a shape drawn to assist in cutting out shapes.

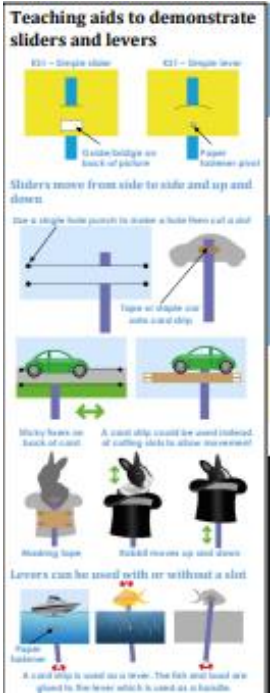
	Linked Designer/Engineer: James Fox	Design	Make	Evaluate
Year 1 Expected	Pupils should be taught: <ul style="list-style-type: none"> James works with machine embroidery His works are shown in Manchester and Preston. His works look at modern life issues e.g politics, gender, work & culture. 	Pupils should be taught: <ul style="list-style-type: none"> To investigate and evaluate existing products linked to the chosen project. Explore and compare fabrics, joining techniques, finishing techniques and fastenings used. Use questions to develop their understanding e.g. How many parts is it made from? What is it joined with? To make drawings of existing products, stating the user and purpose. To identify and label, if appropriate, the fabrics, fastenings and techniques used. To know what buttons are used for and to give examples of clothing that use buttons. 	Pupils should be taught: <ul style="list-style-type: none"> To thread a metal needle and to tie a knot. To complete a running stitch. To attach two pieces of material using a simple running stitch. To know how to finish a row of stitches with a knot. 	Pupils should be taught: <ul style="list-style-type: none"> To evaluate ongoing work and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Term:	Y1 – Summer 2	Key Text(s):	
Unit Title:	<p>Mechanisms: Wheels and Axles</p> <p><u>National Curriculum objectives:</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Design a functional and appealing product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology. <p><u>Make</u></p> <ul style="list-style-type: none"> • Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. • Select from and use textiles according to their characteristics. <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • Explore and evaluate a range of existing products • Evaluate their ideas and products against design criteria <p><u>Technical Knowledge</u></p> <ul style="list-style-type: none"> • Explore and use wheels, axles and axle holders. • Distinguish between fixed and freely moving axles. • Know and use technical vocabulary relevant to the project. <p><u>Context for Study:</u> This unit follows on from Reception where children will have experience using scissors, crayons, pencils and paper and will have explored moving vehicles through play. This unit is a pre-cursor of Mechanisms in Year 2 where children will begin to use sliders and levers to allow an object to move in a single direction. Also, in Year 4 and Year 5, children will use linkages, pulleys and gears in order to create moving characters and fairground rides.</p> <p>End of Unit Outcome: To create a moving car.</p>		
<p><u>Key Vocabulary for the Unit:</u></p> <p>Axle: a rod on which one or more wheels can rotate, either freely or be fixed to and turn with the axle.</p> <p>Axle holder: the component through which an axle fits and rotates.</p> <p>Chassis: the frame or base on which a vehicle is built.</p> <p>Friction: resistance which is encountered when two things rub together.</p>			

Dowel: wooden rods used for making axles to hold wheels.

Dowel: wooden rods used for making axles to hold wheels.				
	Linked Designer/Engineer: George Stephenson	Design	Make	Evaluate
Year 1 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> George is known as the 'Father of the Railways'. He played a key role in developing the railways system in Britain. The train helped people move around the country. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To explore and evaluate a range of wheeled products such as toys and everyday objects. To make observations through relevant questioning e.g. How do you think the wheels move? How do you think the wheels are fixed on? Why do you think the wheels are round? To draw an example of a wheeled product, stating the user and purpose, and labelling the main parts e.g. body, chassis, wheels, axles and axle holders. To record how wheels and axles are used in daily life around the school grounds. To read a story or non-fiction book that includes a wheeled product. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To make a product that moves by using construction kits with wheels and axles, ask children to make a product that moves. To make an axle holder and recognise the importance of making sure the axles run freely within the holders. <div style="text-align: center; margin: 10px 0;"> <p>Two different ways to fix wheels</p> <p>Types of wheels</p> <p>Wood, card, plastic, Friction, Cotton reels, Foam covered reels.</p> <p>Ways to hold moving axles</p> <p>Use pairs of clothes pegs glued with PVA to the underside of a box. (Check: the peg holes are large enough to allow axles to move freely. Make sure they are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.)</p> <p>Use card triangles with holes for the axle. (Check: the holes are large enough to allow the axle to move freely. Make sure opposite triangles are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.)</p> <p>Use large paper/plastic sheets fixed with masking tape to the underside of a box. (Check: sheets are positioned carefully so the vehicle will move in a straight line when the wheel and axle mechanism is added. Make sure the drive hole is large enough to allow the axle to move freely. The wheels must be fixed tightly to the axle.)</p> </div> <ul style="list-style-type: none"> To mark out, hold, cut and join materials and components correctly. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To evaluate their finished product, communicating how it works and how it matches their design criteria, including any changes they made.

Term:	Y2 – Autumn 2	Key Text(s):	
Unit Title:	<p>Mechanisms: Sliders and Levers</p> <p><u>National Curriculum objectives:</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Generate ideas based on simple design criteria and their own experiences, explaining what they could make. • Develop, model and communicate their ideas through drawings and mock-ups with card and paper. <p><u>Make</u></p> <ul style="list-style-type: none"> • Select and use tools, explaining their choices, to cut, shape and join paper and card. • Use simple finishing techniques suitable for the product they are creating. <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • Explore a range of existing books and everyday products that use simple sliders and levers. • Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria. <p><u>Technical Knowledge</u></p> <ul style="list-style-type: none"> • Explore and use sliders and levers. • Understand that different mechanisms produce different types of movement. • Know and use technical vocabulary relevant to the project. <p><u>Context for Study:</u> This unit follows on from learning in Reception and Year 1 where children will have had experiences of working with paper and card to makes flaps. This unit is the precursor to work studied in Year 3 where children will develop their understanding of pneumatics. They will look closely at forces and look at how mechanical systems work.</p> <p>End of Unit Outcome: To use sliders and levers to produce a Christmas card.</p>		
<p><u>Key Vocabulary for the Unit:</u></p> <p>Mechanism: a device used to create movement in a product.</p> <p>Lever: a rigid bar which moves around a pivot. Levers are used in many everyday products. In this project children will use card strips for levers and paper fasteners for pivots.</p> <p>Slider: a rigid bar which moves backwards and forwards along a straight line. Unlike a lever, a slider does not have a pivot point.</p> <p>Slot: the hole through which a lever or slider is placed to enable part of a picture to move.</p> <p>Guide or bridge: a short card strip used to keep sliders in place and control movement.</p>			

	Linked Designer/Engineer: Robert Sabuda	Design	Make	Evaluate
Year 2 Expected	Pupils should be taught: <ul style="list-style-type: none"> Robert Sabuda is an artist from Michigan. He started his career as an illustrator before writing children's books. In 1994, he published his first pop-up book "The Mummy's Tomb". He is known worldwide for his pop-up paper engineering. Many of his books are based on traditional stories. 	Pupils should be taught: <ul style="list-style-type: none"> To explore and evaluate a collection of books and everyday products that have moving parts, including those with levers and sliders. e.g. What is it? Who is it for? What is it for? As a whole class, to talk about the order in which the mechanisms will be made. To draw a mock of their design. 	Pupils should be taught: <ul style="list-style-type: none"> To recognise the tools they will need to create their product. To draw their Christmas design. To develop their knowledge and skills by replicating the slider and lever teaching aids.  <ul style="list-style-type: none"> To draw the character to be used. 	Pupils should be taught: <ul style="list-style-type: none"> To know how to evaluate their product. E.g. does the mechanism move smoothly?

Term:	Y2 – Spring 2	Key Text(s):	
Unit Title:	<p data-bbox="371 244 1115 288">Food: Preparing Fruit and Vegetables</p> <p data-bbox="371 296 725 325"><u>National Curriculum objectives:</u></p> <p data-bbox="371 333 450 362"><u>Design</u></p> <ul data-bbox="421 365 1498 464" style="list-style-type: none"> • Design appealing products for a particular user based on simple design criteria. • Generate initial ideas and design criteria through investigating a variety of fruit and vegetables. • Communicate these ideas through talk and drawings. <p data-bbox="371 496 439 525"><u>Make</u></p> <ul data-bbox="421 528 1912 592" style="list-style-type: none"> • Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. • Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. <p data-bbox="371 624 472 652"><u>Evaluate</u></p> <ul data-bbox="421 655 1520 719" style="list-style-type: none"> • Taste and evaluate a range of fruit and vegetables to determine the intended user’s preferences. • Evaluate ideas and finished products against design criteria, including intended user and purpose. <p data-bbox="371 751 607 780"><u>Technical Knowledge</u></p> <ul data-bbox="421 783 2002 919" style="list-style-type: none"> • Understand where a range of fruit and vegetables come from e.g. farmed or grown at home. • Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of The eat well plate. • Know and use technical and sensory vocabulary relevant to the project. <p data-bbox="371 951 577 979"><u>Context for Study:</u></p> <p data-bbox="371 983 2033 1110">This unit follows on from learning in Reception where children will have experience of naming common fruit and vegetables. They will have undertaken sensory activities to discuss the appearance, taste and smell of fruit and vegetables. This unit is a precursor to work studied in Year 4 where children will develop their understanding of preparing food hygienically and use a wider range of utensils. In Year 6, children will use a heated appliance (an oven) and develop their knowledge of food groups further.</p> <p data-bbox="371 1142 853 1171">End of Unit Outcome: To make a fruit salad.</p>		
<p data-bbox="192 1222 517 1251">Key Vocabulary for the Unit:</p> <p data-bbox="192 1254 719 1283">Fruit: plant or tree’s edible seed with envelope.</p> <p data-bbox="192 1286 539 1315">Vegetable: plant used for food.</p> <p data-bbox="192 1318 976 1347">Nutrients: all the things in food that the body needs to remain healthy.</p> <p data-bbox="192 1350 786 1378">Pith: the soft white lining inside fruit such as oranges.</p>			

Salad: a cold dish of fresh and/or cooked vegetables or fruit.

Sensory evaluation: subjective testing of foods where senses are used to evaluate qualities such as appearance, smell, taste, texture (mouth feel).

Kebab: cooked and/or fresh ingredients on a skewer.

	Linked Designer/Engineer: Jamie Oliver	Design	Make	Evaluate								
Year 2 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> Jamie Oliver MBE (James Trevor Oliver) was born 27 May 1975. He is an English celebrity chef, restaurateur, and media personality. He is known for his television shows, cookbooks and restaurants. He has highlighted the need for improved cooking in schools and hospitals. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To generate initial ideas and design criteria through investigating a variety of fruit and vegetables. To know where certain fruits and vegetables are grown. E.g. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Orange/Apple/Banana</td> <td style="padding: 2px;">Tree</td> </tr> <tr> <td style="padding: 2px;">Blueberries</td> <td style="padding: 2px;">Shrub</td> </tr> <tr> <td style="padding: 2px;">Carrots/onions/beetroot</td> <td style="padding: 2px;">underground</td> </tr> <tr> <td style="padding: 2px;">Lettuce/Broccoli</td> <td style="padding: 2px;">Above ground</td> </tr> </table> <ul style="list-style-type: none"> To know the parts of different fruits and the parts we eat. E.g Skin/Seeds/stalk To know that we must have a balanced diet and that fruit and vegetables are part of a food group. To know that as part of a healthy diet, we need 5 portions of fruit and vegetables a day. To decide what to include in the fruit salad. Design appealing products for a particular user based on simple design criteria. 	Orange/Apple/Banana	Tree	Blueberries	Shrub	Carrots/onions/beetroot	underground	Lettuce/Broccoli	Above ground	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To know basic food hygiene practices when handling food. To select from a range of fruit according to their characteristics e.g. colour, texture and taste to create a chosen product. To use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. To know how to prepare a fruit salad. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To handle, taste and evaluate a range of fruit and vegetables to determine the intended user's preferences. Evaluate ideas and finished products against design criteria, including intended user and purpose.
Orange/Apple/Banana	Tree											
Blueberries	Shrub											
Carrots/onions/beetroot	underground											
Lettuce/Broccoli	Above ground											

Term:	Y2 – Summer 2	Key Text(s):	
Unit Title:	<p>Structures: Free standing structures (ADD IMAGES FROM EXAMPLE)</p> <p>National Curriculum objectives:</p> <p>Design</p> <ul style="list-style-type: none"> • Generate ideas based on simple design criteria. • Develop, model and communicate their ideas through talking and drawings. <p>Make</p> <ul style="list-style-type: none"> • Plan by suggesting what to do next. • Select and use tools, skills and techniques, explaining their choices. • Select new and reclaimed materials and construction kits to build their structures. • Use simple finishing techniques suitable for the structure they are creating. <p>Evaluate</p> <ul style="list-style-type: none"> • Explore a range of existing freestanding structures. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria. <p>Technical Knowledge</p> <ul style="list-style-type: none"> • Know how to make a freestanding structure stronger, stiffer and more stable. • Know and use the technical vocabulary relevant to the project. <p>Context for Study: This unit follows on from learning in Reception where children will experience using construction kits to build walls, towers and frameworks. They will use basic tools and materials such as scissors, hole punches, plastic and card. This unit is the precursor to work studied in Year 5. Children will make a 3D construction frame with wood and will look at triangulation.</p> <p>End of Unit Outcome: To create a freestanding structure.</p>		
<p>Key Vocabulary for the Unit:</p> <p>Freestanding structure: a structure that stands on its own foundation or base without attachment to anything else.</p> <p>Frame structure: a structure made from thin components e.g. tent frame.</p> <p>Shell structure: a hollow structure with a thin outer covering.</p> <p>Stability: in relation to a freestanding structure, the extent to which it is likely to fall over if a force is applied.</p> <p>Buttress: a structure added to a wall, tower or framework to make it more stable and/or reinforce it.</p> <p>Brick bonding: arranging bricks in a wall to improve the performance of the structure or improve its appearance.</p>			

Mock-up: 3-D representation of a product.

Mock-up: 3-D representation of a product.				
	Linked Designer/Engineer: Isambard Brunel	Design	Make	Evaluate
Year 2 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • Isambard Kingdom Brunel was born on 9th April 1806 • Isambard Kingdom Brunel was a Victorian engineer who was one of the main architects during Britain's industrial revolution. • One of his most famous designs was the Clifton Suspension Bridge. • Isambard was 24 when he designed the bridge. • . The bridge is still seen as one of the most important structures to be built in the Victorian era. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To label a blank bridge with the correct technical vocabulary: foundation, deck, towers • To know and discuss how to make structures strong and stable. E.g. iron or steel are used to make bridges as they are strong and stable. • To evaluate existing famous bridges e.g. Golden Gate Bridge, Sydney Harbour Bridge, Tower Bridge. • To know what structure they will be designing, making and evaluating. • To understand a given criteria e.g. It should be strong enough to carry a 100g weight. • To know how to use drawings to show their ideas. • To plan as a class the method in which the structures will be made. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To know how to make joints • To know how to make towers/foundations. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To know how to evaluate and test the strength of their bridge. • To discuss if their bridge meets their design requirements e.g. did it stand? Did it hold the required weight?

Term:	Y3 – Autumn 2	Key Text(s):	
Unit Title:	<p data-bbox="412 244 920 284">Mechanisms: Pneumatics</p> <p data-bbox="412 300 763 323"><u>National Curriculum objectives:</u></p> <p data-bbox="412 336 495 360"><u>Design</u></p> <ul data-bbox="461 368 1850 427" style="list-style-type: none"> • Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. <p data-bbox="412 459 479 483"><u>Make</u></p> <ul data-bbox="461 496 2007 592" style="list-style-type: none"> • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. • Select from and use finishing techniques suitable for the product they are creating. <p data-bbox="412 624 517 647"><u>Evaluate</u></p> <ul data-bbox="461 660 1547 719" style="list-style-type: none"> • Investigate and analyse books, videos and products with pneumatic mechanisms. • Evaluate their own products and ideas against criteria and user needs, as they design and make. <p data-bbox="412 751 651 775"><u>Technical Knowledge</u></p> <ul data-bbox="461 788 1144 884" style="list-style-type: none"> • Technical knowledge and understanding • Understand and use pneumatic mechanisms. • Know and use technical vocabulary relevant to the project. <p data-bbox="412 916 618 940"><u>Context for Study:</u></p> <p data-bbox="412 948 2029 1043">This unit follows on from learning in Year 1 and Year 2 where children will have explored simple mechanisms, such as sliders and levers, and simple structures. Children will also have learnt how materials can be joined in order to allow movement. This unit is the precursor to work studied in Year 5 where children will make a 3D construction frame with wood and will look at triangulation.</p> <p data-bbox="412 1075 904 1099">End of Unit Outcome: To make a moving toy.</p>		
<p data-bbox="203 1158 517 1182">Key Vocabulary for the Unit:</p> <p data-bbox="203 1190 887 1214">Compressed: something that is squashed, such as air in a tube.</p> <p data-bbox="203 1222 546 1246">Input: what goes into a system.</p> <p data-bbox="203 1254 607 1278">Output: what comes out of a system.</p> <p data-bbox="203 1286 640 1310">Pivot: a point about which a lever turns.</p> <p data-bbox="203 1318 651 1342">Lever: a beam which turns about a point.</p> <p data-bbox="203 1350 741 1374">Pneumatic: a system that works using gases (air).</p>			

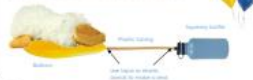
Hydraulic: a system that works using liquids (water).
Pressure: the force used on an object or surface.
Inflate: fill something with air or a gas to make it swell up.
Deflate: remove the pressurised air to allow an object like a balloon to shrink.
Syringe: a tube with a nozzle and plunger for sucking and blowing air or liquids.
System: a set of related parts or components used to create an outcome.

	Linked Designer/Engineer: Richard Arkwright	Design	Make	Evaluate
Year 3 Expected	Pupils should be taught: <ul style="list-style-type: none"> • Richard Arkwright was born in Preston, England on 23 December 1732. • In 1769 Richard Arkwright patented the spinning frame (later called the water frame), a machine to produce inexpensive spun cotton. • In 1771, Arkwright and his business partners built the first water powered cotton mill at Cromford in Derbyshire. 	Pupils should be taught: <ul style="list-style-type: none"> • To develop a design brief with the children within a context which is authentic and meaningful. • To discuss with children the purpose of the products they will be designing and making and who the products will be for. • To use annotated sketches and prototypes in order to develop, model and communicate their ideas. • To investigate, analyse and evaluate familiar objects that use air to make them work <i>e.g. bicycle pump, balloon, inflatable swimming aids, foot pump for inflating an air bed. What does the air do? How has it been used in the design of these products?</i> • To explore a range of pneumatic mechanisms using prepared teaching aids including two syringes joined by plastic tubing; three syringes connected using a T-connector and using different sized syringes. <i>Ask the children: What happens when the plunger of one</i> 	Pupils should be taught: <ul style="list-style-type: none"> • To know the difference between an input and an output movement. • To use a bottle and a balloon in a container to raise or lower an object or a lever. • To use three syringes connected by a T-connector so that two objects move backwards and forwards. • To add levers and linkages to their design in order to make more complex mechanical systems 	Pupils should be taught: <ul style="list-style-type: none"> • To evaluate the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.

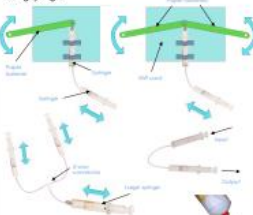
syringe is pressed in? Why do the syringes move at different speeds?

Teaching aids to demonstrate pneumatic systems

Scale the size for the input requirement, to inflate the balloon (output movement) and raise the top.




Using syringes



Design decisions

- Consider the input and output requirements and the scale of the system.
- They might choose to use the syringes to demonstrate the input and output requirements and the scale of the system.
- They might choose to use the syringes to demonstrate the input and output requirements and the scale of the system.
- They might choose to use the syringes to demonstrate the input and output requirements and the scale of the system.



Term:	Y3 – Spring 1	Key Text(s):	Little People Big dream: Coco Chanel
Unit Title:	<p data-bbox="416 244 1104 288">Textiles: 2D shapes to 3D products</p> <p data-bbox="416 300 768 325"><u>National Curriculum objectives:</u></p> <p data-bbox="416 333 495 359"><u>Design</u></p> <ul data-bbox="465 365 1928 429" style="list-style-type: none"> • Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user. • Produce annotated sketches, final product sketches and pattern pieces. <p data-bbox="416 461 483 486"><u>Make</u></p> <ul data-bbox="465 493 1559 557" style="list-style-type: none"> • Plan the main stages of making. • Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. <p data-bbox="416 588 517 614"><u>Evaluate</u></p> <ul data-bbox="465 620 1384 684" style="list-style-type: none"> • Investigate a range of existing products. • Test their product against the original design criteria and with the intended user. <p data-bbox="416 716 651 742"><u>Technical Knowledge</u></p> <ul data-bbox="465 748 1187 885" style="list-style-type: none"> • Know how to strengthen, stiffen and reinforce existing fabrics. • Understand how to securely join two pieces of fabric together • Understand the need for patterns and seam allowance. • Know and use technical vocabulary relevant to the project. <p data-bbox="416 917 622 943"><u>Context for Study:</u></p> <p data-bbox="416 949 1980 1070">This unit follows on from learning in Year 1 where children will have experience of completing a simple running stitch on binca and felt with pre-made holes. The children will have attempted to tie knots and thread large eye needles. They will have created a simple, flat 3D product without needing to think about seam allowance. This unit is the precursor of the textiles unit in Year 5 in which children will move onto more complex stitches and create a product with fastenings.</p> <p data-bbox="416 1109 1323 1134">End of Unit Outcome: To securely join two pieces of fabric together to create a bag.</p>		
<p data-bbox="206 1190 517 1216">Key Vocabulary for the Unit:</p> <p data-bbox="206 1222 1816 1248">Appliqué: means ‘applied’ -describes method of stitching/gluing patches onto fabric (originally to mend holes in worn clothes) to provide decoration.</p> <p data-bbox="206 1254 1160 1279">Pattern/Template: a shape drawn to exact shape and size and used to assist cutting out.</p> <p data-bbox="206 1286 860 1311">Seam: a line of stitching that joins pieces of fabrics together.</p> <p data-bbox="206 1318 999 1343">Seam Allowance: extra fabric allowed for joining together -usually 1.5cm.</p> <p data-bbox="206 1350 936 1375">Prototype: a model that is made to test whether a design will work.</p>			

Aesthetics: the way in which the product looks with the nature and expression of beauty.

Aesthetics: the way in which the product looks with the nature and expression of beauty.				
	Linked Designer/Engineer: Coco Chanel	Design	Make	Evaluate
Year 3 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> Gabrielle Chanel (her real name) was born in 1883 in a poor family to a market trader. Coco Chanel started her fashion career by designing hats. With the help of one of her male admirers, she opened her first shop in Paris in 1913. As it became more popular, she started selling clothes as well. In 1921, she created her first perfume, Chanel No 5. Coco Chanel's revolutionary designs were elegant but also comfortable and practical, as they freed women from wearing corsets 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To know the intended user and purpose. To know how to create a simple design brief. E.g. a school bag for a primary school child. To sketch and annotate possible ideas, choosing one as a final choice and explaining why. To add labels to their chosen design. To plan the main stages of making e.g. a flowchart. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To produce a template of their final design. To use this template to cut around the felt. To understand seam allowance. To glue any decorative patterns onto the front panel. To know how to join 2D pieces of felt with an overhand or simple stitch. To strengthen and reinforce stitches. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To evaluate the product against user, purpose and design criteria. To evaluate the joining of the fabric. To discuss possible improvements.

Term:	Y3 – Summer 2	Key Text(s):	
Unit Title:	<p data-bbox="416 244 1120 288">Structures: Computer Aided Design</p> <p data-bbox="416 296 768 323"><u>National Curriculum objectives:</u></p> <p data-bbox="416 331 495 359"><u>Design</u></p> <ul data-bbox="416 367 2002 467" style="list-style-type: none"> <li data-bbox="416 367 2002 427">• Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the functional and aesthetic purposes of the product. <li data-bbox="416 435 1823 467">• Develop ideas through the analysis of existing shell structures and use computer-aided design to model and communicate ideas. <p data-bbox="416 507 483 534"><u>Make</u></p> <ul data-bbox="416 542 1749 691" style="list-style-type: none"> <li data-bbox="416 542 913 574">• Plan the order of the main stages of making. <li data-bbox="416 582 1749 614">• Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy. <li data-bbox="416 622 1413 654">• Explain their choice of materials according to functional properties and aesthetic qualities. <li data-bbox="416 662 1391 691">• Use computer-generated finishing techniques suitable for the product they are creating. <p data-bbox="416 730 517 758"><u>Evaluate</u></p> <ul data-bbox="416 766 1787 834" style="list-style-type: none"> <li data-bbox="416 766 1787 798">• Investigate and evaluate a range of shell structures including the materials, components and techniques that have been used. <li data-bbox="416 805 1480 834">• Test and evaluate their own products against design criteria and the intended user and purpose. <p data-bbox="416 874 651 901"><u>Technical knowledge</u></p> <ul data-bbox="416 909 1603 1026" style="list-style-type: none"> <li data-bbox="416 909 1603 941">• Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. <li data-bbox="416 949 1267 981">• Develop and use knowledge of how to construct strong, stiff shell structures. <li data-bbox="416 989 1070 1021">• Know and use technical vocabulary relevant to the project. <p data-bbox="416 1058 622 1085"><u>Context for Study:</u></p> <p data-bbox="416 1093 1995 1185">This unit follows on from learning in Year 1 and Year 2 where children will have had experience of using different joining, cutting and finishing techniques with paper and card and a basic understanding of 2-D and 3-D shapes in mathematics. This unit is a precursor of the structures units in Year 4 which involve designing a 2D net in order to construct a 3D shell structure.</p> <p data-bbox="416 1217 1227 1249">End of Unit Outcome: To use computer aided design to create a 3D vehicle</p>		
<p data-bbox="206 1302 517 1329">Key Vocabulary for the Unit:</p> <p data-bbox="206 1337 521 1364">CAD: computer-aided design.</p> <p data-bbox="206 1369 869 1396">Shell structure: a hollow structure with a thin outer covering.</p>			

Edge: where two surfaces meet at an angle.
Face: a surface of a geometric shape.
Vertex: the corners of a geometric shape where edges meet.
Font: a printer's term meaning the style of lettering being used.
Net: the flat or opened-out shape of an object such as a box.
Cuboid: a solid body with rectangular sides.
Prism: a solid geometric shape with ends that are similar, equal and parallel.

	Linked Designer/Engineer: Gustave Eiffel	Design	Make	Evaluate
Year 3 Expected	Pupils should be taught: <ul style="list-style-type: none"> • Gustave was a French structural engineer and architect. • He is known for designing the Eiffel Tower. • He also designed the armature (supporting framework) for the Statue of Liberty, New York Harbour, United States. 	Pupils should be taught: <ul style="list-style-type: none"> • To develop a design brief with the children within a context which is authentic and meaningful. • To discuss the uses and purposes of their shell structure e.g. <i>What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions?</i> • To agree on design criteria that can be used to guide the development and evaluation of their product e.g. <i>How will we know that we have designed and made successful products?</i> 	Pupils should be taught: <ul style="list-style-type: none"> • To use simple drawing software such as **** (Purple Mash) in order to explore the interface and drawing tools to practise drawing and manipulating shapes such as rectangles, squares and triangles. • To use the software to open existing drawings including nets and to draw nets of their own, using gridlines and pre-shaped tools. • To explore a range of fill and font tools and to become familiar with the graphic design aspects within the software in order to achieve the desired appearance of their products. 	Pupils should be taught: <ul style="list-style-type: none"> • To evaluate throughout and the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.

Term:	Y4 – Autumn 2	Key Text(s):	
Unit Title:	<p>Mechanisms: Levers and Linkages (NOT COMPLETE)</p> <p><u>National Curriculum objectives:</u></p> <p>Design</p> <ul style="list-style-type: none"> • Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. <p>Make</p> <ul style="list-style-type: none"> • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut, shape and join paper and card. • Select from and use finishing techniques suitable for the product they are creating. <p>Evaluate</p> <ul style="list-style-type: none"> • Investigate and analyse books and, where available, other products with lever and linkage mechanisms. • Evaluate their own products and ideas against criteria and user needs, as they design and make. <p>Technical knowledge</p> <ul style="list-style-type: none"> • Understand and use lever and linkage mechanisms. • Distinguish between fixed and loose pivots. • Know and use technical vocabulary relevant to the project. <p>Context for Study: This unit follows on from learning in Year 2 in which children will have explored and used mechanisms such as flaps, sliders and levers. Children will also have gained experience of basic cutting, joining and finishing techniques with paper and card. This unit is a precursor to the mechanisms unit in Year 5 in which children will utilise their understanding of electrical circuits, simple switches and components, their ability to strengthen and stiffen structures and their experience of cutting and joining a range of materials in order to create ***** .</p> <p>End of Unit Outcome: To create a Christmas card with moving parts.</p>		
Key Vocabulary for the Unit:			
<p>Mechanism: a device used to create movement in a product.</p> <p>Lever: a rigid bar which moves around a pivot. Levers are used in many everyday products. In this project children will use card strips for levers and paper fasteners for pivots.</p>			

Linkage: the card strips joining one or more levers to produce the type of movement required. The term 'linkage' is also used to describe the lever and linkage mechanism as a whole.

Slot: the hole through which a lever is placed to enable part of a picture to move.

Guide or bridge: a short card strip used to keep lever and linkage mechanisms in place and control movement.

Loose pivot: a paper fastener that joins card strips together.

Fixed pivot: a paper fastener that joins card strips to the backing card.

System: a set of related parts or components used to create an outcome. Systems have an input, process and an output. In a lever and linkage mechanism, the 'input movement' is where the user pushes or pulls a card strip. The 'output movement' is where one or more parts of the picture move.

	Linked Designer/Engineer: James Dyson	Design	Make	Evaluate
Year 4 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> James Dyson is a British designer and inventor. He founded the Dyson Company and is best known for devising and promoting the Dyson Dual Cyclone bagless vacuum cleaner. Dyson experimented with a bagless vacuum cleaner design during the 1970s. He also devised the idea of using a ball instead of wheels, allowing the machine to turn more easily. The James Dyson Foundation was set up in 2002 to encourage education in design and engineering. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms. To use questions to develop children's understanding e.g. Who might it be for? What is its purpose? What do you think will move? How will you make it move? How do you think the mechanism works? What materials have been used? What else could move? To develop a design brief with the children within a context which is authentic and meaningful. To consider the purpose of the products they will be designing and making and who the products will be for. To generate a design criteria that can be used to guide the development and evaluation of the children's products. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To demonstrate a range of lever and linkage mechanisms using prepared teaching aids. To develop their understanding of levers and linkages. E.g. Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots? To demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques. To develop their knowledge and skills by replicating one or more of the teaching aids 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To evaluate the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Term:	Y4 – Spring 2	Key Text(s):	
Unit Title:	<p>Food: Healthy and varied diet</p> <p><u>National Curriculum objectives:</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. • Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. <p><u>Make</u></p> <ul style="list-style-type: none"> • Plan the main stages of a recipe, listing ingredients, utensils and equipment. • Select and use appropriate utensils and equipment to prepare and combine ingredients. • Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics. <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. • Evaluate the ongoing work and the final product with reference to the design criteria and the views of others. <p><u>Technical knowledge</u></p> <ul style="list-style-type: none"> • Know how to use appropriate equipment and utensils to prepare and combine food. • Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. • Know and use relevant technical and sensory vocabulary appropriately. <p><u>Context for Study:</u> This unit follows on from learning in Reception and Year 2 where children have explored where a range of fruit and vegetables come from e.g. farmed or grown at home. Children will also have an understanding of the basic principles of a healthy and varied diet, including how fruit and vegetables are part of the eat well plate. This unit is a precursor to work studied in Year 6 where children will further develop their understanding of food groups and will use a wider range of utensils, including a heated appliance (an oven).</p> <p>End of Unit Outcome: To create a healthy sandwich or wrap</p>		

Key Vocabulary for the Unit:

Appearance: how the food looks to the eye.

Texture: how the product feels in the mouth.

Sensory evaluation: evaluating food products in terms of the taste, smell, texture and appearance.

Preference test: trying different foods and deciding which you like best.

Strawberry huller: tool to remove the stalk and leaves from a strawberry.

Processed food: ingredients that have been changed in some way to enable them to be eaten or used in food preparation and cooking.

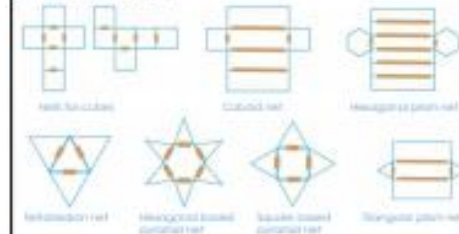
	Linked Designer/Engineer: Heston Blumenthal	Design	Make	Evaluate
Year 4 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> Heston is an English celebrity chef well known for his innovative spins on classic British foods. His restaurant, The Fat Duck, received a rating of three Michelin stars and was voted the #1 restaurant in the world in 2005. He received no formal culinary training. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To investigate a range of food products e.g. the content of their lunchboxes over a week, a selection of foods provided for them, food from a visit to a local shop. To make links to the principles of a varied and healthy diet using The eatwell plate e.g. What ingredients have been used? Which food groups do they belong to? What substances are used in the products e.g. nutrients, water and fibre? To gather information about existing products available relating to your product. Visit a local supermarket and/or use the internet. To find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed e.g. Where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? How and why are they processed? 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing and spreading. To practise food preparation and cooking techniques by making a food product using an existing recipe. To discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. What should we do before we work with food? Why is following instructions important? 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To evaluate the final product against the intended purpose and user, reflecting on the design criteria previously agreed. To consider what others think of the product when considering how the work might be improved.

Term:	Y4 – Summer 2	Key Text(s):	
Unit Title:	<p data-bbox="349 280 891 327">Structures: Shell structures</p> <p data-bbox="349 336 703 363"><u>National Curriculum objectives:</u></p> <p data-bbox="349 371 432 399"><u>Design</u></p> <ul data-bbox="349 406 1890 475" style="list-style-type: none"> • Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. • Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas. <p data-bbox="349 523 421 550"><u>Make</u></p> <ul data-bbox="349 558 1536 703" style="list-style-type: none"> • Order the main stages of making. • Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use finishing techniques suitable for the product they are creating. <p data-bbox="349 746 450 774"><u>Evaluate</u></p> <ul data-bbox="349 782 1818 850" style="list-style-type: none"> • Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. • Test and evaluate their own products against design criteria and the intended user and purpose. <p data-bbox="349 898 584 925"><u>Technical knowledge</u></p> <ul data-bbox="349 933 1543 1042" style="list-style-type: none"> • Develop and use knowledge of how to construct strong, stiff shell structures. • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. • Know and use technical vocabulary relevant to the project. <p data-bbox="349 1085 555 1112"><u>Context for Study:</u></p> <p data-bbox="349 1120 2018 1209">This unit follows on from learning in Year 2 and Year 3 where children have experienced how to construct and strengthen a freestanding structure, assembling 3D nets and using computer aided design in order to create 3D products. This unit is a precursor to the Year 5 structures unit in which children will assemble a frame structure using wood and will look at triangulation.</p> <p data-bbox="349 1249 1059 1276">End of Unit Outcome: To create a 2D net and construct a 3D box.</p>		
<p data-bbox="206 1321 517 1348">Key Vocabulary for the Unit:</p> <p data-bbox="206 1353 676 1380">Cuboid: a solid body with rectangular sides.</p>			

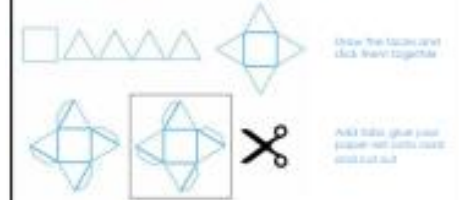
Edge: where two surfaces meet at an angle.
Face: a surface of a geometric shape.
Font: a printer's term meaning the style of lettering being used.
Net: the flat or opened-out shape of an object such as a box.
Prism: a solid geometric shape with ends that are similar, equal and parallel.
Scoring: cutting a line or mark into sheet material to make it easier to fold.
Shell structure: a hollow structure with a thin outer covering.
Vertex: used to refer to the corners of a solid geometric shape, where edges meet.

	Linked Designer/Engineer: Thomas Edison	Design	Make	Evaluate
Year 4 Expected	Pupils should be taught: <ul style="list-style-type: none"> • Thomas Edison was born February 11, 1847 in America. • He is known for creating the first working lightbulb. • He created The Phonograph – the first machine that was able to record and playback sound 	Pupils should be taught: <ul style="list-style-type: none"> • To develop a design brief with the children within a context which is authentic and meaningful. • To discuss with the children the uses and purposes of their shell structures e.g. <i>What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions?</i> • To use annotated sketches and prototypes to develop, model and communicate their ideas for the product e.g. <i>What will you need to include in your design? How can you improve it? What materials will you use? How will you make sure your product works well and has the right appearance</i> 	Pupils should be taught: <ul style="list-style-type: none"> • To use kit parts with flat faces to construct nets. • To practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. • To apply the skills and techniques of scoring, cutting out and assembling pre-drawn nets in order to construct a simple box. Show how a window could be cut out and acetate sheet added. • To use different ways of stiffening and strengthening their shell structures e.g. folding and shaping, corrugating, ribbing, laminating. • To discuss and explore the graphics techniques and media that could be used to achieve the desired appearance of their products. 	Pupils should be taught: <ul style="list-style-type: none"> • To evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Assemble and evaluate 3-D shapes using standard sized card squares, rectangles, equilateral triangles, isosceles triangles and hexagons, joined with marking tape.



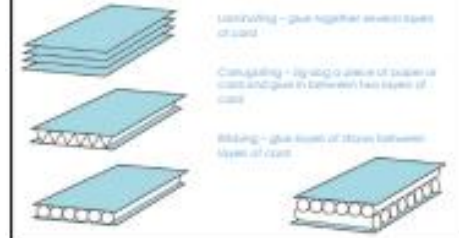
Creating the net for the product you are designing and making without using computer aided design:



Show the faces of net cut, then together

Add tabs, glue your paper net onto card and cut out

Stiffening and strengthening sheet materials:



Term:	Y5 – Autumn 2	Key Text(s):	
Unit Title:	<p data-bbox="371 244 943 284">Structures: Frame structures</p> <p data-bbox="371 296 725 323"><u>National Curriculum objectives:</u></p> <p data-bbox="371 331 450 355"><u>Design</u></p> <ul data-bbox="421 363 1585 464" style="list-style-type: none"> • Carry out research into user needs and existing products, using surveys, interviews and questionnaires. • Develop a simple design specification to guide the development of their ideas and products. • Generate, develop and model innovative ideas through discussion, prototypes and annotated sketches. <p data-bbox="371 496 439 520"><u>Make</u></p> <ul data-bbox="421 528 1794 592" style="list-style-type: none"> • Formulate a clear plan including a step-by-step list of what needs to be done and a list of resources needed. • Select from and use appropriate tools to accurately measure, mark out, cut, shape and join materials to make frameworks. <p data-bbox="371 624 472 647"><u>Evaluate</u></p> <ul data-bbox="421 655 1906 791" style="list-style-type: none"> • Investigate and evaluate a range of existing frame structures. • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Research key events and individuals relevant to frame structures. <p data-bbox="371 823 607 847"><u>Technical Knowledge</u></p> <ul data-bbox="421 855 1211 919" style="list-style-type: none"> • Understand how to strengthen, stiffen and reinforce 3D frameworks • Know and use technical vocabulary relevant to the project. <p data-bbox="371 951 573 975"><u>Context for Study:</u></p> <p data-bbox="371 983 2029 1070">This unit follows on from learning in Year 3 and Year 4 where children will have experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials. In addition, children will have a basic understanding of what structures are (freestanding, shell, frame) and how they can be made stronger, stiffer and more stable.</p> <p data-bbox="371 1110 1070 1134">End of Unit Outcome: To design and construct a frame structure</p>		
<p data-bbox="194 1193 517 1217">Key Vocabulary for the Unit:</p> <p data-bbox="194 1225 1077 1249">Modelling: the process of making a 3-D representation of a structure or product.</p> <p data-bbox="194 1257 887 1281">Compression: the application of pressure to squeeze an object.</p> <p data-bbox="194 1289 707 1313">Strut: a part of a structure under compression.</p> <p data-bbox="194 1321 752 1345">Tension: a force pulling on a material or structure.</p> <p data-bbox="194 1353 629 1377">Tie: a part of a structure under tension.</p>			

Diagonal: a straight line that goes from one corner to another inside a shape.

Horizontal: a line that is parallel to the ground.

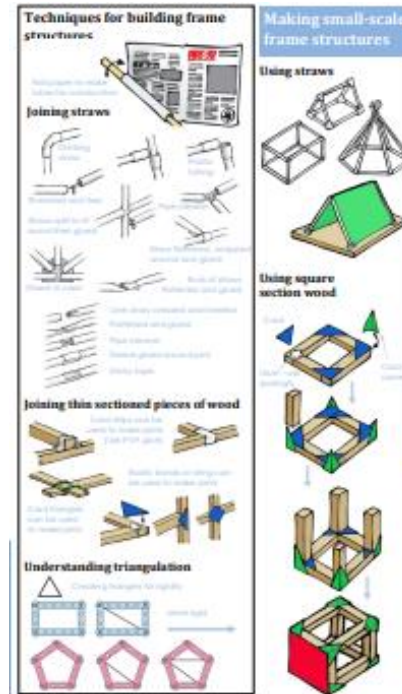
Vertical: a line that is at right angles to the ground.

Triangulation: the use of triangular shapes to strengthen a structure.

Frame structure: a structure made from thin components e.g. tent frame.

	Linked Designer/Engineer: Peter Rice	Design	Make	Evaluate
Year 5 Expected	Pupils should be taught: <ul style="list-style-type: none"> • Peter Rice was born in Dublin on 16th June 1935. • Rice acted as Structural Engineer on three of the most important architectural works of the 20th century: the Sydney Opera House, Pompidou Centre and the Lloyd’s Building. • Rice was renowned for his innate ability to act as both engineer and designer. • In 1992, he was the second engineer to be awarded the Royal Gold Medal for Architecture by the Royal Institute of British Architects. 	Pupils should be taught: <ul style="list-style-type: none"> • To discuss the brief of designing and making a small-scale frame structure e.g. <i>Who is the intended user and what is the purpose of the frame structure? Will it be permanent, or can it be easily dismantled? What materials will you use? How will it be joined? How will it be reinforced? How will it be finished?</i> • To develop a simple design specification to guide their thinking. • To produce a detailed, step-by-step plan, listing tools and materials. 	Pupils should be taught: <ul style="list-style-type: none"> • To use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks. • To compare the strength of square frameworks with triangular frameworks. • To reinforce square frameworks using diagonals and to develop an understanding of using triangulation to add strength to a structure. • To use paper straws with pipe cleaners to build 3-D frameworks such as cubes, cuboids and pyramids. <i>How could each of the frameworks be reinforced and strengthened?</i> • To develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. • To accurately join framework materials together e.g. paper 	Pupils should be taught: <ul style="list-style-type: none"> • To evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.

- straws, square sectioned wood



Term:	Y5 – Spring 1	Key Text(s):	
Unit Title:	<p data-bbox="371 244 1003 288">Mechanisms: Pulleys and Gears</p> <p data-bbox="371 296 725 325"><u>National Curriculum objectives:</u></p> <p data-bbox="371 333 450 362"><u>Design</u></p> <ul data-bbox="421 365 1861 467" style="list-style-type: none"> • Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide their thinking. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. <p data-bbox="371 496 439 525"><u>Make</u></p> <ul data-bbox="421 528 1989 630" style="list-style-type: none"> • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. <p data-bbox="371 659 472 687"><u>Evaluate</u></p> <ul data-bbox="421 691 1906 831" style="list-style-type: none"> • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. • Investigate famous manufacturing and engineering companies relevant to the project. <p data-bbox="371 860 611 888"><u>Technical Knowledge</u></p> <ul data-bbox="421 892 1659 994" style="list-style-type: none"> • Understand that mechanical and electrical systems have an input, process and an output. • Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement. • Know and use technical vocabulary relevant to the project. <p data-bbox="371 1023 580 1051"><u>Context for Study:</u></p> <p data-bbox="371 1054 2033 1157">This unit follows on from prior learning in Year 1 to Year 4 where children will have had experience of axles, axle holders and wheels that are fixed or free moving. Children will have a basic understanding of electrical circuits, simple switches and components and an understanding of how to strengthen and stiffen structures. In addition, children will have experience of cutting and joining techniques with a range of materials including card, plastic and wood.</p> <p data-bbox="371 1185 725 1214">End of Unit Outcome: To create</p>		
<p data-bbox="206 1262 521 1291">Key Vocabulary for the Unit:</p> <p data-bbox="206 1294 815 1323">Pulley: a grooved wheel over which a drive belt can run.</p> <p data-bbox="206 1326 763 1355">Gear: a wheel with teeth around its circumference.</p> <p data-bbox="206 1358 1099 1386">Drive belt: the belt which connects and transfers movement between two pulleys.</p>			

Gearing up or down: changing the rotational speed of a product by the use of pulleys or gears. When a small pulley or gear is used to drive a larger one the rotational speed is reduced and the product has been geared down.

Mechanical system: a set of related parts or components used to create movement.

Driver: the gear or pulley that provides the input movement to the system.

Follower: the gear or pulley that provides the output movement to the system.

Mesh: the point where two gears join together and transfer movement.

Motor spindle: the rod on the end of the motor onto which a gear or pulley is attached

	Linked Designer/Engineer: Margaret E. Knight	Design	Make	Evaluate
Year 5 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> When she was twelve, she saw an accident in a cloth factory. She invented a device that would automatically stop a machine if something were caught in it. The factories began using the device soon after. Later, Margaret worked in a paper bag factory. At that time, paper bags weren't flat on the bottom. Margaret thought about how much easier they'd be to use if they were flat and she went to work creating a machine that would make the bags. Margaret is most famous for her bag machine, but she went on to make 100 inventions and receive 20 patents. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To develop an authentic and meaningful design brief. To generate innovative ideas by carrying out research through surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product. To communicate ideas through detailed, annotated drawings from different views and diagrams. The drawings should indicate the design decisions made, including the location of the mechanical and electrical components, how they work as a system with an input, process and output, and the appearance and finishing techniques for the product. Produce detailed step-by-step plans and lists of tools, equipment and materials needed. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To recap the difference between an input, process and output. To use a construction kit to explore combinations of two different size gears meshed together. To investigate the direction and speed of gear rotation, focusing on how the size of the driver gear affects the speed of the follower gear. To build a working circuit that incorporates a battery, a motor and a handmade switch, such as a reversing switch. To use tools and equipment accurately including cutting and stripping wire, and making secure electrical connections. To develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> To evaluate the final product in use, comparing it to the original design specification. To critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for the intended user and purpose.

Term:	Y5 – Summer 1	Key Text(s):	
Unit Title:	<p data-bbox="416 280 1263 328">Textiles: combining different fabric shapes</p> <p data-bbox="416 336 768 363"><u>National Curriculum objectives:</u></p> <p data-bbox="416 371 495 399"><u>Design</u></p> <ul data-bbox="465 406 1585 507" style="list-style-type: none"> • Generate innovative ideas by carrying out research of existing products. • Develop, model and communicate ideas through drawings, templates, mock-ups and prototypes. • Design purposeful, functional and appealing products for the intended user that are fit for purpose. <p data-bbox="416 536 483 563"><u>Make</u></p> <ul data-bbox="465 571 1272 671" style="list-style-type: none"> • Produce detailed lists of equipment and fabrics relevant to their tasks. • Formulate step-by-step plans. • Make products that are accurately assembled and well finished. <p data-bbox="416 700 517 727"><u>Evaluate</u></p> <ul data-bbox="465 735 1944 836" style="list-style-type: none"> • Investigate and analyse textile products linked to their final product. • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. <p data-bbox="416 900 651 927"><u>Technical Knowledge</u></p> <ul data-bbox="465 935 1854 962" style="list-style-type: none"> • A 3D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. <p data-bbox="416 991 618 1018"><u>Context for Study:</u></p> <p data-bbox="416 1026 2011 1117">This unit follows on from learning in Year 1 and Year 3 where children will have experienced completing some basic stitching techniques. They will have threaded a needle, secured thread with a knot and fastened a row of stitches with a knot. They will have cut fabric, used templates and joined two pieces of fabric together using thread.</p> <p data-bbox="416 1155 1597 1182">End of Unit Outcome: To design a pencil case that can be constructed by hand and by using simple materials.</p>		
<p data-bbox="206 1233 517 1260">Key Vocabulary for the Unit:</p> <p data-bbox="206 1268 1688 1295">Mock up: quick 3-D model using easy to work and cheaper materials and temporary joints. Useful for checking proportions and scale.</p> <p data-bbox="206 1303 1167 1331">Pattern or template: a shape drawn to exact shape and size, used to assist in cutting out.</p> <p data-bbox="206 1339 1167 1366">Seam allowance: extra fabric allowed for joining together - 15mm for domestic patterns.</p> <p data-bbox="206 1374 745 1401">Specification: describes what a product has to do.</p>			

Tacking: large running stitches to hold pieces of fabric together temporarily.

Working drawing: detailed drawing contains all information needed to make a product but is updated as changes are made.

	Linked Designer/Engineer: Faith Ringgold	Design	Make	Evaluate
Year 5 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • She was born on 8th October 1930 in New York. • The works that Ringgold created in 1960s were inspired from the Impressionism, Africa art and Cubism. • The American People Series was created in 1963. It was the first political collection of Ringgold. The works highlighted the point of view of women toward the racial interaction. • She has also written and illustrated 11 children's books. • Faith Ringgold has said that she uses her art to tell a story. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To know the intended user and purpose. • To know how to create a simple design brief. <i>e.g. User: myself</i> <i>Purpose: to create a storage pouch</i> <i>e.g. pencil case to keep smaller items safe.</i> <i>Criteria: Must include two pieces of fabric sewn together and a secure fastening. It must be easy to sew by hand and be made out of given materials.</i> • To sketch and annotate possible ideas, choosing one as a final choice and explaining why. • To add labels to their chosen design. <i>e.g. seam allowance, front, back, pattern symbols.</i> 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To mark out the measurements on tracing paper. • To use this template to cut around the fabric. • To understand seam allowance. • To know how to finish a row of stitches with a knot. • To know a range of stitches including the overhand stitch. • To practise sewing a press stud button on felt. • To know how to sew two 2D pieces of fabric • To glue any decorative patterns onto the front panel, allowing for the seam. • To strengthen and reinforce fabric. • To attach a fastening. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To evaluate the product against user, purpose and design criteria. • To evaluate the joining of the fabric. • To evaluate the product. • To discuss possible improvements.

Term:	Y6 – Spring 1	Key Text(s):	
Unit Title:	<p data-bbox="416 244 1391 288">Electrical Systems: complex circuits and switches</p> <p data-bbox="416 296 770 325"><u>National Curriculum objectives:</u></p> <p data-bbox="416 333 495 362"><u>Design</u></p> <ul data-bbox="465 365 1989 501" style="list-style-type: none"> <li data-bbox="465 365 1989 427">• Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost. <li data-bbox="465 435 1451 464">• Generate and develop innovative ideas and share and clarify these through discussion. <li data-bbox="465 472 1744 501">• Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. <p data-bbox="416 531 483 560"><u>Make</u></p> <ul data-bbox="465 563 1944 735" style="list-style-type: none"> <li data-bbox="465 563 1592 592">• Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. <li data-bbox="465 600 1944 662">• Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. <li data-bbox="465 670 1928 732">• Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment. <p data-bbox="416 762 517 791"><u>Evaluate</u></p> <ul data-bbox="465 794 1693 903" style="list-style-type: none"> <li data-bbox="465 794 1693 823">• Continually evaluate and modify the working features of the product to match the initial design specification. <li data-bbox="465 831 1424 860">• Test the system to demonstrate its effectiveness for the intended user and purpose. <li data-bbox="465 868 1581 896">• Investigate famous inventors who developed ground-breaking electrical systems and components. <p data-bbox="416 962 651 991"><u>Technical Knowledge</u></p> <ul data-bbox="465 994 1473 1102" style="list-style-type: none"> <li data-bbox="465 994 1122 1023">• Understand and use electrical systems in their products. <li data-bbox="465 1031 1473 1059">• Apply their understanding of computing to program, monitor and control their products. <li data-bbox="465 1067 1151 1096">• Know and use technical vocabulary relevant to the project. <p data-bbox="416 1129 622 1158"><u>Context for Study:</u></p> <p data-bbox="416 1161 1032 1190">This unit follows on from learning in Year 4 *****</p> <p data-bbox="416 1225 689 1254">End of Unit Outcome: To</p>		
<p data-bbox="206 1307 517 1335">Key Vocabulary for the Unit:</p> <p data-bbox="206 1339 808 1367">Modelling: to realise and manipulate ideas in a tangible form.</p> <p data-bbox="206 1370 1032 1399">Open switch: when a switch is positioned such that electricity cannot flow through it.</p>			

Closed switch: when a switch is positioned such that electricity can flow through it.

Normally open: the term used to describe when a switch is in the off position, i.e. the switch is open and no electricity can flow when the button is not pressed.

Normally closed: the term used to describe when a switch is in the on position i.e. the switch is closed and electricity can flow when the button is not pressed

Output devices: components that produce an outcome e.g. bulbs and buzzers.

Input devices: components that are used to control an electrical circuit e.g. switches or sensors.

	Linked Designer/Engineer: Sir Jony Ive	Design	Make	Evaluate
Year 6 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • Sir Jonathan Paul Ive, is a British industrial designer and Apple executive who was responsible for making design as integral to the appeal of a personal computer as its power and speed. • He is responsible for the design of many Apple products we use today such as the iMac, iPhone, ipad and iWatch. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To generate innovative ideas by drawing on research. • To develop a design specification for their product, carefully considering the purpose and needs of the intended user. • To communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. Drawings should indicate the design decisions made, including the location of the electrical components and how they work as a system with an input, process and output. • To produce detailed step-by-step plans and lists of tools, equipment and materials needed. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To practise methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks. • To make high quality products, applying knowledge, understanding and skills from investigative and evaluative activities and focused tasks. • To create and modify a computer control program to enable the product to work automatically in response to changes in the environment. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • Critically evaluate throughout and the final product, comparing it to the original design specification. • To test the system to demonstrate its effectiveness for the intended user and purpose.

Term:	Y6 – Summer 2	Key Text(s):	
Unit Title:	<p data-bbox="416 244 1240 288">Food: celebrating culture and seasonality</p> <p data-bbox="416 296 768 325"><u>National Curriculum objectives:</u></p> <p data-bbox="416 333 495 362"><u>Design</u></p> <ul data-bbox="465 365 1935 501" style="list-style-type: none"> <li data-bbox="465 365 1935 427">• Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification. <li data-bbox="465 435 1727 464">• Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose. <li data-bbox="465 472 1935 501">• Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas. <p data-bbox="416 531 483 560"><u>Make</u></p> <ul data-bbox="465 563 1727 667" style="list-style-type: none"> <li data-bbox="465 563 1397 592">• Write a step-by-step recipe, including a list of ingredients, equipment and utensils <li data-bbox="465 600 1727 628">• Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. <li data-bbox="465 636 1541 667">• Make, decorate and present the food product appropriately for the intended user and purpose <p data-bbox="416 697 517 726"><u>Evaluate</u></p> <ul data-bbox="465 729 2007 903" style="list-style-type: none"> <li data-bbox="465 729 2007 791">• Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. <li data-bbox="465 799 1984 861">• Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements. <li data-bbox="465 869 1525 903">• Understand how key chefs have influenced eating habits to promote varied and healthy diets. <p data-bbox="416 933 651 962"><u>Technical Knowledge</u></p> <ul data-bbox="465 965 1603 1067" style="list-style-type: none"> <li data-bbox="465 965 1496 994">• Know how to use utensils and equipment including heat sources to prepare and cook food. <li data-bbox="465 1002 1603 1031">• Understand about seasonality in relation to food products and the source of different food products. <li data-bbox="465 1038 1133 1067">• Know and use relevant technical and sensory vocabulary. <p data-bbox="416 1098 622 1126"><u>Context for Study:</u></p> <p data-bbox="416 1129 1984 1224">This unit follows on from learning in Year 2 and Year 4 in which children will have acquired a knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. Children will also have had experience of using appropriate equipment and utensils in order to apply a range of techniques for measuring out, preparing and combining ingredients.</p> <p data-bbox="416 1254 1059 1283">End of Unit Outcome: To create a savoury scone or muffin.</p>		
<p data-bbox="206 1334 521 1362">Key Vocabulary for the Unit:</p> <p data-bbox="206 1366 1003 1394">Finishing: related to the appearance of the product shape, decoration and colour.</p>			

Rubbing in: rubbing the dry ingredients together with the fat, lifting to put air into the mixture, so that it resembles fine breadcrumbs.

Knead: pulling and squeezing dough to make it smooth.

Bran: the hard, protective shell of a grain of wheat.

Dough: a mixture of flour, yeast and water before it is cooked.

Germ: part of the seed where the root and shoots grow from.

Yeast: a tiny plant which makes bubbles of carbon dioxide when mixed with flour and warm water.

Unleavened bread: flat bread where yeast has not been added.

	Linked Designer/Engineer: Lisa Goodwin-Allen	Design	Make	Evaluate
Year 6 Expected	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • Lisa Goodwin-Allen (born 29 April 1981) is a British chef best known for being executive chef of the Michelin starred Northcote restaurant near Preston. • She was also one of four winning chefs on season five of the BBC cooking show Great British Menu. • She was placed in charge of the kitchen at Northcote aged 23. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To develop a design brief and simple design specification with the children within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating. • To discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for. • To generate a design criteria that can be used to guide the development and evaluation of the product. • To use annotated sketches, discussion and information and communication technology if appropriate, to develop and communicate their ideas. • To record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt. 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. • To use appropriate utensils and equipment safely and hygienically. • To follow a basic recipe to prepare and cook a savoury food product. • To ask questions about which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell. • When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. Which shape is most appealing and why? 	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> • To evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.

