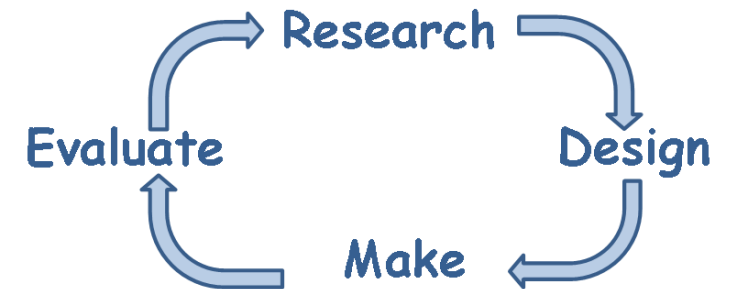




## DT Curriculum

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



### Lesson coverage for Design Technology

Lesson 1 – Knowledge organiser and vocabulary

Lesson 2 – Research the designer/engineer

Lesson 3&4 – Design the product

Lesson 4 – Make the product

Lesson 6 – Evaluate the product

End of topic – LBQ and uploads final piece to SeeSaw.



## Long Term Overview

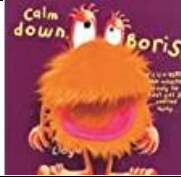
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>EYFS</b>		<b>Food</b> Raising aspirations			<b>Mechanisms</b> Exploring sounds	
<b>Year 1</b>				<b>Textiles</b> Templates and Joining Techniques		<b>Mechanisms</b> Wheels and Axles
<b>Year 2</b>		<b>Mechanisms</b> Sliders and Levers		<b>Food</b>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



## EYFS – Expressive Arts & Design

<b>3 &amp; 4 Year Olds</b>	<p><u>Physical Development</u></p> <ul style="list-style-type: none"><li>• Know the names of key tools and resources, e.g. glue and scissors, and what they are used for.</li><li>• Know the correct grip to use when holding scissors, pencils and other one-handed tools</li></ul> <p><u>Expressive Arts and Design</u></p> <ul style="list-style-type: none"><li>• 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.</li><li>• Know how to connect pieces together such as Lego or bricks.</li><li>• Know the names of some different materials, including food, and their basic properties, i.e. what they would be good for.</li><li>• Know what they want to and could make, and which materials would work well.</li><li>• Know what some different shapes look like and how to create them, in order to create drawings to record their design ideas</li></ul>
<b>Reception</b>	<p><u>Physical Development</u></p> <ul style="list-style-type: none"><li>• Know techniques to help them move carefully and with control.</li><li>• Know the names of a range of tools.</li><li>• Know how to hold and use a range of tools for a desired outcome, e.g. tape and glue used to build a structure.</li><li>• Know the safety rules when using certain tools, resources and equipment.</li></ul> <p><u>Expressive Arts and Design</u></p> <ul style="list-style-type: none"><li>• Know the names of different feelings.</li><li>• Know that art and design can inspire feelings and emotions, and vice versa.</li><li>• 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.</li><li>• Know that they can return to and build on their previous learning, and know who to ask for help when needed.</li><li>• Know that it is okay to make mistakes, and have some techniques for using these situations as opportunities to build their own resilience.</li><li>• Know techniques for working collaboratively with adults and other children, sharing ideas, resources and skills</li></ul>
<b>Early Learning Goals</b>	<p><u>Physical Development</u></p> <ul style="list-style-type: none"><li>• Know how to use a range of small tools, including scissors, paintbrushes and cutlery.</li></ul> <p><u>Expressive Arts and Design</u></p> <ul style="list-style-type: none"><li>• Know how to safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.</li><li>• Know that they can share their creations, explaining the process they have used.</li></ul>



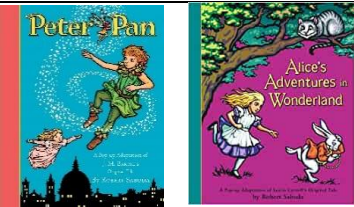
Term:	Y1 – Spring 2	Key Text(s):	
<b>Unit Title:</b>	<b>Textiles: Templates and Joining techniques</b> <p><b><u>National Curriculum objectives:</u></b></p> <p><b><u>Design</u></b></p> <ul style="list-style-type: none"><li>• Design a functional and appealing product for a chosen user and purpose based on simple design criteria.</li><li>• Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.</li></ul> <p><b><u>Make</u></b></p> <ul style="list-style-type: none"><li>• Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.</li><li>• Select from and use textiles according to their characteristics.</li></ul> <p><b><u>Evaluate</u></b></p> <ul style="list-style-type: none"><li>• Explore and evaluate a range of existing products</li><li>• Evaluate their ideas and products against design criteria</li></ul> <p><b><u>Technical Knowledge</u></b></p> <ul style="list-style-type: none"><li>• Understand how simple 3-D textile products are made, using a template to create two identical shapes.</li><li>• Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling.</li><li>• Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons.</li><li>• Know and use technical vocabulary relevant to the project.</li></ul> <p><b><u>Context for Study:</u></b> 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><b>End of Unit Outcome:</b> To join two pieces of material together to make a 3D hand puppet.</p>		
<b><u>Key Vocabulary for the Unit:</u></b> <b>Design:</b> to generate, develop and communicate ideas for a product.			



**Embroider:** to decorate fabric with stitches.  
**Evaluate:** to judge how a product meets chosen criteria.  
**Fray:** to unravel or become worn at the edge.  
**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.

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



Term:	Y2 – Autumn 2	Key Text(s):	
<b>Unit Title:</b>	<b>Mechanisms: Sliders and Levers</b> <p><b><u>National Curriculum objectives:</u></b></p> <p><b><u>Design</u></b></p> <ul style="list-style-type: none"><li>• Generate ideas based on simple design criteria and their own experiences, explaining what they could make.</li><li>• Develop, model and communicate their ideas through drawings and mock-ups with card and paper.</li></ul> <p><b><u>Make</u></b></p> <ul style="list-style-type: none"><li>• Select and use tools, explaining their choices, to cut, shape and join paper and card.</li><li>• Use simple finishing techniques suitable for the product they are creating.</li></ul> <p><b><u>Evaluate</u></b></p> <ul style="list-style-type: none"><li>• Explore a range of existing books and everyday products that use simple sliders and levers.</li><li>• Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.</li></ul> <p><b><u>Technical Knowledge</u></b></p> <ul style="list-style-type: none"><li>• Explore and use sliders and levers.</li><li>• Understand that different mechanisms produce different types of movement.</li><li>• Know and use technical vocabulary relevant to the project.</li></ul> <p><b><u>Context for Study:</u></b> 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><b>End of Unit Outcome:</b> To use sliders and levers to produce a Christmas card.</p>		
<p><b><u>Key Vocabulary for the Unit:</u></b> <b>Mechanism:</b> a device used to create movement in a product.</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.

**Pivot:** a central point on which a mechanism turns.

**Slider:** a rigid bar which moves backwards and forwards along a straight line. Unlike a lever, a slider does not have a pivot point.

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

**Guide or bridge:** a short card strip used to keep sliders in place and control movement.

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







Term:	Y3 – Autumn 2	Key Text(s):	
<b>Unit Title:</b>	<b>Mechanisms: Pneumatics</b>		
	<b>National Curriculum objectives:</b>		
	<b>Design</b>		
	<ul style="list-style-type: none"><li>• Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user.</li><li>• Use annotated sketches and prototypes to develop, model and communicate ideas.</li></ul>		
	<b>Make</b>		
	<ul style="list-style-type: none"><li>• Order the main stages of making.</li><li>• Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons.</li><li>• Select from and use finishing techniques suitable for the product they are creating.</li></ul>		
	<b>Evaluate</b>		
	<ul style="list-style-type: none"><li>• Investigate and analyse books, videos and products with pneumatic mechanisms.</li><li>• Evaluate their own products and ideas against criteria and user needs, as they design and make.</li></ul>		
	<b>Technical Knowledge</b>		
	<ul style="list-style-type: none"><li>• Technical knowledge and understanding</li><li>• Understand and use pneumatic mechanisms.</li><li>• Know and use technical vocabulary relevant to the project.</li></ul>		
	<b>Context for Study:</b>		
	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.		
	<b>End of Unit Outcome:</b> To make a moving toy.		
<b>Key Vocabulary for the Unit:</b>			
<b>Compressed:</b> something that is squashed, such as air in a tube.			
<b>Input:</b> what goes into a system.			
<b>Output:</b> what comes out of a system.			
<b>Pivot:</b> a point about which a lever turns.			
<b>Lever:</b> a beam which turns about a point.			
<b>Pneumatic:</b> a system that works using gases (air).			



**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.

	<b>Linked Designer/Engineer: Richard Arkwright</b>	<b>Design</b>	<b>Make</b>	<b>Evaluate</b>
Year 3 Expected	Pupils should be taught: <ul style="list-style-type: none"> <li>Richard Arkwright was born in Preston, England on 23 December 1732.</li> <li>In 1769 Richard Arkwright patented the spinning frame (later called the water frame), a machine to produce inexpensive spun cotton.</li> <li>In 1771, Arkwright and his business partners built the first water powered cotton mill at Cromford in Derbyshire.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>To develop a design brief with the children within a context which is authentic and meaningful.</li> <li>To discuss with children the purpose of the products they will be designing and making and who the products will be for.</li> <li>To use annotated sketches and prototypes in order to develop, model and communicate their ideas.</li> <li>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></li> <li>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></li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>To know the difference between an input and an output movement.</li> <li>To use a bottle and a balloon in a container to raise or lower an object or a lever.</li> <li>To use three syringes connected by a T-connector so that two objects move backwards and forwards.</li> <li>To add levers and linkages to their design in order to make more complex mechanical systems</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>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.</li> </ul>

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

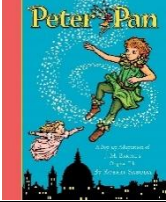
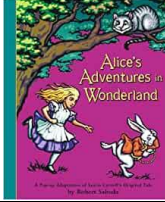
**Teaching aids to demonstrate pneumatic systems**

Scale the air flow (input requirement) to inflate the balloon (output movement) and raise the top.

**Using syringes**

**Design decisions**

- Students might use syringes to help and it could be a challenge to raise it when it is required to move.
- They might choose to use the same syringe to raise the top and to control the flow of air to raise the balloon as well for weight.
- Another design could involve using a piston for design and make more complex pneumatic systems.

Term:	Y4 – Autumn 2	Key Text(s):	 
Unit Title:	<p><b>Mechanisms: Levers and Linkages</b></p> <p><b>National Curriculum objectives:</b></p> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>• Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user.</li> <li>• Use annotated sketches and prototypes to develop, model and communicate ideas.</li> </ul> <p><b>Make</b></p> <ul style="list-style-type: none"> <li>• Order the main stages of making.</li> <li>• Select from and use appropriate tools with some accuracy to cut, shape and join paper and card.</li> <li>• Select from and use finishing techniques suitable for the product they are creating.</li> </ul> <p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• Investigate and analyse books and, where available, other products with lever and linkage mechanisms.</li> <li>• Evaluate their own products and ideas against criteria and user needs, as they design and make.</li> </ul> <p><b>Technical knowledge</b></p> <ul style="list-style-type: none"> <li>• Understand and use lever and linkage mechanisms.</li> <li>• Distinguish between fixed and loose pivots.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul> <p><b>Context for Study:</b> 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 a 3D object that includes gears, pulleys and levers.</p> <p><b>End of Unit Outcome:</b> To create a Christmas card with moving parts.</p>		



**Key Vocabulary for the Unit:**

**Mechanism:** a device used to create movement in a product.

**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.

**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.

	<b>Linked Designer/Engineer: James Dyson</b>	<b>Design</b>	<b>Make</b>	<b>Evaluate</b>
<b>Year 4 Expected</b>	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>The James Dyson Foundation was set up in 2002 to encourage</li> </ul>	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> <li>To investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms.</li> <li>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?</li> <li>To develop a design brief with the children within a context which is authentic and meaningful.</li> <li>To consider the purpose of the products they will be designing and making and who the products will be for.</li> </ul>	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> <li>To demonstrate a range of lever and linkage mechanisms using prepared teaching aids.</li> <li>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?</li> <li>To demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.</li> </ul>	<p>Pupils should be taught:</p> <ul style="list-style-type: none"> <li>To evaluate the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.</li> </ul>



	education in design and engineering.	<ul style="list-style-type: none"><li>• To generate a design criteria that can be used to guide the development and evaluation of the children's products.</li></ul>	<ul style="list-style-type: none"><li>• To develop their knowledge and skills by replicating one or more of the teaching aids</li></ul>	
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Term:	Y5 – Autumn 2	Key Text(s):	
Unit Title:	<p><b>Structures: Frame structures</b></p> <p><b>National Curriculum objectives:</b></p> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>• Carry out research into user needs and existing products, using surveys, interviews and questionnaires.</li> <li>• Develop a simple design specification to guide the development of their ideas and products.</li> <li>• Generate, develop and model innovative ideas through discussion, prototypes and annotated sketches.</li> </ul> <p><b>Make</b></p> <ul style="list-style-type: none"> <li>• Formulate a clear plan including a step-by-step list of what needs to be done and a list of resources needed.</li> <li>• Select from and use appropriate tools to accurately measure, mark out, cut, shape and join materials to make frameworks.</li> </ul> <p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• Investigate and evaluate a range of existing frame structures.</li> <li>• Compare the final product to the original design specification.</li> <li>• Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.</li> <li>• Research key events and individuals relevant to frame structures.</li> </ul> <p><b>Technical Knowledge</b></p> <ul style="list-style-type: none"> <li>• Understand how to strengthen, stiffen and reinforce 3D frameworks</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul> <p><b>Context for Study:</b> 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><b>End of Unit Outcome:</b> To design and construct a frame structure</p>		



**Key Vocabulary for the Unit:**

**Modelling:** the process of making a 3-D representation of a structure or product.

**Compression:** the application of pressure to squeeze an object.

**Strut:** a part of a structure under compression.

**Tension:** a force pulling on a material or structure.

**Tie:** a part of a structure under tension.

**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.

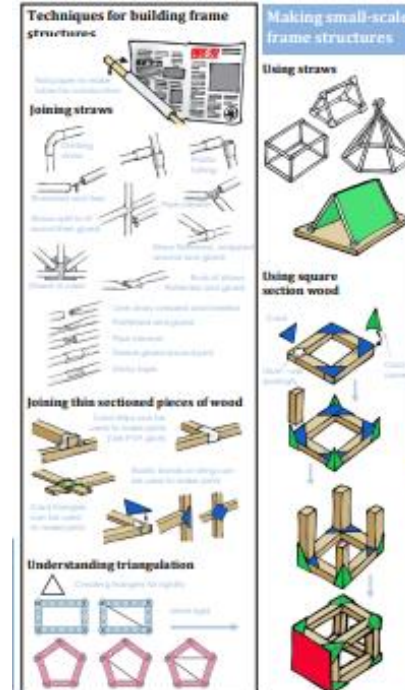
**Triangulation:** the use of triangular shapes to strengthen a structure.

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

	<b>Linked Designer/Engineer: Peter Rice</b>	<b>Design</b>	<b>Make</b>	<b>Evaluate</b>
<b>Year 5 Expected</b>	Pupils should be taught: <ul style="list-style-type: none"> <li>• Peter Rice was born in Dublin on 16th June 1935.</li> <li>• 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.</li> <li>• Rice was renowned for his innate ability to act as both engineer and designer.</li> <li>• In 1992, he was the second engineer to be awarded the Royal Gold Medal for Architecture by the Royal Institute of British Architects.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>• 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></li> <li>• To develop a simple design specification to guide their thinking.</li> <li>• To produce a detailed, step-by-step plan, listing tools and materials.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>• To use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks.</li> <li>• To compare the strength of square frameworks with triangular frameworks.</li> <li>• To reinforce square frameworks using diagonals and to develop an understanding of using triangulation to add strength to a structure.</li> <li>• 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></li> <li>• 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.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>• To evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.</li> </ul>



- To accurately join framework materials together e.g. paper
- straws, square sectioned wood





Term:	Y6 – Spring 2	Key Text(s):	
<b>Unit Title:</b>	<p><b>Electrical Systems: complex circuits and switches</b></p> <p><b><u>National Curriculum objectives:</u></b></p> <p><b><u>Design</u></b></p> <ul style="list-style-type: none"> <li>• 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> <li>• Generate and develop innovative ideas and share and clarify these through discussion.</li> <li>• Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.</li> </ul> <p><b><u>Make</u></b></p> <ul style="list-style-type: none"> <li>• Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.</li> <li>• Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.</li> <li>• Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment.</li> </ul> <p><b><u>Evaluate</u></b></p> <ul style="list-style-type: none"> <li>• Continually evaluate and modify the working features of the product to match the initial design specification.</li> <li>• Test the system to demonstrate its effectiveness for the intended user and purpose.</li> <li>• Investigate famous inventors who developed ground-breaking electrical systems and components.</li> </ul> <p><b><u>Technical Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Understand and use electrical systems in their products.</li> <li>• Apply their understanding of computing to program, monitor and control their products.</li> <li>• Know and use technical vocabulary relevant to the project.</li> </ul> <p><b><u>Context for Study:</u></b> This unit follows on from learning in Year 4 *****</p> <p><b>End of Unit Outcome:</b> To</p>		
<p><b>Key Vocabulary for the Unit:</b> <b>Modelling:</b> to realise and manipulate ideas in a tangible form.</p>			



**Open switch:** when a switch is positioned such that electricity cannot flow through it.  
**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.

	<b>Linked Designer/Engineer: Sir Jony Ive</b>	<b>Design</b>	<b>Make</b>	<b>Evaluate</b>
<b>Year 6 Expected</b>	Pupils should be taught: <ul style="list-style-type: none"> <li>• 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.</li> <li>• He is responsible for the design of many Apple products we use today such as the iMac, iPhone, iPad and iWatch.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>• To generate innovative ideas by drawing on research.</li> <li>• To develop a design specification for their product, carefully considering the purpose and needs of the intended user.</li> <li>• 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.</li> <li>• To produce detailed step-by-step plans and lists of tools, equipment and materials needed.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>• To practise methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks.</li> <li>• To make high quality products, applying knowledge, understanding and skills from investigative and evaluative activities and focused tasks.</li> <li>• To create and modify a computer control program to enable the product to work automatically in response to changes in the environment.</li> </ul>	Pupils should be taught: <ul style="list-style-type: none"> <li>• Critically evaluate throughout and the final product, comparing it to the original design specification.</li> <li>• To test the system to demonstrate its effectiveness for the intended user and purpose.</li> </ul>