



Welton St Mary's Church of England Primary Academy



# Design Technology Curriculum

*Together we care, learn and thrive*

‘Recognising the need is the primary condition for design’ – Charles Eames




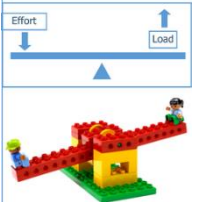
‘Design is not just what it looks like and feels like. Design is how it works.’ Steve Jobs





### Design Technology Intent


In Design and Technology we are excited to **support** children in their journey to understanding how products can significantly impact the lives of others as well as the cultural wealth of the nation. Using subject specific vocabulary, children will be **encouraged** to evaluate aspects of their designs and designs of others to consider why they are successful or how its functionality can be improved. There will be **opportunities** for children to refine product-specific skills and overcome challenges that will be solved through perseverance, **collaboration** and critical thinking. As a result, children will be able to use their knowledge and imagination to design, plan, make and evaluate products that solve real and relevant **problems in the world**.






- **Inclusive** 
- **Value each person** 
- **All to flourish** 
- **Strive for excellence** 
- **Rooted in God's love** 
- **Agents of positive change** 





# DT Overview


Year 1 Overview	<b>Fairy Tales (mechanisms) to include cutting skills</b> Linked to community  Emma Parrish- children's book illustrator (sliders)  	<b>Shelter – Grandad's Island Book (structures)</b> Linked to industry  Charles Mackintosh – Waterproofing (Scotland)  	<b>Food Technology</b>  Exploring food through our senses  	<b>Skills focusing on how to make a lever- Pivot (mechanisms)</b> Linked to gardens and playground  
Final Outcome	Book for family hour with moving part (slider)	Shelter	See Food Technology Overview	Moving part lever
Key skills	Make a simple slider	Cut, finish, join	See Food Technology Overview	Creating a lever, join, finish
Concept focus	Imagine, plan and create	Understanding the impact on daily life, the wider world and the cultural wealth of the nation.	See Food Technology Overview	Problem solving Critical thinking and evaluation

Year 2 overview	<b>Card Slider and Lever (mechanisms)</b> to include cutting skills  Linked to community  	<b>Puppet (textiles)</b> Linked to industry  Margaret Steiff - Stuffed toys (Germany)  	<b>Food Technology</b> The importance of breakfast  	<b>Moving Vehicle (mechanisms)</b> Linked to gardens and playground  Joel Glickman – K’Nex (USA) Ole Kirk Christiansen - LEGO (Denmark)  
Final outcome	A card with moving element	A puppet	See Food Technology Overview	Moving vehicle
Key skills	Apply lever and slider skills in combination  Cut, finish, join, shape	Threading a needle, knots, running stitch	See Food Technology Overview	Wheels and Axels
concept focus	Imagine, plan and create	Understanding the impact on daily life, the wider world and the cultural wealth of the nation	See Food Technology Overview	Problem solving Critical thinking and evaluation

Year 3 overview	<p><b>Fabric decoration (textiles)</b> Linked to home</p> <p>Isaac Singer – Sewing machine (USA) Application of sewing skills</p> 	<p><b>Food Technology</b></p> <p>The need for a balanced diet</p> 	<p><b>Packaging (structures and CAD)</b> Linked to school</p> <p>Robert Gair (Scotland)</p> 	<p><b>Moving Toy (mechanisms - CAMs)</b> Linked to leisure</p> 
Final outcome	A fabric Christmas tree with a decorative attachment	See Food Technology Overview	Box for biscuits/ product to celebrate end of food technology term	Moving toy
Key skills	<p>Application of KS1 skills New skill (blanket stitch) Add decorative details (e.g ribbon and beads)</p>	See Food Technology Overview	Cut, join, finish, shape	Levers- with linkages or a linked lever (new skill)
concept focus	<p>Problem solving</p> <p>Critical thinking and evaluation</p>	See Food Technology Overview	Understanding the impact on daily life, the wider world and the cultural wealth of the nation	Imagine, plan and create

Year 4 overview	<b>Pulleys (mechanisms)</b> Linked to wider world and culture  Elisha Otis – Elevator pulley (Canada) Joel Glickman – K’Nex (USA)  	<b>Jewellery (mechanisms/textiles)</b> Linked to industry and culture  <i>Paloma Picasso</i> - Jewellery designs for Tiffany & Co (France)  	<b>Food Technology</b> Using local produce  	<b>Desk Tidy (structures and CAD)</b> Linked to school  Ole Kirk Christiansen LEGO - (Denmark)   
Final outcome	Pulley system	Necklace/bracelet/earrings Gift for a friend or family member	See Food Technology Overview	A desk tidy
Key skills	New skill- Pulley system	Fastenings, button holes, ties, loop	See Food Technology Overview	Sustainability, stability, structure
concept focus	Understanding the impact on daily life, the wider world and the cultural wealth of the nation	Imagine, plan and create Critical thinking and evaluation	See Food Technology Overview	Problem solving Critical thinking and evaluation

Year 5 overview	<b>Food Technology</b>  Food from around the world  	<b>Electrical Circuits (electrical)</b> Linked to industry and leisure  John Spinello- Game (USA)  	<b>Garden Seat (structure)</b> Linked to enterprise  Hella Jongerius –chairs (Netherlands)  	<b>Embroidery (textiles)</b> Linked to home and leisure  William Morris- embroidery (England) Lucienne Day – embroidery (England)  
Final outcome	See Food Technology Overview	Retrieval quiz game	Create garden seat for book character	To create an embroidery design for embroidery hoop/ bookmark
Key skills	See Food Technology Overview	Circuits; switches/buzzers	Cut, join, finish, shape	Application of KS1 and LKS2 skills New skill (chain stitch) New skill (French knot)
concept focus	See Food Technology Overview	Problem solving	Understanding the impact on daily life, the wider world and the cultural wealth of the nation	Imagine, plan and create  Critical thinking and evaluation

Year 6 overview	<p><b>Gears (mechanism)</b></p> <p>Linked to wider world and enterprise</p> <p>Joel Glickman – K’Nex (USA)</p> 	<p><b>Food Technology</b></p> <p>Make do and mend- Rationing</p> 	<p><b>Construct a Shelter (structures and CAD)</b></p> <p>Linked to industry</p> <p>John Baker – Morrison Shelters (England)</p> <p>Charles Mackintosh – Waterproofing (Scotland)</p> 	<p><b>Props for Year 6 Leavers Concert</b></p> <p>Linked to enterprise and school</p>
Final outcome	Create moving product using gears and a pulley in combination	See Food Technology Overview	Shelter suitable for industry, wider world	
Key skills	Gears and a pulley	See Food Technology Overview	Cut, join, finish, shape	
concept focus	<p>Imagine, plan and create</p> <p>Critical thinking and evaluation</p>	See Food Technology Overview	<p>Understanding the impact on daily life, the wider world and the cultural wealth of the nation</p> <p>Problem solving</p>	



# Core Concepts

## **CONCEPT** – Critical thinking and evaluation

- Imagine, plan and create
- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Critique, evaluate and test their ideas and products and the work of others

## **CONCEPT** – problem solving

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world

## **CONCEPT** – Understanding the impact on daily life, the wider world and the cultural wealth of the nation

- 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

## **CONCEPT** – Imagine, plan and create

- 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

# Progression of skills

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Textiles		<p>Create a textiles product linked to industry.</p> <p>Begin to identify different types and textures of fabric and materials.</p> <p>Be able to thread a needle.</p> <p>Be able to knot a length of thread</p> <p>Be able to use a running stitch.</p> <p>Gain confidence in stitching two pieces of fabric together using a running stitch.</p> <p>Change and modify threads and fabrics by knotting, fraying, fringing, pulling threads, twisting, plaiting.</p> <p>Use appropriate language to describe colours, media,</p>	<p>Create a textiles product linked to home.</p> <p>Apply decoration using beads, buttons, pockets etc.</p> <p>Be able to use a blanket stitch.</p> <p>Show further experience in changing and modifying threads and fabrics, knotting, fraying, fringing, pulling threads, twisting, plaiting.</p> <p>Become competent in using a running stitch.</p> <p>Use appropriate language to describe colours,</p>	<p>Experiment with different fastenings – eg hook and eye, button and loop and select one that is appropriate for their piece of jewellery.</p> <p>Create a piece of jewellery that includes a suitable fastening – linked to industry and culture.</p>	<p>Be able to use a chain stitch.</p> <p>Be able to use back stitch.</p> <p>Be able to create a French knot.</p> <p>Use a number of different stitches creatively to produce different patterns and textures.</p> <p>Demonstrate experience in combining techniques to produce an end piece - linked to home and leisure.</p> <p>Show awareness of the work of others and describe how their work has impacted on the world.</p> <p>Use IT and sketchbooks to collect and record visual information from different sources to inform their ideas.</p>	

		equipment and textures.	media, equipment and textures.  Use sketchbooks to create design.			
Mechanisms and mechanical systems	Experiment with making a simple slider and explain how to create it. Create a product that includes a slider – linked to community. Experiment with the mechanism of a simple lever and explain how to create it - linked to gardens and playgrounds.	Become confident in creating both sliders and levers within a single product- linked to community.  Use an axle and a wheel mechanism in combination to create a moving product – linked to gardens and playground.	Experiment with creating a more complex lever that uses linkages or a linked lever system. Use language such as fixed, pivot and moving parts to explain how their lever works. Create a product that includes a complex lever – linked to leisure.	Explain what a pulley is, how to use it and have a go at creating one in isolation. Create a product that includes a pulley - linked to the wider world and culture.		Experiment with creating a gear mechanism and explain how to create and use it. Decide on and make an appropriate pulley. Use a pulley and gears mechanism in combination to create a product- linked to the wider world and enterprise.
Structures	Choose suitable structure materials – linked to industry. Practise measuring, cutting and joining materials using appropriate tools e.g. ruler and scissors. Begin to consider the overall finish to the product.	Choose suitable structure materials – linked to garden and playground  Explain the purpose of an axle and experiment with making one.  Become confident when measuring, cutting and joining materials.  Begin to consider the purpose of shape when designing and making a product.	Consider the shape, size and weight of the product that needs packaging.  Choose a suitable structure material and consider the effects on the environment – linked to school.  Experiment with making 2D nets using CAD.  Use the 'sketch tool' to draw tabs on CAD	Use tools such as a manual drill and saw safely. Consider the shape, size and weight of the product and who it is for - linked to school.  To identify and alter 3D shapes when designing a product by adjusting the length, width and height.  Combine multiple pre-set 3D shapes to design a structure.  Become competent at using the 'sketch tool' to draw own 3D shapes that contribute to a structure.	Consider the shape, size and weight of the product and who it is for- linked to enterprise.  Choose suitable joining methods for a structure product e.g. screws and adhesives.  Evaluate the effectiveness of the product for its purpose.	Choose suitable materials by considering their specific properties, function durability and sustainability. Use all skills and knowledge to be able to build a suitable structure, explain decisions made and test its effectiveness - linked to industry.  In a CAD program, use the 'sketch tool' when designing the shape and size of a complete structure.  Add labels to a design when using a CAD program to detail the size of a structure and materials used.

			<p>Experiment with colour choice to create an appealing design for a target audience. E.g 'text'</p> <p>Use tools to change viewpoint and perspective when looking at and designing a product.</p>			
Electrical circuits					<p>Experiment with constructing a simple series electrical circuit including cells, wires, bulbs, switches and buzzers.</p> <p>Create a product using the necessary electrical components – linked to industry and leisure.</p> <p>Consider the product's shape, finish and safety.</p> <p>Use appropriate tools e.g wire cutters.</p>	

# Assessment

This has been written using the Design and Technology Association Progression Framework to support our assessment and progression of skills.

Assessment of knowledge will be through ability to understand use and apply knowledge in structures, electrical, textiles, mechanical systems.

**CONCEPT** – Critical thinking and evaluation

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Imagine, plan and create
- Critique, evaluate and test their ideas and products and the work of others
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	By the End of Y2	By the end of Y4	By the end of Y6
Expected	<p>I can ask questions and explore existing products – what the products are for, who the products are for, how they work, how they are used, where they might be used, what materials the products are made from, what I like and dislike about the products</p> <p>I can use my own ideas to make something</p> <p>I can explain to someone else how I want to make my product</p> <p>I can describe how something works</p> <p>I can explain what went well with my work</p> <p>I can explain why I have chosen specific materials</p> <p>I can make simple judgements about my products and ideas against the design criteria</p>	<p>I can investigate and analyse who designed the product, where different products were designed and made, when they were designed and made and whether the products can be recycled or reused</p> <p>I can explain how I have improved my original design</p> <p>I can identify the strengths and areas for development in my ideas and products</p> <p>I can use my design criteria to evaluate my completed product</p> <p>I can investigate and analyse how well the products are designed, how well the products are made, why materials have been chosen, what methods of construction have been used, how well products work, how well products achieve their purposes, how well products meet user needs and wants</p>	<p>I can investigate and analyse how well the products are designed, how well the products are made, why materials have been chosen, what methods of construction have been used, how well products work, how well products achieve their purposes, how well products meet user needs and wants</p> <p>I can investigate and analyse the cost of making the product, how innovative products are, how sustainable the materials used in products are and the impact that the product has</p> <p>I can evaluate appearance and function against original criteria</p> <p>I can show that I can test and evaluate my products</p> <p>I can consider the views of others, including intended user, to improve my work</p> <p>I can critically evaluate the quality of the design, manufacture and fitness for purpose for my product as I design and make it</p>

Relevant people/designers	Charles Mackintosh – Waterproofing (Scotland) Emma Parrish- children's book illustrator (sliders) Joel Glickman – K’Nex (USA) Ole Kirk Christiansen- LEGO (Denmark) Margaret Steiff - Stuffed toys (Germany)	Isaac Singer – (USA) Robert Gair- (Scottish) Joel Glickman – K’Nex (USA) Elisha Otis – elevator pulley (Canada) Ole Kirk Christiansen- LEGO (Denmark) Paloma Picasso - jewellery designs for Tiffany & Co (France)	John Spinello - Operation game (USA) Hella Jongerius –chairs (Netherlands) Lucienne Day- Embroidery (England) William Morris - Embroidery (England) Joel Glickman – K’Nex (USA) John Baker – Morrison Shelters (England) Charles Mackintosh – Waterproofing (Scotland)
Concept: Problem solving <ul style="list-style-type: none"> <li>Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world</li> </ul>			
	By the end of Y2	By the end of Y4	By the end of Y6
Expected	I can make my model stronger  I can join materials and components in different ways  I show resilience when faced with a problem  I can ask for help when faced with a problem	I can select the most appropriate tools and techniques for a given task  I can persevere and adapt my work when my original ideas do not work  I can demonstrate resourcefulness when tackling practical problems	I can suggest alternative plans; outlining the positive features and drawbacks  I can work within a budget  I can demonstrate resourcefulness when tackling practical problems
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Concept: Understanding the impact on daily life, the wider world and the cultural wealth of the nation. <ul style="list-style-type: none"> <li>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</li> </ul>			
	By the End of Y2	By the end of Y4	By the end of Y6

Expected	<p>I can work confidently within a range of contexts such as home, school, local community, garden and playgrounds, industry and the wider world</p> <p>I can say whether the product is for me or another user and the impact it will have</p> <p>I can describe what my product is for and how it works</p> <p>I can say how my product is suitable for its user</p>	<p>I can work confidently within a range of contexts such as the school, leisure, culture, industry and the wider environment</p> <p>I can describe the purpose of the products and its intended impact for its user</p> <p>I can explain the design choices for the product that will appeal to the intended user</p> <p>I can gather information about the needs and wants of the intended users and use this to shape the design choices</p> <p>I know about different inventors, designers, engineers and manufacturers who have developed ground-breaking products and the impact that they have had on daily life, the wider world and the cultural wealth of the nation</p>	<p>I can show that I consider culture and society and audience in my plans and designs.</p> <p>I can use market research, surveys, interviews, questionnaires and web-based resources to inform my plans and ideas.</p> <p>I can identify the needs, wants, preferences of the intended users</p> <p>I can explain how a product will appeal to a specific audience.</p> <p>I know about different inventors, designers, engineers and manufacturers who have developed ground-breaking products and the impact that they have had on daily life, the wider world and the cultural wealth of the nation</p>
Relevant people/ Designers	<p>Charles Mackintosh – Waterproofing (Scotland)</p> <p>Emma Parrish- children's book illustrator (sliders)</p> <p>Joel Glickman – K'Nex (USA)</p> <p>Ole Kirk Christiansen- LEGO (Denmark)</p> <p>Margaret Steiff - Stuffed toys (Germany)</p>	<p>Isaac Singer – (USA)</p> <p>Robert Gair- (Scottish)</p> <p>Joel Glickman – K'Nex (USA)</p> <p>Elisha Otis – elevator pulley (Canada)</p> <p>Ole Kirk Christiansen- LEGO (Denmark)</p> <p>Paloma Picasso - jewellery designs for Tiffany &amp; Co (France)</p>	<p>John Spinello - Operation game (USA)</p> <p>Hella Jongerius –textiles, chairs (Netherlands)</p> <p>Lucienne Day- Embroidery (England)</p> <p>William Morris - Embroidery (England)</p> <p>Joel Glickman – K'Nex (USA)</p> <p>John Baker – Morrison Shelters (England)</p> <p>Charles Mackintosh – Waterproofing (Scotland)</p>
<p>Concept: Imagine, plan, create</p> <ul style="list-style-type: none"> <li>Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world</li> <li>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</li> </ul>			
	By the end of Y2	By the end of Y4	By the end of Y6
Expected	<p>I can think of an idea and plan what to do next drawing on my own experiences</p>	<p>I can produce a step by step plan and explain it. I can select tools and equipment suitable for the task and explain my choices</p> <p>I can use ideas from other people when I am</p>	<p>I can model my ideas through prototypes and patterns</p> <p>I can produce a step by step plan, appropriate list</p>

	<p>I can use my knowledge of existing products to help me with my own ideas</p> <p>I can communicate a simple plan by talking and using design drawings before making the product</p> <p>I can choose tools and materials and explain why I have chosen them</p> <p>I can explore materials, components, construction kits, make templates</p> <p>I can make a product that moves</p> <p>I know about the simple working characteristics of materials and components</p> <p>I know about the movement of simple mechanisms like levers, sliders, wheels and axles and can explain how they work and may be used for</p> <p>I know how to make structures stronger, stiffer and more stable</p> <p>I know the correct vocabulary for the projects I have made e.g mechanism, textile, structure</p> <p>I can measure, mark out, cut and shape materials and components</p> <p>I can assemble, join and combine materials and components</p> <p>I can use finishing techniques, including those from art and design</p> <p>I can follow procedures for safety</p>	<p>designing</p> <p>I can model my ideas through prototypes and patterns</p> <p>I can use annotated drawings, cross –sectional drawing and exploded diagrams to develop and communicate ideas</p> <p>I can follow a step-by-step plan, choosing the right equipment and materials</p> <p>I can use my learning from science to help design and make products that work</p> <p>I can use my learning in maths to help design and make products that work</p> <p>I know the correct vocabulary for the projects I am undertaking</p> <p>I know that materials have both functional properties as well as aesthetic qualities</p> <p>I know and can explain how to make a strong structure</p> <p>I can follow procedures for safety</p> <p>I can use what I know from KS1 about materials and components and build on this knowledge when using construction kits, textiles, mechanical components and when building structures</p> <p>I can measure, mark out, cut, shape materials and components with some accuracy</p> <p>I can assemble, join and combine materials and components with some accuracy</p> <p>I can apply a range of finishing techniques, including those from art and design with some accuracy</p>	<p>of tools, equipment and materials needed</p> <p>I can use annotated drawings, cross –sectional drawing and exploded diagrams to develop and communicate ideas</p> <p>I can use computer aided design (CAD) to develop and communicate ideas</p> <p>I can make changes to my plan having identified areas for development</p> <p>I can make a prototype before make a final version and refine my plan accordingly</p> <p>I can use a range of tools and equipment competently</p> <p>I can come up with a range of ideas after collecting information from different sources</p> <p>I know that mechanical and electrical systems have an input, process and output</p> <p>I can use my learning from science to help design and make products that work</p> <p>I can use my learning in maths to help design and make products that work</p> <p>I know the correct vocabulary for the projects I am undertaking</p> <p>I know how to programme a computer to control my products</p> <p>I know how mechanical systems such as cams, pulleys and gears create movement</p> <p>I know how to reinforce and strengthen a 3D frame</p> <p>I can follow procedures for safety</p>
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			<p>I can accurately measure, mark out, cut and shape materials and components</p> <p>I can accurately assemble, join and combine materials and components</p> <p>I can accurately apply a range of finishing techniques including those from art and design</p>
Relevant people/Designers	<p>Charles Mackintosh – Waterproofing (Scotland)</p> <p>Emma Parrish- children's book illustrator (sliders)</p> <p>Joel Glickman – K'Nex (USA)</p> <p>Ole Kirk Christiansen- LEGO (Denmark)</p> <p>Margaret Steiff - Stuffed toys (Germany)</p>	<p>Isaac Singer – (USA)</p> <p>Robert Gair- (Scottish)</p> <p>Joel Glickman – K'Nex (USA)</p> <p>Elisha Otis – elevator pulley (Canada)</p> <p>Ole Kirk Christiansen- LEGO (Denmark)</p> <p>Paloma Picasso - jewellery designs for Tiffany &amp; Co (France)</p>	<p>John Spinello - Operation game (USA)</p> <p>Hella Jongerius –textiles, chairs (Netherlands)</p> <p>Lucienne Day- Embroidery (England)</p> <p>William Morris - Embroidery (England)</p> <p>Joel Glickman – K'Nex (USA)</p> <p>John Baker – Morrison Shelters (England)</p> <p>Charles Mackintosh – Waterproofing (Scotland)</p>