



Poulton Lancelyn

DT

Long Term Plan

2021/22



## DT Rationale

Our high quality Design and Technology curriculum is inspiring, rigorous and practical. Design technology allows pupils to use their creativity and imagination, as they design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Pupils evaluate past and present design and technology, in order to help pupils develop a critical understanding of its impact on daily life and the wider world.

## DT Intent

	Structures	Mechanisms	Textiles	Electrical systems	Cooking and nutrition	
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn Our Isles	Moving picture of bonfire night <span style="color: green;">M</span>	Bridges <span style="color: cyan;">S</span>	Crumble <span style="color: yellow;">C</span> Packaging <span style="color: cyan;">S</span>	Money pouch <span style="color: magenta;">T</span>	Frames <span style="color: cyan;">S</span>	Lanterns <span style="color: cyan;">S</span> Electrics <span style="color: blue;">E</span>
Spring Our World	Fruit Salad <span style="color: yellow;">C</span>	Vehicle <span style="color: cyan;">S</span> <span style="color: green;">M</span> Sandwich <span style="color: yellow;">C</span>	Rainforest shelter <span style="color: cyan;">S</span> <span style="color: green;">M</span>	Structures <span style="color: blue;">E</span>	Jewellery <span style="color: magenta;">T</span> Fair trade chocolate cake <span style="color: yellow;">C</span>	Mittens <span style="color: magenta;">T</span>
Summer Our Planet	Making a floating boat <span style="color: cyan;">S</span>	Pond net <span style="color: magenta;">T</span> <span style="color: cyan;">S</span>	Face masks <span style="color: magenta;">T</span>	Palm oil free afternoon tea <span style="color: yellow;">C</span>	Tippy tap <span style="color: green;">M</span> <span style="color: cyan;">S</span>	Free from food miles meal! <span style="color: yellow;">C</span>

## DT Implementation

Design and Technology at Poulton Lancelyn Primary School allows children to appreciate inventions and develop understanding of how things work as well as teaching life skills. The teaching of Design and Technology throughout the school follows the National Curriculum and uses the Design and Technology Association's 'Projects On A Page' documents as well as teacher's expertise to deliver high quality, comprehensive and progressive lessons.

The coverage across the school has been planned to ensure key strands are built upon throughout their education. As children progress through the year groups they are able to draw on their previously learnt knowledge and skills to create increasingly more intricate and challenging products in the areas of; cooking and nutrition, structures, mechanisms, textiles and electrical systems.

For each unit, pupils plan, design and make products within a variety of contexts often linked to our themes of 'Our Nation', 'Our World' and 'Our Planet'. Children will first develop an understanding of the importance of researching pre-existing products to inform their own designs. Pupils will then be given the opportunity to plan and design a product with a clear purpose and audience in mind; during this part of the process, pupils will be encouraged to take into consideration the appropriate tools, materials, measurements and other key details that will help their product meet the design criteria. After this, teachers will provide pupils with an opportunity to practise the key skills involved with focused practical tasks. Once pupils have practised the skills, they will be given time to create their final products and finally evaluate their effectiveness and make any necessary adjustments. Pupils will also have the opportunity to work collaboratively and independently during each stage of the design processes.

In our ever increasing technological world we also aim to give pupils the opportunity to develop Science, Technology, Engineering, Arts and Mathematical (STEAM) knowledge throughout our design and technology curriculum.

## DT Progression Map

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Research and Design</b>	1. To communicate their own ideas and opinions on existing products through discussion	1. Communicate their opinions about why they like existing products	1. Communicate the strengths and weaknesses of existing products	1. Communicate how research of existing products will inform their design	1. Communicate the strength and weaknesses of different products in relation to the specification of the task and how this will inform their design	1. Conduct market research and other research before planning their designs and use this analysis in relation to the specification of the task and how this will inform their design
	2. Design their own product through drawings, with templates to support when necessary 3. Label their designs with basic labels	2. Design and label their own design with diagrams and words, showing how they have met the given criteria 3. Explain how the product will function 4. Create mock-ups with support to demonstrate designs	2. Design a functional product that meets a range of design requirements 3. Describe their design using an accurate sketch 4. Create functional models of their product where applicable	2. Design a functional product that meets a range of design requirements ensuring it is realistic and appropriate 3. Describe their design using an accurate sketch and explanation 4. Devise a template or prototype to decide the strength and reliability of their product	2. After conducting research, create a range of designs through collaborative thinking 3. Describe and analyse a range of designs to create the most effective final design in relation to purpose 4. Create a detailed prototype explaining how their plan meets the design criteria	2. After conducting research, create a range of designs through collaborative thinking exemplifying diversity in the designs 3. Work collaboratively to discuss and compromise on ideas and justify their own opinions to others when creating a final design from different views and cross-sections 4. Use their prototype or template to check if their design will be successful and adapt it where necessary
	4. Verbally explain the materials and tools they plan to use and why	5. Using other models, choose the best tools to create their product and explain why they will work best 6. After being given steps of a plan, suggest what should happen next in their planning process	5. Detail the tools and equipment needed in relation to previous research 6. With modelling, plan a step-by-step guide which details the order of steps	5. Take into account what another user would want when choosing materials and the tools 6. Plan and step-by-step instructional guide and explain it to others	5. Consider the user's opinion and functionality when selecting appropriate materials and tools, justifying their selection 6. Produce a detailed, step-by-step plan, which explains why their finished product will be a good quality based on their plan	3. Work within constraints (timing, budgeting, H and S) when selecting materials and tools, justifying their selection 6. Produce a detailed, step-by-step plan, which explains why their finished product will be a good quality with consideration to audience, purpose, culture and society.
<b>Make</b>	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Structures	<ol style="list-style-type: none"> <li>1. Make a stable structure from card, tape and glue.</li> <li>2. Follow instructions to cut and assemble a supporting structure.</li> </ol>	<ol style="list-style-type: none"> <li>1. To make a structure according to a design criteria.</li> <li>2. Create joints and structures from paper/card and tape.</li> </ol>	<ol style="list-style-type: none"> <li>1. Construct a range of 3D geometric shapes using nets.</li> <li>2. Create special features for individual Designs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Create a range of different shaped frame structures.</li> <li>2. Make a variety of free-standing frame structures of different shapes and sizes.</li> <li>3. Select appropriate materials to build a strong structure.</li> <li>4. Reinforce corners to strengthen a structure.</li> <li>5. Create a design in accordance with a plan.</li> <li>6. Learn to create different textural effects with materials.</li> </ol>	<ol style="list-style-type: none"> <li>1. Build a wooden bridge structure Independently measuring and marking wood accurately.</li> <li>5. Select appropriate tools and equipment for particular tasks.</li> <li>6. Use the correct techniques to saws safely.</li> <li>7. Identify where a structure needs reinforcement and use card corners for support.</li> <li>8. Understand basic wood functional properties.</li> </ol>	<ol style="list-style-type: none"> <li>1. Draw upon new and prior knowledge of structures.</li> <li>2. Measure, mark and cut wood to create a range of structures.</li> <li>3. Use a range of materials to reinforce and add decoration to structures.</li> </ol>
Mechanisms	<ol style="list-style-type: none"> <li>1. Follow a design to create moving models that use levers and sliders.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make linkages using card for levers and split pins for pivots.</li> <li>2. Experiment with linkages adjusting the widths, lengths and thicknesses of card used.</li> <li>3. Cut and assemble components neatly.</li> <li>4. Select materials according to their characteristics.</li> <li>5. Follow a design brief.</li> </ol>	<ol style="list-style-type: none"> <li>1. Create a pneumatic system to create a desired motion.</li> <li>2. Build secure housing for a pneumatic system.</li> <li>3. Use syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic structure.</li> <li>4. Select materials due to their functional and aesthetic characteristics.</li> <li>5. Manipulate materials to create different effects by cutting, creasing, folding and weaving.</li> </ol>		<ol style="list-style-type: none"> <li>1. Follow a design brief with focus on accuracy.</li> <li>2. Make mechanisms and/or structures using sliders, pivots and folds to produce movement.</li> <li>3. Use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.</li> </ol>	
Textiles		<ol style="list-style-type: none"> <li>1. Select and cut fabrics for sewing</li> <li>2. Decorate using fabric glue or running stitch</li> </ol>	<ol style="list-style-type: none"> <li>1. Follow a design criteria</li> <li>2. Select and cut fabrics with ease using fabric scissors</li> </ol>	<ol style="list-style-type: none"> <li>1. Make and test a paper template with accuracy and in keeping with the design criteria</li> </ol>	<ol style="list-style-type: none"> <li>1. Create a 3D product from a 2D design</li> <li>2. Measure, mark and cut fabric accurately and independently</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a template when pinning panels onto fabric</li> <li>2. Mark and cut fabric accurately, in accordance with a design</li> </ol>

		3. Sequence steps for construction	3. Sew cross stitch to join fabric 4. Decorate fabric using appliqué 5. Complete design ideas with stuffing and sewing the edges	2. Measure, mark and cut fabric using a paper template 3. Select a stitch style to join fabric, working neatly sewing small neat stitches 4. Incorporate fastening to a design	3. Create strong and secure stitches when joining fabric 4. Use applique to attach pieces of fabric decoration	3. Sew a strong running stitch, making small, neat stitches and following the edge 4. Tie strong knots 5. Attach objects using thread and add a secure fastening
<b>Electrical Systems</b>				1. Make a working electrical circuit and switch		1. Making and testing a circuit 2. Incorporate a circuit into a base
<b>Cooking and nutrition</b>	1. Chop fruit and vegetables safely 2. Identify if a food is a fruit or a vegetable 3. Learn where and how fruits and vegetables grow	1. Slice food safely using the bridge or claw grip 2. Construct a sandwich that meets a design brief	1. Know how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination 2. Follow the instructions within a recipe	1. Follow a baking recipe 2. Cooking safely, following basic hygiene rules 3. Adapt a recipe	1. Cut and preparing food safely 2. Use equipment safely, including knives, hot pans and hobs 3. Know how to avoid cross-contamination 4. Follow a step by step method carefully to make a recipe	1. Follow a recipe, including using the correct quantities of each ingredient 2. Adapt a recipe based on research 3. Work to a given timescale 4. Work safely and hygienically with independence
	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
<b>Evaluate</b>	1. Discuss alternatives if something about the product isn't working	1. Suggest basic changes to improve their products during the process	1. Make decisions to change their plan/design throughout the making process	1. Evaluate their product thinking of both appearance and its mechanisms during the process	1. Ensure that their evaluation of their product's effectiveness is ongoing throughout their designing and making process 2. Consistently check whether anything can be improved before going through with it	1. Discuss and decide whether it is fit for purpose (during the design, making and evaluating process) 2. Decide whether they need to gain more information to make their product better 3. Consistently consider whether their product meets the design criteria
	1. Explain how their finished product works and how they created it 2. Discuss what they like about their finished product and what they could make better	2. Discuss and explain what went well in their design and making process and what could be improved 3. Discuss, in more detail than Y1, how their finished product matches the design criteria set out by the teacher	2. Explain what they have changed to improve their further product further 3. Discuss what others could add/change to improve their product further in relation to the product criteria	2. Explain how their finished product compares to their original design 3. Suggest ways to improve their finished product in relation to the product criteria whilst also identifying the positive elements of their design	3. Seek advice to refine and improve their product, re-moulding materials if necessary 4. Suggest alternative plans and say what the good points and drawbacks are of a finished product 5. Evaluate the appearance and function against the original criteria	4. Test their finished product 5. Discuss a range of elements that could improve their product, including alternative resources, budget and technology 6. Offer constructive evaluation to others to improve their work

Technical knowledge	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Structures</b>	<ol style="list-style-type: none"> <li>1. Describe the purpose of structures</li> <li>2. Learn how to turn 2D nets into 3D structures</li> <li>3. Learn that the shape of materials can be changed to improve the strength and stiffness of structures</li> <li>4. Develop awareness of different structures for different purposes</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify natural and man-made structures</li> <li>2. Identify when a structure is more or less stable than another</li> <li>3. Knowing that shapes and structures with wide, flat bases or legs are the most stable</li> <li>4. Understand that the shape of a structure affects its strength</li> <li>5. Use the vocabulary: strength, stiffness and stability</li> <li>6. Know that materials can be manipulated to improve strength and stiffness</li> <li>7. Build a strong and stiff structure by folding paper</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify features of a shelter</li> <li>2. Identify suitable materials to be selected and used for a shelter, considering weight, compression, tension</li> <li>3. Extend the knowledge of wide and flat based objects are more stable</li> <li>4. Understand the difference between frame and shell structure</li> </ol>	<ol style="list-style-type: none"> <li>1. Learn what air raid shelters are and their purpose</li> <li>2. Build on prior knowledge of net structures and broadening knowledge of frame structures</li> <li>3. Implement frame and shell structure knowledge</li> <li>4. Consider effective and ineffective designs</li> </ol>	<ol style="list-style-type: none"> <li>1. Explore how to create a strong frame</li> <li>2. Identify stronger and weaker structures</li> <li>3. Find different ways to reinforce structures</li> <li>4. Understand how triangles can be used to reinforce frames</li> </ol>	<ol style="list-style-type: none"> <li>1. Know that structures can be strengthened by manipulating materials and shapes</li> <li>2. Identify the shell structure in everyday life (cars, aeroplanes, tins, cans)</li> <li>3. Understand man made and natural structures</li> </ol>
<b>Mechanisms</b>	<ol style="list-style-type: none"> <li>1. Learn that levers and sliders are mechanisms and can make things move</li> <li>2. Identify whether a mechanism is a lever or slider and determine what movement the mechanism will make</li> <li>3. Use the vocabulary: up, down, left, right, vertical and horizontal to describe movement</li> </ol>	<ol style="list-style-type: none"> <li>1. Learn that mechanisms are a collection of moving parts that work together in a machine</li> <li>2. Learn that there is an input and output in a mechanism</li> <li>3. Identify mechanisms in everyday objects</li> <li>4. Learn that a lever is something that turns on a pivot</li> <li>5. Learn that a linkage is a system of levers that are connected by pivots</li> </ol>	<ol style="list-style-type: none"> <li>1. Understand how pneumatic systems work</li> <li>2. Learn that mechanisms are a system of parts that work together to create motion</li> <li>3. Understand that pneumatic systems can be used as part of a mechanism</li> <li>4. Learn that pneumatic systems force air over a distance to create movement</li> </ol>		<ol style="list-style-type: none"> <li>1. Know that an input is the motion used to start a mechanism</li> <li>2. Know that output is the motion that happens as a result of starting the input</li> <li>3. Know that mechanisms control movement</li> <li>4. Describe mechanisms that can be used to change one kind of motion into another</li> </ol>	

		<ul style="list-style-type: none"> <li>6. Explore wheel mechanisms</li> <li>7. Learn how axels help wheels to move a vehicle</li> </ul>				
Textiles	<ul style="list-style-type: none"> <li>1. Learn different ways in which to join fabrics together: pinning, stapling, gluing</li> </ul>	<ul style="list-style-type: none"> <li>1. Join items using fabric glue or stitching Identifying benefits of these techniques</li> <li>2. Thread a needle</li> <li>3. Sew running stitch, with evenly spaced, neat, even stitches to join fabric</li> <li>4. Neatly pin and cut fabric using a template</li> </ul>	<ul style="list-style-type: none"> <li>1. Thread needles with greater independence</li> <li>2. Tie knots with greater independence</li> <li>3. Sew cross stitch and appliqué</li> <li>4. Understand the need to count the thread on a piece of evenweave fabric in each direction to create uniform size and appearance</li> <li>5. Understand that fabrics can be layered for affect</li> </ul>	<ul style="list-style-type: none"> <li>1. Understand that there are different types of fastenings and what they are</li> <li>2. Articulate the benefits and disadvantages of different fastening types</li> </ul>	<ul style="list-style-type: none"> <li>1. Thread needles independently</li> </ul>	<ul style="list-style-type: none"> <li>1. Learn to sew blanket stitch to join fabric</li> <li>2. Apply blanket stitch so the space between the stitches are even and regular</li> <li>3. Learn different decorative stitches</li> <li>4. Application and outcome of the individual technique</li> <li>5. Sew accurately with even regularity of stitches</li> </ul>
Electrical Systems				<ul style="list-style-type: none"> <li>1. Learn how electrical items work</li> <li>2. Identify electrical products</li> <li>3. Learn what electrical conductors and insulators are</li> <li>4. Understand that a battery contains stored electricity and can be used to power products</li> <li>5. Learn the key components used to create a functioning circuit</li> </ul>		<ul style="list-style-type: none"> <li>1. Understand that breaks in a circuit will stop it from working</li> <li>2. Explain how a series circuit will work</li> <li>3. Identify the negative and positive leg of an LED</li> <li>4. Draw a series circuit diagram and symbols</li> <li>5. Learn that batteries contain acid, which can be dangerous if they leak</li> <li>6. Identify and name the circuit components in a lantern</li> </ul>
Cooking and nutrition	<ul style="list-style-type: none"> <li>1. Understand the difference between fruits and vegetables</li> <li>2. Describe and group fruits by texture and taste</li> </ul>	<ul style="list-style-type: none"> <li>1. Understand what makes a balanced diet</li> <li>2. Know where to find the nutritional information on packaging</li> <li>3. Know the five food groups</li> </ul>	<ul style="list-style-type: none"> <li>1. Learn that climate affects food growth</li> <li>2. Work with cooking equipment safely and hygienically</li> <li>4. Learn that vegetables and fruit grow in certain seasons</li> <li>5. Learn that each fruit and vegetable gives us nutritional benefits</li> <li>6. Learn to use, store and clean a knife safely</li> </ul>	<ul style="list-style-type: none"> <li>1. Understand the impact of the cost and importance of budgeting while planning ingredients for afternoon tea</li> <li>2. Understand the environmental impact on future product and cost of production</li> </ul>	<ul style="list-style-type: none"> <li>1. Record the relevant ingredients and equipment needed for a recipe</li> <li>2. Learn to adapt a recipe to make it healthier</li> <li>3. Compare two adapted recipes using a nutritional calculator and then identifying the healthier option</li> </ul>	<ul style="list-style-type: none"> <li>1. Learn that imported foods travel from far away and this can negatively impact the environment</li> <li>2. Learn how to research a recipe by ingredient</li> <li>3. Understand the combinations of food that will complement one another</li> <li>4. Understand where food comes from, describing the</li> </ul>

							process of 'Farm to Fork' for a given ingredient
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# Design and technology

## Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

## Aims

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.

## Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

**Schools are not required by law to teach the example content in [square brackets].**

## Subject content

### Key stage 1

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

When designing and making, pupils should be taught to:

#### Design

- design purposeful, functional, appealing products for themselves and other users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

#### Make

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

#### Evaluate

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

#### Technical knowledge

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

## Key stage 2

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

When designing and making, pupils should be taught to:

### Design

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

### Make

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

### Evaluate

- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world

### Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures

- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of computing to program, monitor and control their products.

- **Cooking and nutrition**

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

Pupils should be taught to:

### **Key stage 1**

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

### **Key stage 2**

- understand and apply the principles of a healthy and varied diet
- prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.