

Design and Technology

Purpose of Study

Pelynt's Design and Technology curriculum identifies closely with the National curriculum in recognising that 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. The Design and Technology Curriculum 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.

Key Design and Technology Principles that reflect the Bridge approach to the curriculum identified from the National Curriculum Expert Group for Design and Technology.

User – pupils should have a clear idea of who they are designing and making products for, considering their needs, wants, values, interests and preferences.

Purpose – pupils should be able to clearly communicate the purpose of the products they are designing and making. Each product they create should be designed to perform one or more defined task. Pupils products should be evaluated through use.

Functionality – pupils should design and make products that work/function effectively in order to fulfil users' needs, wants and purposes.

Design Decisions – pupils need opportunities to make their own design decisions. Making design decisions allows pupils to demonstrate their creative, technical and practical expertise and draw on learning from other subjects

Innovation – when designing and making, pupils need some scope to be original with their thinking. Projects that encourage innovation lead to a range of design ideas and products being developed and characterised by engaging open-ended starting points for learning.

Authenticity – pupils should carry out products that are believable, real and meaningful to themselves and others.

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.

In Key Stage 1 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].

In Key Stage 2 they should work in a range of **relevant contexts** for example, the home, school, leisure, culture, enterprise, industry and the wider environment)

Key areas of Learning include Design, Make, Evaluate, Technical Knowledge, Cooking and Nutrition

Key Stage 1	Key Stage 2
<p>National Curriculum Study Focus</p> <p>When designing and making, pupils should be taught to:</p> <p>Design</p> <ul style="list-style-type: none"> • 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 • 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 <p>Evaluate</p> <ul style="list-style-type: none"> • explore and evaluate a range of existing products • evaluate their ideas and products against design criteria 	<p>National curriculum Study focus</p> <p>When designing and making, pupils should be taught to:</p> <p>Design</p> <ul style="list-style-type: none"> • 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

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.

Cooking and Nutrition

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

- 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

		<ul style="list-style-type: none"> • 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
DESIGN		
Years 1/2	Years 3/4	Years 5/6
<p>Context Uses and Purpose State the purpose of the design and the intended user Explore materials, make templates and mock-ups e.g. moving picture / lighthouse</p>	<p>Context Uses and Purpose Gather information about the needs and wants of particular individuals and groups Develop their own design criteria and use these to inform their ideas Research designs</p>	<p>Context Uses and Purpose Carry out research, using surveys, interviews, questionnaires and web-based resources Identify the needs, wants, preferences and values of particular individuals and groups Develop a simple design specification to guide their thinking Recognise when their products have to fulfil conflicting requirements</p>
<p>Ideas Generate own ideas for design by drawing on own experiences or from reading</p>	<p>Ideas Share and clarify ideas through discussion Model their ideas using prototypes and pattern pieces Use annotated sketches, cross-sectional drawings and diagrams Use computer-aided design</p>	<p>Ideas Generate innovative ideas, drawing on research Make design decisions, taking account of constraints such as time, resources and cost Develop prototypes</p>
MAKE		
Years 1/2	Years 3/4	Years 5/6
<p>Planning Select from a range of tools and equipment explaining their choices</p>	<p>Planning Select tools and equipment suitable for the task</p>	

<p>Select from a range of materials and components according to their characteristics</p>	<p>Explain their choice of tools and equipment in relation to the skills and techniques they will be using</p> <p>Select materials and components suitable for the task</p> <p>Explain their choice of materials and components according to functional properties and aesthetic qualities</p> <p>Order the main stages of making</p> <p>Produce detailed lists of tools, equipment and materials that they need</p>	
<p>Practical Skills and Techniques</p> <ul style="list-style-type: none"> • Follow procedures for safety • Use and make own templates • Measure, mark out, cut out and shape materials and components • Assemble, join and combine materials and components • Use simple fixing materials e.g. temporary – paper clips tape and permanent – glue, staples • Use finishing techniques, including those from art and design 	<p>Practical Skills and Techniques</p> <ul style="list-style-type: none"> • Follow procedures for safety • Use a wider range of materials and components, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components 	
	<ul style="list-style-type: none"> • Measure, mark out, cut and shape materials and components with some accuracy • Assemble, join and combine materials and components with some accuracy apply a range of finishing techniques, include those from art and design, with some accuracy 	<ul style="list-style-type: none"> • Accurately measure to nearest mm, mark out, cut and shape materials and components • Accurately assemble, join and combine materials/ components • Accurately apply a range of finishing techniques, including those from art and design • Use techniques that involve a number of steps Demonstrate resourcefulness, e.g. make refinements
EVALUATE		
Years 1/2	Years 3/4	Years 5/6
<p>Own ideas and products</p> <p>Talk about their design ideas and what they are making</p>	<p>Own ideas and Products</p> <p>Identify the strengths and weaknesses of their ideas and products</p> <p>Consider the views of others, including intended users, to improve their work</p>	

<p>Make simple judgements about their products and ideas against design criteria</p> <p>Suggest how their products could be improved Evaluating products and components used</p>	<p>Refer back to their design criteria as they design and make</p> <p>Use their design criteria to evaluate their completed products</p>	
	<p>Identify the strengths and weaknesses of their ideas and products</p> <p>Consider the views of others, including intended users, to improve their work</p>	<p>Critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make</p> <p>Compare their ideas and products to their original design specification</p>
<p>Existing products</p> <p>Investigate - what products are, who they are for, how they are made and what materials are used</p>	<p>Existing Products</p> <p>Investigate - how well products have been designed, how well products have been made, why materials have been chosen, what methods of construction have been used, how well products work, how well products achieve their purposes and how well products meet user needs and wants</p>	
	<p>Investigate - who designed and made the products, where products were designed and made, when products were designed and made and whether products can be recycled or reused</p>	<p>Investigate - how much products cost to make, how innovative products are and how sustainable the materials in products are</p>
<p>Key Events and Individuals</p>	<p>Key Events and Individuals</p> <p>Identify great designers and their work and use research of designers to influence work</p>	
<p>TECHNICAL KNOWLEDGE AND PRACTICAL SKILLS</p>		
<p>Years 1/2</p>	<p>Years 3/4</p>	<p>Years 5/6</p>
<p>Making Products Work</p> <p>Understand about the simple working characteristics of materials and components</p>	<p>Making Products Work</p> <p>Understand how to use learning from science and maths to help design and make products that work</p> <p>Know that materials have both functional properties and aesthetic qualities</p> <p>Know that materials can be combined and mixed to create more useful characteristics</p> <p>Know that mechanical and electrical systems have an input, process and output</p> <p>Use the correct technical vocabulary for the projects they are undertaking</p>	

<p>Understand about the movement of simple mechanisms including levers, sliders (Year 1) wheels and axles (Year 2)</p> <p>Understand that food ingredients should be combined according to their sensory characteristics</p> <p>Know the correct technical vocabulary for the projects they are undertaking</p> <p>Understand how freestanding structures can be made stronger, stiffer and more stable</p>	<p>Understand how levers and linkages or pneumatic systems create movement</p> <p>Understand how simple electrical circuits and components can be used to create functional products</p> <p>Understand how to program a computer to control their products</p> <p>Know how to make strong, stiff shell structures</p> <p>Know that a single fabric shape can be used to make a 3D textiles product</p> <p>Know that food ingredients can be fresh, pre-cooked and processed</p>	<p>Understand how cams, pulleys and gears create movement</p> <p>Understand how more complex electrical circuits and components can be used to create functional products</p> <p>Understand how to program a computer to monitor changes in the environment / control their products</p> <p>Know how to reinforce/strengthen a 3D framework</p> <p>Know that a 3D textiles product can be made from a combination of fabric shapes</p> <p>Know that a recipe can be adapted by adding or substituting one or more ingredients</p>
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DETAILED PROGRESSION

MATERIALS

Cross curricular links with Forest School

Years 1 and 2	Years 3/4	Years 5/6
<ul style="list-style-type: none"> • Cut material safely using tools provided • Measure and mark out to the nearest centimetre • Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling) • Demonstrate a range of joining techniques (such as gluing, 	<ul style="list-style-type: none"> • Cut materials accurately and safely by selecting appropriate tools • Measure and mark out to the nearest millimetre • Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs) 	<ul style="list-style-type: none"> • Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape) • Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require a shaper scissor than would be used to cut paper)

<p>hinges or combining materials to strengthen)</p> <ul style="list-style-type: none"> • Mark out materials to be cut using more complex templates • Recognise properties of wood • Sawing of wood under close supervision • Use of wood during construction projects • Examine the tactile properties of different sorts of material – cardboard and plastic and how they can be joined • Use of a variety of reclaimed materials and tools to cut them. 		
<p>TEXTILES Cross curricular links with Art and Design and Forest School</p>		
<ul style="list-style-type: none"> • Shape textiles using templates • Join textiles using running stitch • Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing) • 	<ul style="list-style-type: none"> • Understand the need for a seam allowance • Join textiles with appropriate stitching • Select the most appropriate techniques to decorate fabrics 	<ul style="list-style-type: none"> • Create objects (such as a cushion) that employ a seam allowance • Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration) • Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles
<p>MECHANICS Cross curricular links with Science</p>		
<ul style="list-style-type: none"> • Combine free play with range of kits and join kits with other material (e.g. card, doweling, string) 	<ul style="list-style-type: none"> • Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as levers, winding mechanisms, pulleys and gears) 	<ul style="list-style-type: none"> • Convert rotary motion to linear using cams • Use innovative combination of electronics (or computing) and mechanics in product designs

<ul style="list-style-type: none"> • Supplement with particular set task e.g. farm building with Lego • Construct with kits containing running wheels, build a model with wheels and axles • Explore and use mechanisms (for example levers, sliders, wheels and axles) in products • Investigate simple winding mechanisms using a kit • Follow a given plan eg Polydron • Make an environment and provide parameters for design 		
<p>CONSTRUCTION Cross curricular links with Forest School</p>		
<ul style="list-style-type: none"> • Use materials to practice drilling, screwing, gluing and nailing materials to make and strengthen products • Model different types of join – hinges, simple pop ups, stapling, folding tearing • Learn skills of joining different materials • Learn to use tools safely (snips, card drill, scissors, hacksaw, bench hooks) • Learn how to care for tools • Select appropriate joining techniques/resources <p>Joins</p>	<ul style="list-style-type: none"> • Choose suitable techniques to construct products or to repair items • Strengthen materials using suitable techniques 	<ul style="list-style-type: none"> • Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing. Gluing, filling and sanding)

<ul style="list-style-type: none"> • Use children’s glue to join sheet material • Decide on the appropriateness and join using either blu tac, Sellotape, masking tape or split pins • Start to recognise properties of a wider selection of glues eg margin for wood, clear glue or children’s glue for paper • See adult using glue gun • Stapling • Use pencils and rulers, simple templates 		
ELECTRONICS Cross curricular links with Science		
<ul style="list-style-type: none"> • Diagnose faults in battery operated devices (such as low battery, water damage or battery terminal damage) 	<ul style="list-style-type: none"> • Create series and parallel circuits – kits and own • Be familiar with bulbs, LED, motor, buzzer, switch (makes and breaks a circuit, Cell/battery, connectors • Introduction to circuit diagrams • Introduction to switches – push switch, toggle switch, reed switch, Switches with more than two connectors 	<ul style="list-style-type: none"> • Create circuits using electronic kits that employ a number of components (such as LEDs, resistors, transistors and chips)
Cooking and Nutrition		
Years 1/2	Years 3/4	Years 5/6
Taught to	Taught to	

<ul style="list-style-type: none"> • use the basic principles of a healthy and varied diet to prepare dishes • understand where food comes from 	<ul style="list-style-type: none"> • 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 	
<p>Where food comes from Know where food comes from</p>	<p>Where food comes from Know that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world</p> <p>Know that seasons may affect the food available Understand how food is processed into ingredients that can be eaten or used in cooking</p>	
<p>Food Preparation, cooking and Nutrition Use appropriate equipment to weigh and measure ingredients Prepare simple dishes safely and hygienically, without using a heat source</p> <p>Use techniques such as cutting</p> <p>Name and sort foods into the five groups of the 'eat well' plate</p> <p>Know that everyone should eat at least five portions of fruit and vegetables every day</p>	<p>Food Preparation, cooking and Nutrition How to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source</p> <p>How to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking</p> <p>Know that a healthy diet is made up from a variety and balance of different foods and drinks, as depicted in the 'eat well' plate</p> <p>Know that to be active and healthy, food is needed to provide energy for the body</p> <p>Measure using grams</p> <p>Follow a recipe</p>	<p>Know that recipes can be adapted to change the appearance, taste, texture and aroma</p> <p>Know that different foods contain different substances - nutrients, water and fibre - that are needed for health</p> <p>Understand the need for correct storage</p> <p>Measure accurately</p> <p>Work out ratios in recipes</p>

DETAILED PROGRESSION

FOOD

Cross curricular links with Forest School

Years 1/ 2	Years 3/4	Years 5/6
<ul style="list-style-type: none">• Cut, peel or grate ingredients safely and hygienically• Measure or weigh using measuring cups or electronic scales• Assemble or cook healthy ingredients• Understand where food comes from	<ul style="list-style-type: none">• Prepare ingredients hygienically using appropriate utensils• Measure ingredients to the nearest gram accurately• Follow a recipe• Assemble or cook healthy ingredients (controlling the temperature or the hob or oven if cooking)	<ul style="list-style-type: none">• Understand the importance of correct storage and handling of materials (using knowledge of micro-organisms)• Measure accurately and calculate ratios of ingredients to scale up or down from a recipe• Demonstrate a range of baking and cooking techniques• Create and refine recipes, including healthy seasonal ingredients, methods, cooking times and temperatures• Understand how a variety of ingredients are grown, reared, caught and processed• Understand and apply principles of a healthy and varied diet