Gladstone Road Primary School Design Technology

Curriculum Plans

"Design is not just what it looks like and feels like. Design is how it works." Steve Jobs, Co-founder Apple Inc

Intent

Our Design Technology curriculum has been carefully planned and designed to encompass the content of the National Curriculum and ensure that it reflects and is distinct to our locality.

- Pupils' design technology education begins in the early years and builds year on year, developing pupils' expertise.
- Curriculum plans have been constructed effectively to ensure that pupils know more, remember more and are able to do more.
- Golden Threads, based on the four key strands as well as cooking and nutrition have been identified for each year group and underpin the key knowledge and concepts taught through our curriculum.
- Key knowledge has been mapped out from the early years to the end of KS2 to ensure that that the curriculum is coherently sequenced and there is clear progression.
- The organisation of the curriculum builds knowledge so that pupils can draw on it in future learning.
- Vocabulary has been identified and outlined clearly so that this can be taught explicitly within lessons.
- Clearly defined end points have been identified to ensure that pupils build upon prior learning and develop their knowledge of key concepts.
- Pupils commit knowledge to their long-term memory through recalling and repeated practice outlined in plans.

Implementation

Within and beyond our classrooms we provide a range of opportunities and implement a range of teaching methods to ensure that over the course of study, teaching is designed to help learners to remember in the long term the content they have been taught and to integrate new knowledge into larger concepts.

- Knowledge organisers which outline knowledge (including vocabulary) all children must master and apply in lessons are introduced at the start and referred to throughout a unit of study.
- A well sequenced cycle of lessons carefully plans for progression and depth concentrating on design technology knowledge and skills suited to the age group.
- Lessons follow a consistent structure of: retrieval, explanation, application and assessment which may include such features as questioning, modelling, individual, partner, group or whole class activities.
- Enrichment activities/visits are carefully used where appropriate to ensure pupils are able to practise and apply their knowledge and skills.
- Our inclusive approach is demonstrated through the way in which tasks and activities are adapted to ensure that all pupils are able to access the curriculum.
- Through retrieval, teachers make sure that pupils can draw on what they already know so that they can remember more.
- Key vocabulary is explicitly taught to enable pupils to develop their range of design technology vocabulary and understanding.
- Assessment for learning strategies are used at the start, during and at the end of lessons to assess pupils' learning and identify any gaps or misconceptions.

Impact

- Our Design Curriculum is high quality, well thought out and is planned to demonstrate progression. If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:
    - Pre and post unit assessments
    - Assessment against 'End of Year Expectations' with clearly identified end points. These are then passed to the receiving teacher to ensure any gaps can be addressed when a key concept is revisited.

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GOLDEN THREADS	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Designing	EAD: Creating with materials Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Share their creations, explaining the process they have used.	**Understanding Contexts, Users and Purposes** Across KS1 pupils should: • work confidently within a rangeof contexts, such as imaginary,story-based, home, school, gardens, playgrounds, local community, industry and the wider environment • state what products they aredesigning and making • say whether their products arefor themselves or other users • describe what their productsare for • say how their products willwork • say how they will make theirproducts suitable for their intended users • use simple design criteria tohelp develop their ideas		**Understanding Contexts, Users and Purposes** Across KS2 pupils should: • work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment • describe the purpose of their products • indicate the design features of their products that will appeal to intended users • explain how particular parts of their products work In early KS2 pupils should also: • gather information about the needs and wants of individuals and groups • develop their own design criteria and use these to inform their ideas In late KS2 pupils should also: • carry out research, using surveys, interviews, questionnaires and web-based resources • identify the needs, wants, preferences and values of individuals and groups • develop a simple design specification to guide their thinking			
		Generating, Developing, Modelling and Communicating Ideas Across KS1 pupils should: • generate ideas by drawing on their own experiences • use knowledge of existing products to help come up with ideas • develop and communicate ideas by talking and drawing • model ideas by exploring materials, components and construction kits and by making templates and mock- ups • use information and communication technology, where appropriate, to develop and communicate their ideas		**Generating, Developing, Modelling and Communicating Ideas** Across KS2 pupils should: • share and clarify ideas through discussion • model their ideas using prototypes and pattern pieces • use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas • use computer-aided design to develop and communicate their ideas In early KS2 pupils should also: • generate realistic ideas, focusing on the needs of the user • make design decisions that take account of the availability of resources In late KS2 pupils should also: • generate innovative ideas, drawing on research • make design decisions, taking account of constraints such as time, resources and cost			
Making	EAD: Creating with materials Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Share their creations,	**Planning** Across KS1 pupils should: • plan by suggesting what to do next • select from a range of tools and equipment, explaining their choices • select from a range of materials and components according to their characteristics		**Planning** Across KS2 pupils should: • select tools and equipment suitable for the task • explain their choice of tools and equipment in relation to skills and techniques they will be using • select materials and components suitable for the task • explain their choice of materials and components according to functional properties and aesthetic qualities In early KS2 pupils should also: • order the main stages of making In late KS2 pupils should also: • produce appropriate lists of tools, equipment and materials that they need • formulate step-by-step plans as a guide to making			

	explaining the process they have used. <u>PD: Fine motor</u> Use a range of small tools, including scissors, paintbrushes and cutlery.	**Practical Skills and Techniques** Across KS1 pupils should: • follow procedures for safety and hygiene • use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components • measure, mark out, cut and shape materials and components • assemble, join and combine materials and components • use finishing techniques, including those from art and design	**Practical Skills and Techniques** Across KS2 pupils should: • follow procedures for safety and hygiene • use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components In early KS2 pupils should also: • 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, including those from art and design, with some accuracy In late KS2 pupils should also: • accurately measure, mark out, cut and shape materials and components • accurately assemble, join and combine materials and components • accurately apply a range of finishing techniques, including those from art and design • use techniques that involve a number of steps • demonstrate resourcefulness when tackling practical problems
Evaluating Products	<u>EAD: Creating with materials</u> Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Share their creations, explaining the process they have used.	**Own Ideas and Products** Across KS1 pupils should: • talk about their design ideas and what they are making • make simple judgements about their products and ideas against design criteria • suggest how their products could be improved	**Own Ideas and Products** Across KS2 pupils should: • identify the strengths and areas for development in their ideas and products • consider the views of others, including intended users, to improve their work • In early KS2 pupils should also: • refer to their design criteria as they design and make • use their design criteria to evaluate their completed products • In late KS2 pupils should also: • critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make • evaluate their ideas and products against their original design specification
		Existing Products Across KS1 pupils should explore: • what products are • who products are for • what products are for • how products work • how products are used • where products might be used • what materials products are made from • what they like and dislike about products	**Existing Products** Across KS2 pupils should investigate and analyse: • 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 • how well products meet user needs and wants In early KS2 pupils should also investigate and analyse: • who designed and made the products • where products were designed and made • when products were designed and made • whether products can be recycled or reused In late KS2 pupils should also investigate and analyse: • how much products cost to make • how innovative products are • how sustainable the materials in products are • what impact products have beyond their intended purpose

			Key Events and Individuals Across KS2 pupils should know: • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products
Technical Knowledge	<u>EAD: Creating with materials</u> Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Share their creations, explaining the process they have used.	**Making Products Work** Across KS1 pupils should know: • about the simple working characteristics of materials and components • about the movement of simple mechanisms such as levers, sliders, wheels and axles • how freestanding structures can be made stronger, stiffer and more stable • that a 3-D textiles product can be assembled from two identical fabric shapes • that food ingredients should be combined according to their sensory characteristics • the correct technical vocabulary for the projects they are undertaking	**Making Products Work** Across KS2 pupils should know: • how to use learning from science to help design and make products that work • how to use learning from mathematics to help design and make products that work • that materials have both functional properties and aesthetic qualities • that materials can be combined and mixed to create more useful characteristics • that mechanical and electrical systems have an input, process and output • the correct technical vocabulary for the projects they are undertaking In early KS2 pupils should also know: • how mechanical systems such as levers and linkages or pneumatic systems create movement • how simple electrical circuits and components can be used to create functional products • how to program a computer to control their products • how to make strong, stiff shell structures • that a single fabric shape can be used to make a 3D textiles product • that food ingredients can be fresh, pre-cooked and processed In late KS2 pupils should also know: • how mechanical systems such as cams or pulleys or gears create movement • how more complex electrical circuits and components can be used to create functional products • how to program a computer to monitor changes in the environment and control their products • how to reinforce and strengthen a 3D framework • that a 3D textiles product can be made from a combination of fabric shapes • that a recipe can be adapted by adding or substituting one or more ingredients
		Food Preparation, Cooking and Nutrition Across KS1 pupils should know: • how to name and sort foods into the five groups in The Eatwell plate • that everyone should eat at least five portions of fruit and vegetables every day • how to prepare simple dishes safely and hygienically, without using a heat source • how to use techniques such as cutting and peeling	**Food Preparation, Cooking and Nutrition** Across KS2 pupils should know: • how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source • how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking • In early KS2 pupils should also know: • that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The Eatwell plate • that to be active and healthy, food and drink are needed to provide energy for the body • In late KS2 pupils should also know: • that recipes can be adapted to change the appearance, taste, texture and aroma • that different food and drink contain different substances – nutrients, water and fibre – that are needed for health

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Upper KS2	**Autumn Term** Savoury Biscuit Cooking and Nutrition	**Spring Term** Bridges Structures	**Summer Term** Moving toys Mechanisms
Prior Knowledge (Retrieval)	Y4- Talk about making a healthy scone • Identify an annotated sketch and cross-sectional drawing and explain their importance in designing their savoury scone. (Which is the annotated sketch and the cross-section diagram? Why are these diagrams important?) • Talk about how design decisions can be affected because of the availability of resources (were they able to purchase all the ingredients that they planned for?) • Identify the main stages of the plan that are needed before a product is made (What did they need to prepare prior to making their scone? Ingredients, equipment and hygiene) • Explain choices as to why tools were selected (weighing scales, knives, spoons, rolling pin) What tools were used and why? • Give an example of when they measured, marked, cut and shaped - healthy scone (measuring out ingredients, shaping scones.) (Why was it important to accurately measure the ingredients for your scone?) • Talk about a range of existing products and why they needed to be explored. (Why did they explore other scones before they designed their own?) • Check pupils understanding of the terms- hygiene, adapting? How did you ensure good hygiene and safety whilst making your scones? How did you adapt your scone for your user? • Name and sort foods into the 5 groups of the Eatwell Plate (fruits, vegetables, carbohydrates, protein, dairy and other alternatives and oils and spread. (Can they sort selected foods into the 5 groups?) • Describe that all food comes from plants and animals. (Which foods are farmed, grown elsewhere or caught in the UK, Europe and the wider world?)	Y4-Talk about making a minotaur maze • Identify an annotated sketch and cross-sectional drawing and explain their importance in designing their savoury scone. (Which is the annotated sketch and the cross-section diagram? Why are these diagrams important?) • Talk about how design decisions can be affected because of the availability of resources (were they able to purchase all the ingredients that they planned for?) • Explain choices as to why tools were selected (saws, scissors, glue guns) What tools were used and why? • Give an example of when they measured, marked, cut and shaped – minotaur maze (measuring dowelling, card.) (Why was it important to accurately measure the resources for your maze?) • Give examples of how they joined materials. (How did you join materials and what was your reason for this choice?) • Check pupils understanding of the terms- frame, structure, adapting. (How did you ensure your framework was accurately made? How did you need to adapt your framework?) • Talk about inventions that have shapes the world, for example Daedelus inventor of the labyrinth (minotaur maze.) (What do you know about Daedelus and his influence on mazes?) • Talk about how they can strengthen and reinforce a framework. (How can you strengthen a framework?) glue guns, nails and saws. • Talk about how they can use the views of others to improve their work and how they can support others to improve their work (How can someone else help you to improve your work? How can you support someone else to make improvements?) • Give an example of how they used their design criteria to evaluate. (How did your design criteria support your evaluation?)	Y3- Talk about making a pneumatic system • Create a design criteria and identify a user and a purpose for their product. (Who is your product for and how does it work?) • Talk about how an annotated skecth is useful for a designer. (What should an annotated sketch of a product include?) Cross sectional has also been covered in Y4. Can the children identify this? • Identify the importance of using prototypes and why they are important to the design process (How did they know their pneumatic would work?) • Talk about how design decisions can be affected because of the availability of resources (How did you make prepare for having resources?) • Give examples of why making a plan of the main stages is important before the making process (What did they need to prepare prior to making their pneumatic system? Box preparation, making holes, cutting, measuring) • Give an example of when they measured, marked, cut resources for their pneumatic (Why was it important to accurately measure resources for the system?) • Consider why you used materials for your pneumatic system. (Why did you use the materials you used for your pneumatic system?) • Talk about a range of existing products and why they needed to be explored. (Why did they explore other pneumatic systems before they designed their own?) • Talk about why they need to make improvements to their pneumatic system. (How did you make an improvement to your pneumatic system and why was this important?) • Check pupils understanding of the terms of how mechanical systems create movement.

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Y5 **Key person/event** Isambard Kingdom Brunel (bridge engineer)	**D & T Element – Cooking & Nutrition** Savoury biscuits- scope to link with 3D Modelling (Computing) and Mathematics (Volume) <u>Knowledge and Skills to be developed:</u> <u>Designing</u> Generate innovative ideas, drawing on research. Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their design ideas. Model their ideas using prototypes and computer-aided design. Make designs, taking account of constraints such as time, resources and cost. <u>Making</u> Formulate step by step plans as a guide to making. Produce appropriate lists of tools, equipment, materials and components that they need-wooden mixing spoons, knives, weighing scales Accurately measure, mark out, cut and shape materials and components, weighing out ingredients, timings. Accurately assemble, join and combine materials and components to make their gift box <u>Evaluating</u> Investigate and analyse a range of existing products. Evaluate their ideas and products against their original design specification. Consider the views of others, including intended users, to improve their work. <u>Technical Knowledge</u> Reinforce and strengthen a 3D framework (gift box) Know the correct technical vocabulary for the products they are undertaking, healthier option, nutritional. **<u>Cooking and Nutrition</u>** Identify that food is grown, reared and caught in the UK, Europe and the wider world. Identify that seasons may affect the food available. Describe how food is processed into ingredients that can be eaten or used in cooking. Identify that a healthy diet is made up from a variety and balance of different food and drink, (Eatwell plate). Fruit and vegetables Carbohydrates Protein	**D & T Element – Structures** Build different bridges and the structures which support them <u>Knowledge and Skills to be developed:</u> <u>Designing</u> Generate innovative ideas, drawing on research. Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their design ideas. Model their ideas using prototypes and computer-aided design. Make designs decisions, taking account of constraints such as time, resources and cost. <u>Making</u> Formulate step by step plans as a guide to making. Produce appropriate lists of tools, equipment, materials and components that they need- sello-tape, masking tape, card, scissors. Accurately measure, mark out, cut and shape materials and components-rulers, and measuring tapes Accurately assemble, join and combine materials and components. Accurately apply a range of finishing techniques, including those from art and design. Moveable toy and bridges. <u>Evaluating</u> Investigate and analyse a range of existing products. Evaluate their ideas and products against their original design specification. Consider the views of others, including intended users, to improve their work. Name and describe some inventors and how their inventions have shaped the world. For example,Y5-Isambard Kingdom Brunel (bridge engineer) <u>Technical Knowledge</u> Reinforce and strengthen a 3D framework. Bridge Know the correct technical vocabulary for the products they are undertaking, weaker, stronger structures, reinforce, compression, tension, abutments	**D & T Element – Mechanisms** Moving Victorian toy <u>Knowledge and Skills to be developed:</u> <u>Designing</u> Generate innovative ideas, drawing on research. Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their design ideas. Model their ideas using prototypes. Make designs, taking account of constraints such as time, resources and cost. <u>Making</u> Formulate step by step plans as a guide to making. Produce appropriate lists of tools, equipment, materials and components that they need- glue guns, card, scissors, cams, dowelling rods Accurately measure, mark out, cut and shape materials and components-rulers Accurately assemble, join and combine materials and components. Accurately apply a range of finishing techniques, including those from art and design- Moveable toy. <u>Evaluating</u> Investigate and analyse a range of existing products. Evaluate their ideas and products against their original design specification. Consider the views of others, including intended users, to improve their work. <u>Technical Knowledge</u> Reinforce and strengthen a 3D framework- Moveable toy Know the correct technical vocabulary for the products they are undertaking, weaker, stronger structures, reinforce, movement, mechanism, rotation, comparing, shaft

	Dairy and other alternatives Oil and spreads Prepare and cook savoury biscuits safely and hygienically. Use a range of techniques such as … peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.		
Future learning	**Breakfast bar (Y6)** • Understanding technical vocabulary -Fairtrade, sustainable, sustainability balanced diet • Considering constraints such as cost. • Using finishing techniques from art and design. • Using a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking. • Producing appropriate lists for resources.	**Making a structure for a nightlight (electrical systems/** Programming (making a structure for the night light) • Producing appropriate lists for resources • Assemble, join and combine materials for a structure to hold programming equipment. • Learn about famous engineers that shaped the world, such as Alan Turing, Charles Babbage, Ada Lovelace •	**N/A**
Design Vocabulary	research, market, annotated sketches, cross sectional drawings, exploded diagrams, constraints, time, resources, cost	cross sectional drawings, exploded diagrams, annotated sketches	mixture, structure, mechanism, cams, shape, accurately, cross sectional drawings, exploded diagrams, annotated sketches
Make Vocabulary	step by step, appropriate, tools, equipment wooden mixing spoons, knives, weighing scales, grams, accurate, measure	step by step, appropriate, tools, equipment sello-tape, masking tape, card, scissors, ruler, ruler, centimetre, length, assemble, cut, join, finishing techniques, prototype	design brief, focus, cams, tension, folds, produce movement, layers, spacers, mechanical parts, aesthetically pleasing
Evaluate Vocabulary	Investigate, analyse, existing, products, improve, design, specification, original, intended user, adapt, weigh, loads.	Investigate, analyse, existing, products, improve, design, specification, original, intended user, adapt, Isambard Kingdom Brunel, comparing	identifying, movement, desired effect, modify, alter, products
Technical Knowledge Vocabulary	Processed, reared, caught, grown, seasonality, Eatwell Plate, fruit and vegetables, carbohydrates, protein, dairy and other alternatives, oil and spreads	truss, beam, abutments, triangulation, tension, gravity, pressure, fit for purpose, strengthen, downward, upward force, compression, triangle, Lattice, Warren, Pratt, pillars, Isambard Kingdom Brunel, structure, reinforce, 3D framework, weaker, stronger	motion, mechanism, control movement, shaft
Quality texts	• A range of recipes from Be-Ro cookbook.	• How Do Bridges Not Fall Down? A Book about Architecture and Engineering • The Little Giant- Isamabad Kingdom Brunel Story	• Toys in the Past Adjunct Lecturer Elizabeth Moore
Enrichment activities (e.g. visitors/ visits)		A walk along the cinder track to see arch and beam bridges,	

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National Curriculum	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, textiles 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 electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] Food and Nutrition • understand and apply the principles of a healthy and varied diet • prepare and ook 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 • 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, textiles 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 electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]	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, textiles 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 electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]