

**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 school design 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

Organisation

- Although our design technology curriculum is arranged into different areas of learning there will be no set order in which these need to be completed, and in many cases there will be an overlap, for example a project or task may include structures as well as mechanisms or electrical circuits.
- Although there will be some stand-alone design technology lessons, this subject will be embedded in the wider curriculum as much as possible. Broader topic areas will allow pupils to encounter the skills, concepts and knowledge highlighted in this document. On many occasions the skills and knowledge highlighted in each year group will also be addressed through the Art and Design curriculum.

Skills Progression

Aspect	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Developing, planning and communicating ideas	Begin to draw on their own experience to help generate ideas and research conducted on criteria Begin to understand the development of existing products: What they are for, how they work, materials used. Start to suggest ideas and explain what they are going to do Understand how to identify a target group for what they intend to design and make based on a design criteria Begin to develop their ideas through talk and drawings	Start to generate ideas by drawing on their own and other people's experiences Begin to develop their design ideas through discussion, observation, drawing and modelling Identify a purpose for what they intend to design and make Understand how to identify a target group for what they intend to design and make based on a design criteria Develop their ideas through talk and drawings and label parts Make templates and mock ups of their ideas in card and paper or using ICT	With growing confidence generate ideas for an item, considering its purpose and the user/s Start to order the main stages of making a product. Identify a purpose and establish criteria for a successful product Understand how well products have been designed, made, what materials have been used and the construction technique Start to understand whether products can be recycled or reused Know to make drawings with labels when designing When planning explain their choice of materials and components including function and aesthetic	Confidently make labelled drawings from different views showing specific features Develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail Identify the strengths and areas for development in their ideas and products When planning consider the views of others, including intended users, to improve their work Learn about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products	Begin to use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose Draw up a specification for their design Accurately apply a range of finishing techniques, including those from art and design Use results of investigations, information sources, including ICT when developing design ideas Plan the order of their work, choosing appropriate materials, tools and techniques Suggest alternative methods of making if the first attempts fail	Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose Know how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose

Working with tools, equipment, materials and components to make quality products	Begin to make their design using appropriate techniques	Begin to select tools and materials; use correct vocabulary to name and describe them	Select a wider range of tools and techniques for making their product i.e. construction materials and kits, textiles, food ingredients, mechanical components and electrical components	Select appropriate materials, tools and techniques e.g. cutting, shaping, joining and finishing, accurately	Demonstrate how to use skills in using different tools and equipment safely and accurately with growing confidence; cut and join with accuracy to ensure a good-quality finish to the product	Confidently select and use appropriate tools, materials, components and techniques
	Demonstrate how to cut, shape and join fabric to make a simple product Use basic sewing techniques Explore using tools e.g. scissors and a hole punch safely Begin to assemble, join and combine materials and components together using a variety of temporary methods e.g. glues or masking tape Begin to use simple finishing techniques to improve the appearance of their product	With help measure, cut and score with some accuracy Learn to use hand tools safely and appropriately Start to assemble, join and combine materials in order to make a product With help measure, mark out, cut and shape a range of materials Begin to 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	Explain their choice of tools and equipment in relation to the skills and techniques used With confidence pin, sew and stitch materials together to create a product Start to understand that mechanical systems such as levers and linkages or pneumatic systems create movement Measure, mark out, cut, score and assemble components with more accuracy	Start to work safely and accurately with a wider range of tools Start to join and combine materials and components accurately in temporary and permanent ways Understand how more complex electrical circuits and components can be used to create functional products Weigh and measure accurately (time, dry ingredients, liquids)	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 Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT Know how mechanical systems such as cams or pulleys or gears create movement	Use tools safely and accurately Assemble components to make working models Aim to make and to achieve a quality product Understand that mechanical and electrical systems have an input, process and output Construct products using permanent joining techniques Demonstrate how to program a computer to monitor changes in the environment and control their products

Evaluating processes and products	Start to evaluate their product by discussing how well it works in relation to the purpose (design criteria) When looking at existing products explain what they like and dislike about products and why	Look at a range of existing products and explain what they like and dislike about products and why Start to evaluate their products as they are developed, identifying strengths and possible changes they might make With confidence talk about their ideas, saying what they like and dislike about them	Evaluate their product against original design criteria e.g. how well it meets its intended purpose Begin to disassemble and evaluate familiar products and consider the views of others to improve them Start to evaluate their work at the beginning and at the end of the assignment	Start to evaluate their products by carrying out appropriate tests Start to think about their ideas as they make progress and be willing to change things if this helps them to improve their work Evaluate the key designs of individuals in design and technology has helped shape the world	Evaluate a product against the original design specification and by carrying out tests Evaluate their work at the beginning, during and at the end of the assignment Begin to evaluate it personally as well as seeking evaluation from others	Thoroughly evaluate their products, identifying strengths and areas for development, and carrying out appropriate tests Record their evaluations using drawings with labels
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National Curriculum objectives

	Key Stage 1	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 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	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 • 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	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: • use the basic principles of a healthy and varied diet to prepare dishes • understand where food comes from	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: • 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

Unit Planner

Year	Units		
	Autumn	Spring	Summer
1	Food technology- Christmas biscuits	Making puppets Textiles- templates and joining (sewing)	Moving toys (pneumatics, axles, wind up mechanisms)
2	Moving story books (sliders, levers, pop ups)	London buildings (structures)	Food technology- Fruit salad
3	Mechanisms (gears and pulleys) Cable cars	Food technology- Bronze Age bread	Textiles (sewing)- Tudor hats and purses
4	Roman shields and helmets	Food technology- Roald Dahl's revolting tea party	Electrical circuits- Interactive quiz to map the world
5	Anderson shelters (structures)	Food technology- Greek food (vine leaves, olives)	Catapults (mechanisms)
6	Bottle biomes Wind turbines- electrical circuits and sustainable energy	Food technology- South American food (ceviche, lomo saltado)	Cams and Followers

Knowledge Table

Year	Knowledge
1	- To know that toys can be powered in different ways, e.g. through wind or wound mechanism - To know about the movement of simple mechanisms such as wheels and axles - To know how to join two fabrics together by sewing - To know that all food comes from plants or animals - To know the five main food groups in 'The Eat well Plate' - To know that everyone should eat at least five portions of fruit and vegetables every day
2	- To know different joining techniques to create simple structures - To know the importance of 'finishing' products to produce a final piece - To know about the movement of simple mechanisms such as slides and levers - To know techniques such as cutting, peeling and grating - To know how to prepare simple dishes safely and hygienically, without using a heat source
3	- To understand how gears and pulleys are used to transfer rotary motion from one place to another or lift heavy loads - To know the properties of different textiles and their suitability for use in specific designs - To know different stitches, and explain the pros and cons of using each one for a specific task - To 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 - To understand that a healthy diet is made up from a variety and balance of different food and drink, as depicted in 'The Eat well plate'
4	- To know that electrical circuits have an input, process and output - To know how to create an electrical circuit and describe the purpose of each part - To know how to use a range of materials and techniques (including finishing techniques) to create models of real life objects (Roman shields and helmets) - To understand 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 - To know that food is processed into ingredients that can be eaten or used in cooking
5	- To know different ways of creating structures, and that different designs are stronger than others - To know that a catapult is a lever propped up by a fulcrum (a pivoting point) and that there are different types of catapult (onager, mangonel, ballista, trebuchet) - To know how a mechanism can magnify a force to throw a payload (magnifying stored potential energy)

	- To understand that seasons may affect the food available - To know how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source
6	- To know the purpose of a cam and explain how circular and non-circular cams can create linear and non-linear movement - To know the purpose of a follower and how a slide is used to allow the follower to move - To know how different electrical components are used for different purposes - To understand the reasons for different electrical circuits - To know that different food and drink contain different substances – nutrients, water and fibre – that are needed for health - To know a range of food preparation techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking

Conceptual Links

Examples of concepts that can be linked to specific units are:

Nature and Environment- Sustainable products (e.g. wind turbines, renewable energy, renewable use of materials etc.)

Culture and Tradition- Foods from different cultures, traditional dishes

Individuality, identity- bespoke products, individualised designs based on own likes or desires

Wealth, Consumerism and Commercialism- Product evaluation, advertising

Technology- Use of design programmes, technological advances through history, use of mechanisms

Agriculture- Food technology units

Exploration, Invasion, Warfare- Uses of catapults, swords/shields, Anderson Shelters etc.

Design Technology Curriculum Key Vocabulary

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
design designer technology materials design criteria techniques evaluate purpose plan structure healthy	observation drawing modelling design design criteria techniques evaluate label templates tools materials assemble join combine sewing mechanisms levers sliders folds wheels axles product hygiene cutting peeling grating	user purpose design model evaluate prototype annotate sketch function design criteria utensils ingredients recipe 3- dimensional shape net textures face edge adhesives tools laminating	shaping joining finishing component product function aesthetic nutrition electrical circuit interactive texture	elastic lever fulcrum marginal trebuchet blend boil knead beat bake plan evaluate	sustainable renewable energy products wind turbines recycling traditional cultural nutrients kneading components linear non-linear electrical nutrition balanced hygiene cam follower slide carbohydrate protein allergy utensil