Design and Technology

Intent

Our design and technology curriculum is designed to provide a coherent and progressive development of knowledge, skills and understanding. It is intended that these will enable children to confidently approach everyday problem solving and equip them with the skills to experiment, invent and create their own works or designs. Opportunities are given for pupils to reflect upon and evaluate past and present design technology, its uses and its effectiveness.

We want our pupils to:

Love learning by using imagination and creativity to solve problems.
Achieve their full potential by becoming proficient problem solvers, both as individuals and as members of a team, encouraged to become innovators and risk takers.
Develop curiosit**y** by exploring their ideas and imagination to design and make products that will solve real and relevant problems.
Have **f**un experimenting with exciting and innovative ideas, linking DT with other disciplines such as mathematics, science, engineering, computing and art to create new products.
Be **i**nspired by famous craftsmen, great designers and innovators, reflecting and evaluating their inventions.
Have memorable **e**xperiences by solving problems, using a wide range of materials to create exciting new products.
Learn **l**ife skills by working alone or with others to solve problems considering their own and other's needs, wants and values.
Develop as individuals by providing creativity, innovation, support and inspiration.

Implementation

Design and technology projects at Layfield Primary School are well sequenced to provide a coherent subject scheme that helps to develop children's skills and confidence. Key aspects and techniques such as joining, cutting, shaping and finishing are revisited throughout a range of projects and are developed over time.

Where there are opportunities for making meaningful connections with other projects, lessons are sequenced accordingly. Design and technology lessons are taught throughout the year, with opportunities for classes to revisit skills and build on their previous learning.

Early Learning Goals	National Curriculum	
EY	**KS1**	**KS2**
Understanding the World: None Birth to Five Matters: Children require access to a range of technologies, both digital and non-digital in their early lives. Exploring with different technologies through play provides opportunities to develop skills that children will go on to develop in their lifetimes. Investigations, scientific inquiry and exploration are essential components of learning about and with technology both digitally and in the natural world. Through technology children have additional opportunities to learn across all areas in both formal and informal ways. Technologies should be seen as tools to learn both from and with, in order to integrate technology effectively within early years practice.	When designing and making, pupils should be taught to: <u>Design</u> - 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 <u>Make</u> - 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 <u>Evaluate</u> - explore and evaluate a range of existing products - evaluate their ideas and products against design criteria <u>Technical knowledge</u> - 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. <u>Cooking and nutrition</u> - use the basic principles of a healthy and varied diet to prepare dishes	When designing and making, pupils should be taught to: <u>Design</u> - 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 <u>Make</u> - 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 <u>Evaluate</u> - 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 <u>Technical knowledge</u> - apply their understanding of how to strengthen, stiffen and reinforce more complex structures

	- understand where food comes from.	- 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. <u>Cooking and nutrition</u> - 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.

<u>Early Years</u>

'Understanding the World: Technology' is one of the seven areas of the early years foundation stage and involves guiding children to make sense of their physical world and community through opportunities to explore, observe and find out about people, places, technology and the environment. Children are encouraged to explore, observe, solve problems, think critically, make decision and talk about why they have made their decisions. Activities include opportunities to construct, structure and join, using a variety of tools, cooking techniques, exploration and discussion.

Term	Nursery	Reception
Autumn 1	Use various construction material	
Autumn 2	Join construction pieces together to build and balance	Use simple tools and techniques competently and appropriately
Spring 1	Beginning to construct, stacking blocks vertically and horizontally, making enclosures and creating spaces	Use simple tools and techniques competently and appropriately

Spring 2	Realise tools can be used for a purpose Create closed shapes with continuous lines which represent objects that can be spoken about or identified	Manipulates materials to achieve a planned effect
Summer 1		Use what they have learnt about materials in an original way to be able to explain their choices
Summer 2	Construct with bricks and blocks to make an enclosure	Safely use and explore a variety of materials, tools and techniques Construct with a purpose in mind, using a variety of resources

Key Stage 1

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

In the autumn term of Year 1, children begin to learn manipulate paper and card in the project *Moon Zoom* before designing and making a rocket. In the spring term project *Bright lights, Big City*, they learn the term 'mechanism' and assemble and test wheels and axles to make a London Bus. In the summer term, children begin to learn to cut and join fabric as part of their project *Paws, Claws and Whiskers.*

In the autumn term of Year 2, children learn more about textiles in the project *Land Ahoy!* to create a Pirate Flag, where they learn to sew a simple running stitch and use pattern pieces. the spring term project *Street Detectives*, children develop their knowledge of mechanical systems further, learning to assemble and test levels, slides or axels to create a piece of playground equipment. In the summer term, children begin to develop their understanding of structures in *Towers, Turrets and Tunnels*, within this hey learn to join and strengthen wood for the first time.

Each term, throughout KS1, children learn about food by following recipes, finding out about food sources and learning simple cooking techniques.

Key Stage 2

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

In the autumn term of Year 3, children extend their knowledge of textiles whilst making puppets as part of their project *Heroes and Villains*. In the spring term project *Gods and Mortals*, children extend their understanding of mechanisms by exploring cams and using joining and finishing techniques to make decoy vessels. In the summer term project *Flow*, they continue to develop their knowledge of structures, using triangles and braces for strength to design and build a bridge.

In the autumn term of Year 4, children continue to develop their understanding of textiles in the project *I am Warrior*, designing and making a Roman Bulla. During the spring term project *Road Trip USA*, children explore and use electrical systems and IT monitoring and control to make traffic lights. In the summer term project *Blue Abyss*, they build on their knowledge of mechanisms, learning about underwater exploration and use their knowledge to create a submarine.

In the autumn term of Year 5, children deepen their understanding of mechanisms by studying cams and gears in the project *Scream Machine,* to make a Theme Park Ride. In the spring term project *Beast Creator*, children design and make 3D textile beast models. In the summer term, they learn more about structures in the project *Pharaohs*, studying the history of architecture and developing new ways to create structural strength and stability.

In the autumn term of Year 6, children consolidate their knowledge of structures, joining and strengthening techniques by completing an igloo bridge-building challenge. In the spring term project *A Child's War*, children research, design and make traditional toys using a range of textiles. In the summer term project *Hola Mexico*, they extend their knowledge of electrical systems by making a carnival float.

Children continue to learn about food throughout Key Stage 2, understanding the concept of a balanced diet and making healthy meals in different projects each term. Children continue to explore food and nutrition, learning about seasonal foods and the benefits of eating seasonally. They also learn about food safety, preservation technologies, processed and whole foods.

	Autumn term		Spring term		Summer term	
Year 1	Structures	Food	Mechanical systems	Food	Textiles	Food
	Rockets	Sandwiches	London bus	Bread rolls	Felt animals	Brazilian cakes
Year 2	Textiles	Food	Mechanical systems	Food	Structures	Food
	Pirate flag	Biscuits	Playground equipment	Cakes	Castles	Honey recipes
Year 3	Textiles	Food	Mechanical systems	Food	Structures	Food

	Puppets	Fruit smoothies	Decoy vessel	Honey comb	Bridges	Meat dish
Year 4	Textiles	Food	Electrical system	Food	Mechanical system	Food
	Roman bulla	Vegetarian foods	Light up signs	Stew	Submarine	American food
Year 5	Mechanical systems	Food	Textiles	Food	Structures	Food
	Theme park rides	Toffee apples	3D beast models	1900s food	Pyramids	Bread making
Year 6	Structures	Food	Textiles	Food	Electrical systems	Food
	Igloos	Heart-healthy foods	WW2 toys	WW2 recipes	Carnival float	Mexican food

Skills and Knowledge Progress Grid

Early Years Foundation Stage

The curriculum is taught through topics which ensure continuous provision and the skills progression as outlined in 'Birth to 5 Matters':

EY Nursery	**Range 4** • Enjoys playing with small world reconstructions, building on first-hand experiences, e.g. visiting farms, garages, train tracks, walking by river or lake
	Range 5 • Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world • Talks about why things happen and how things work
	Range 6 • Knows about similarities and differences in relation to objects
EY Reception	

Key Stages 1 & 2

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Design	- have own ideas - explain what I want to do - explain what my product is for, and how it will work - use pictures and words to plan, begin to use models - design a product for myself following design criteria - research similar existing products	- have own ideas and plan what to do next - explain what I want to do and describe how I may do it - explain purpose of product, how it will work and how it will be suitable for the user - describe design using pictures, words, models, diagrams, begin to use ICT - design products for myself and others following design criteria - choose best tools and materials, and explain choices - use knowledge of existing products to produce ideas	- begin to research others' needs - show design meets a range of requirements - describe purpose of product - follow a given design criteria - have at least one idea about how to create product - create a plan which shows order, equipment and tools - describe design using an accurately labelled sketch and words - make design decisions - explain how product will work - begin to use computers to show design	- use research for design ideas - show design meets a range of requirements and is fit for purpose - begin to create own design criteria - have at least one idea about how to create product and suggest improvements for design. - produce a plan and explain it to others - say how realistic plan is - include an annotated sketch - make and explain design decisions considering availability of resources - explain how product will work - begin to use computers to show design.	- use internet for research and design ideas - take a user's view into account when designing - begin to consider needs/ wants of individuals/ groups when designing and ensure product is fit for purpose - create own design criteria - have a range of ideas -produce a logical, realistic plan and explain it to others - use cross-sectional planning and annotated sketches - make design decisions considering time and resources - clearly explain how parts of product will work. - use computer-aided designs	- draw on research to inform design - use research of user's individual needs, wants, requirements for design - identify features of design that will appeal to the intended user - create own design criteria and specification - come up with innovative design ideas - follow and refine a logical plan - use annotated sketches, cross-sectional planning and exploded diagrams - make design decisions, considering, resources and cost - clearly explain how parts of design will work, and how they are fit for purpose - independently model and refine design ideas by making prototypes

						and using pattern pieces - use computer-aided designs
Make	- explain what I'm making and why - consider what I need to do next - select tools/ equipment to cut, shape, join, finish and explain choices - measure, mark out, cut and shape, with support - choose suitable materials and explain choices - try to use finishing techniques to make product look good - work in a safe and hygienic manner	- explain what I am making and why it fits the purpose - make suggestions as to what I need to do next - join materials/ components together in different ways - measure, mark out, cut and shape materials and components, with support - describe which tools I'm using and why - choose suitable materials and explain choices depending on characteristics - use finishing techniques to make product look good - work safely and hygienically	- select suitable tools/equipment, explain choices; begin to use them accurately - select appropriate materials, fit for purpose - work through plan in order - consider how good product will be - begin to measure, mark out, cut and shape materials/ components with some accuracy - begin to assemble, join and combine materials and components with some accuracy - begin to apply a range of finishing techniques with some accuracy	- select suitable tools and equipment, explain choices in relation to required techniques and use accurately - select appropriate materials, fit for purpose; explain choices - work through plan in order - realise if product is going to be good quality - measure, mark out, cut and shape materials/ components with some accuracy - assemble, join and combine materials and components with some accuracy - apply a range of finishing techniques with some accuracy	- use selected tools/equipment with good level of precision - produce suitable lists of tools, equipment/ materials needed - select appropriate materials, fit for purpose; explain choices, considering functionality - create and follow detailed step-by-step plan - explain how product will appeal to an audience - mainly accurately measure, mark out, cut and shape materials/ components - mainly accurately assemble, join and combine materials/ components - mainly accurately apply a range of finishing techniques - use techniques that involve a small number of steps - begin to be resourceful with practical problems	- use selected tools and equipment precisely - produce suitable lists of tools, equipment, materials needed, considering constraints - select appropriate materials, fit for purpose; explain choices, considering functionality and aesthetics - create, follow, and adapt detailed step-by-step plans - explain how product will appeal to audience; make changes to improve quality - accurately measure, mark out, cut and shape materials/ components - accurately assemble, join and combine materials/ components - accurately apply a range of finishing techniques - use techniques that involve a number of steps

						- be resourceful with practical problems
Evaluate	- talk about my work, linking it to what I was asked to do - talk about existing products considering: use, materials, how they work, audience, where they might be used - talk about existing products, and say what is and isn't good - talk about things that other people have made - begin to talk about what could make product better	- describe what went well, thinking about design criteria - talk about existing products considering: use, materials, how they work, audience, where they might be used; express personal opinion - evaluate how good existing products are - talk about what I would do differently if I were to do it again and why	- look at design criteria while designing and making - use design criteria to evaluate finished product - say what I would change to make design better - begin to evaluate existing products, considering: how well they have been made, materials, whether they work, how they have been made, fit for purpose - begin to understand by whom, when and where products were designed - learn about some inventors/ designers/ engineers/ chefs/ manufacturers of ground-breaking products	- refer to design criteria while designing and making - use criteria to evaluate product - begin to explain how I could improve original design - evaluate existing products, considering: how well they've been made, materials, whether they work, how they have been made, fit for purpose - discuss by whom, when and where products were designed - research whether products can be recycled or reused - know about some inventors/ designers/ engineers/ chefs/ manufacturers of ground-breaking products	- evaluate quality of design while designing and making - evaluate ideas and finished product against specification, considering purpose and appearance - test and evaluate final product - evaluate and discuss existing products, considering: how well they've been made, materials, whether they work, how they have been made, fit for purpose - begin to evaluate how much products cost to make and how innovative they are - research how sustainable materials are - talk about some key inventors/ designers/ engineers/ chefs/ manufacturers of ground-breaking products	- evaluate quality of design while designing and making; is it fit for purpose? - keep checking design is best it can be - evaluate ideas and finished product against specification, stating if it's fit for purpose - test and evaluate final product; explain what would improve it and the effect different resources may have had - do thorough evaluations of existing products considering: how well they've been made, materials, whether they work, how they've been made, fit for purpose - evaluate how much products cost to make and how innovative they are - research and discuss how sustainable materials are - consider the impact of products

							beyond their intended purpose - discuss some key inventors/ designers/ engineers/ chefs/ manufacturers of ground-breaking products
Technical knowledge	**Structures**	- begin to measure and join materials, with some support - describe differences in materials - suggest ways to make material/ product stronger	- measure materials - describe some different characteristics of materials - join materials in different ways - use joining, rolling or folding to make it stronger - use own ideas to try to make product stronger	- use appropriate materials - work accurately to make cuts and holes join materials - begin to make strong structures		- select materials carefully, considering intended use of product and appearance - explain how product meets design criteria - measure accurately enough to ensure precision - ensure product is strong and fit for purpose - begin to reinforce and strengthen a 3D frame	- select materials carefully, considering intended use of the product, the aesthetics and functionality - explain how product meets design criteria - reinforce and strengthen a 3D frame
	Mechanisms	- begin to use wheels and axles	- use levers, slides or axels	- select appropriate tools / techniques - alter product after checking, to make it better - begin to try new/different ideas - use simple lever and linkages to create movement	- select most appropriate tools / techniques - explain alterations to product after checking it - grow in confidence about trying new / different ideas - use levers and linkages to create movement	- refine product after testing - grow in confidence about trying new / different ideas - begin to use cams, pulleys or gears to create movement	
	Textiles	- measure, cut and join textiles to make a product, with some support	- measure textiles - join textiles together to make a product,	- join different textiles in different ways	- think about user when choosing textiles	- think about user and aesthetics when choosing textiles	- think about user's wants/needs and aesthetics when choosing textiles

		- choose suitable textiles	and explain how I did it - carefully cut textiles to produce accurate pieces - explain choices of textile	- choose textiles considering appearance and functionality - begin to understand that a simple fabric shape can be used to make a 3D textiles project	- think about how to make product strong - begin to devise a template - understand that a simple fabric shape can be used to make a 3D textiles project	- use own template - think about how to make product strong and look better - think of a range of ways to join things - begin to understand that a single 3D textiles project can be made from a combination of fabric shapes.	- make product attractive and strong - use a range of joining techniques - think about how product might be sold - think carefully about what would improve product - understand that a single 3D textiles project can be made from a combination of fabric shapes.
	Electrical systems				- use a number of components in circuit		- use different types of circuit in product - think of ways in which adding a circuit would improve product
Food and nutrition		- describe textures - wash hands & clean surfaces - think of interesting ways to decorate food -say where some foods come from - describe differences between some food groups - discuss how fruit and vegetables are healthy - cut, peel and grate safely, with support	- explain hygiene and keep a hygienic kitchen - describe properties of ingredients and importance of varied diet - say where food comes from - describe how food is farmed, home-grown, caught - draw eat well plate; explain there are groups of food - describe “five a day”	- carefully select ingredients - use equipment safely - make product look attractive - think about how to grow plants to use in cooking - begin to understand food comes from UK and wider world - describe how healthy diet= variety/ balance of food/ drinks - explain how food and drink are	- explain how to be safe/hygienic - think about presenting product in interesting/ attractive ways - understand ingredients can be fresh, pre-cooked or processed - begin to understand about food being grown, reared or caught in the UK or wider world - describe eat well plate and how a healthy diet= variety	- explain how to be safe / hygienic and follow own guidelines - present product well - interesting, attractive, fit for purpose - begin to understand seasonality of foods - understand food can be grown, reared or caught in the UK and the wider world - describe how recipes can be adapted to change	- understand a recipe can be adapted by adding / substituting ingredients - explain seasonality of foods - learn about food processing methods - name some types of food that are grown, reared or caught in the UK or wider world - adapt recipes to change appearance, taste, texture or aroma. - describe some of the different

		- cut, peel and grate with increasing confidence	needed for active/ healthy bodies - prepare and cook some dishes safely and hygienically grow in confidence using some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking	/ balance of food and drinks - explain importance of food and drink for active, healthy bodies - prepare and cook some dishes safely and hygienically - use some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking	appearance, taste, texture, aroma - explain how there are different substances in food / drink needed for health - prepare and cook some savoury dishes safely and hygienically including, where appropriate, use of heat source - use range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.	substances in food and drink, and how they can affect health - prepare and cook a variety of savoury dishes safely and hygienically including, where appropriate, the use of heat source - use a range of techniques confidently such as peeling, chopping, slicing, grating, mixing