Design Technology

The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear and participate in is crucial for developing their understanding, self-expression, vocabulary and ability to communicate through the arts. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe. Educational Programme – Physical Development Fine motor control and precision helps with hand-eye co-ordination, which is later linked to early literacy. Repeated and varied opportunities to explore and play with small world activities, puzzles, arts and crafts and the practice of using small tools, with feedback and support from adults, allow children to develop proficiency, control and confidence.

	Before starting Reception, children should:	During Reception, the children will learn to:	By the end of Reception, children should:
Expressive art and design	• Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings and a park. • Explore different materials freely, in order to develop their ideas about how to use them and what to make. • Develop their own ideas and then decide which materials to use to express them. • Create closed shapes with continuous lines, and begin to use these shapes to represent objects.	• Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills.	**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. • Make use of props and materials when role-playing characters in narratives and stories.
Physical	• Use large-muscle movements to wave flags and streamers, paint and make marks. • Choose the right resources to carry out their own plan. • Use one-handed tools and equipment, for example, making snips in paper with scissors.	• Develop their small motor skills so that they can use a range of tools competently, safely and confidently. Suggested tools: pencils for drawing and writing, paintbrushes, scissors, knives, forks and spoons.	**Fine Motor Skills** • Hold a pencil effectively in preparation for fluent writing - using the tripod grip in almost all cases. • Use a range of small tools, including scissors, paintbrushes and cutlery. • Begin to show accuracy and care when drawing.
PSED	• Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen, or one which is suggested to them.	• Show resilience and perseverance in the face of challenge.	• Set and work towards simple goals.

<table>
<tr><td colspan="5" align="center">**National Curriculum Expectations:**</td></tr>
<tr><td colspan="5">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.</td></tr>
</table>

		By the end of Year 2	By the end of Year 4	By the end of Year 6

By the end of Year 2

Design
- Design purposeful, functional, appealing products based on design criteria.
- Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and ICT.

Make
- Select from and use a range of tools and equipment to perform practical tasks.
- Select from and use a wide range of materials and components, including construction materials, textiles, and ingredients.

Evaluate
- Explore and evaluate a range of existing products.
- Evaluate ideas / products against design criteria.

Technical knowledge
- Build structures, exploring how they can be made stronger, stiffer and more stable.
- Explore and use mechanisms in their products.
- Use the basic principles of a healthy and varied diet to prepare dishes
- Understand where food comes from.

By the end of Year 4

Design
- Use research and develop criteria to inform the design of innovative, functional, appealing products that are fit for purpose.
- Generate, develop, model and communicate 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 accurately.
- Select from and use a wider range of materials and components.

Evaluate
- Investigate and analyse a range of existing products.
- Evaluate ideas and products against own design criteria and consider the views of others.
- Understand how key events and individuals 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
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].
- Apply understanding of computing to program, monitor and control products.
- 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 — **Understanding contexts, users and purposes**

By the end of Year 2

Children can:
- work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment
- state what products they are designing and making
- say whether their products are for themselves or other users
- describe what their products are for
- say how their products will work
- say how they will make their products suitable for their intended users
- use simple design criteria to help develop their ideas

By the end of Year 4

Children can:
- 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

Children can:
- gather information about the needs and wants of particular individuals and groups
- develop their own design criteria and use these to inform their ideas

By the end of Year 6

Children can:
- 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

	Generating, developing, modelling and communicating ideas	Children can: • 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 mockups • use information and communication technology, where appropriate, to develop and communicate their ideas	Children can: • 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	
			Children can: • generate realistic ideas, focusing on the needs of the user • make design decisions that take account of the availability of resources • generate innovative ideas, drawing on research • make design decisions, taking account of constraints such as time, resources and cost	Children can: • generate innovative ideas, drawing on research • make design decisions, taking account of constraints such as time, resources and cost
	Planning	Children can: • 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	Children can: • select tools and equipment suitable for the task • explain their choice of tools and equipment in relation to the 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	
			Children can: • order the main stages of making	Children can: • produce appropriate lists of tools, equipment and materials that they need • formulate step-by-step plans as a guide to making
Make	**Practical skills and technique**	Children can: • 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	Children can: • 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	
			Children can: • 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	Children can: • 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
Evaluate	**Own ideas and products**	Children can: • 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	Children can: • identify the strengths and areas for development in their ideas and products • consider the views of others, including intended users, to improve their work	
			Children can: • refer to their design criteria as they design and make • use their design criteria to evaluate their completed products	Children can: • 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	Children can investigate and analyse: • 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	Children can 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	

		• what they like and dislike about products	Children can 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	Children can 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		Children know: • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products	
Technical Knowledge	**Making products work**	Children 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	Children 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 Children 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	Children 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 ingredient
	Where food comes from	Children know: • that all food comes from plants or animals • that food has to be farmed, grown elsewhere (e.g. home) or caught	Children 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	Children know: • that seasons may affect the food available • how food is processed into ingredients that can be eaten or used in cooking
	Food preparation, cooking and nutrition	Children 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, peeling and grating	Children 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 Children 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	Children 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