# Design and Technology

Fulfen Primary School adopts best practice from a range of research, resources and educational thinking to improve outcomes for all our children.

Design and technology is an inspiring, enjoyable 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.

At Fulfen, we aim to provide a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take sensible risks, becoming resourceful, innovative, enterprising and capable individuals. 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.

Design and technology at Fulfen should be taught through a combination of defined design and technology projects, the direct teaching of skills and through activities integrated within the learning of other National Curriculum subjects or 'themed' work.

Our passionate and critical-thinking innovators will acquire the skills:

- To have significant levels of originality and the willingness to take creative risks to produce innovative ideas and prototypes.
- To have an excellent attitude to learning and independent working.
- To have the ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users' needs.
- To have the ability to act as responsible designers and makers, working ethically, using limited materials carefully and working safely.
- To have a thorough knowledge of which tools, equipment and materials to use to make their products.
- To have the ability to apply mathematical knowledge.
- To have the ability to manage risks extremely well to manufacture products safely and hygienically.
- To have a passion for the subject and knowledge of up-to-date technological innovations in materials, products and systems.

# CURRICULUM MAP

**EYFS Curriculum**

**Design**

- Hold conversation when engaged in back-and-forth exchanges with their teacher and peers. *(ELG – understanding)*
- Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. (ELG – speaking)
- Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate. (ELG – self-regulation)

**Make**

- Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.( ELG: Managing self)
- Use a range of small tools, including scissors, paintbrushes and cutlery. ( ELG: Fine motor skills)
- 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. (ELG: Creating with Materials)

**Evaluate**

- Express their ideas and feelings about their experiences using full sentences, including use of past, present and future tenses and making use of conjunctions, with modelling and support from their teacher. (ELG: Speaking)
- Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. (ELG: Managing self)
- Share their creations, explaining the process they have used. (ELG: Creating with Materials)
- Hold conversation when engaged in back-and-forth exchanges with their teacher and peers. (ELG Listening, Attention and Understanding)
- Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate. (ELG – Speaking)

**Technical Knowledge**

- Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.

**Cooking & Nutrition**

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. (ELG – managing self)
- Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate. (ELG – managing self)
- Use a range of small tools, including scissors, paint brushes and cutlery (ELG – Fine motor skills)

| | Autumn | Spring | Summer |
|---|---|---|---|
| **Pre-School** | **Mud Kitchen** | **Pancake Party!** | **Let's Look at Hats!** |
| **Reception** | **Hinges and Catches** | **Pat-a-cake!** | **Teddy Bears' Picnic Blanket** |

## Key Stage 1 National Curriculum

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

**Technical knowledge**

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

**Cooking & Nutrition**

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

| | Autumn | Spring | Summer |
|---|---|---|---|
| **Year 1**<br>**Topics & NC strands** | **Pumpkin Picking!**<br>**Sweet Dreams!**<br>**Food Preparation** | **Sliders and Levers: Moving Pictures**<br>**Serious About Sandwiches** | **Structures: Whose Home?** |
| **Year 2**<br>**Topics & NC strands** | **Three Billy Goats Gruff - Building Bridges**<br>**Cross-stitch bookmarks** | **Crazy Cars!** | **A Piece of Pizza!** |

## Key Stage 2 National Curriculum

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**

- 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 & Nutrition**

- 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.

| | Autumn | Spring | Summer |
|---|---|---|---|
| **Year 3** Topics | **Banish Broken Biscuits! (Ethical packaging designers)**<br>**Hanukkah** | **Chips 'N' Dips!**<br>**Charlie and The Chocolate Factory!** | **Linked Levers**<br>**Noughts & Crosses Sewing Challenge** |
| **Year 4** Topics | **Mighty Mascots! (Mary Anderson)**<br>**A Bright Christmas! (Thomas Edison)** | **Chinese New Year**<br>**Marbulous Structures (Thomas Farnolls Pritchard)** | **Summer Salads**<br>**Running stitch Keyrings** |
| **Year 5** Topics | **What is DT?**<br>**Pencil Case Rolls**<br>**Diwali Dining** | **Alarming Vehicles (Victor Helman)** | **The Great Bread Bake Off**<br>**Bird Hide Challenge** |
| **Year 6** Topics | **Christmas Dinner!**<br>**Next in Fashion (Fiona Fairhurst)** | **Mama's Bolognese (Gordon Ramsey)**<br>**Blanket Stitch Butterflies** | **Iftar**<br>**Losing our Marbles at Drayton Manor!** |

# Design and Technology - Skills and Knowledge Progression Map

| KS1 Skills, Knowledge & Concepts | DESIGN:<br>• Understanding contexts, users and purposes.<br>• Generating, developing, modelling and communicating ideas. | MAKE:<br>• Planning<br>• Practical skills and techniques | EVALUATE:<br>• Own ideas and products<br>• Existing products<br>• Key events and individuals | TECHNICAL KNOWLEDGE:<br>• Making products work | COOKING AND NUTRITION:<br>• Where food comes from<br>• Food preparation, cooking and nutrition | VOCABULARY: |
|---|---|---|---|---|---|---|
| **KEY STAGE 1** | Pupils should:<br>• Work confidently within a range of contexts, such as imaginary, story-based, home, school, outside, the local community and the wider environment.<br>• State what products they are designing and making.<br>• Say whether their products are for themselves or other users.<br>• Describe what their products are for.<br>• Say how their product will work.<br>• Say how they will make their product suitable for the intended user.<br>• Use simple design criteria to help develop their ideas.<br>• Generate ideas by drawing on their own experiences.<br>• Use knowledge of existing to help come up with ideas.<br>• Develop and communicate ideas by talking and drawing.<br>• Model ideas by exploring materials, components and construction kits and by making templates and mock-ups.<br>• Use ICT where appropriate to develop and communicate their ideas. | Pupils should:<br>• Plan by suggesting what to do next.<br>• Select from a range of tools and equipment, explaining their choices.<br>• Select from a range of materials and components according to their characteristics.<br>• Follow procedures for safety and hygiene.<br>• Use a range of materials and components including construction materials and kits, textiles, food ingredients and mechanical components.<br>• Measure, mark out, cut and shape materials and components.<br>• Assemble, join and combine materials and components.<br>• Use finishing techniques, including those from art and design. | Pupils should:<br>• Talk about their design and what they are making.<br>• Make simple judgements about their products and ideas against design criteria.<br>• Suggest how their products could be improved.<br><br>• When exploring existing products, pupils should ask:<br>• What are the products?<br>• Who are the products for?<br>• What are the products for?<br>• How do the products work?<br>• How are the products used?<br>• Where might the products be used?<br>• What materials are the products made from?<br>• What do they like / dislike about the product? | Pupils should know:<br>• About the simple working characteristics of materials and components.<br>• About the movement of simple mechanisms such as levers, sliders, wheels and axles.<br>• How freestanding structures can be made stronger, stiffer and more stable.<br>• That a 3D textiles product can be assembled from two identical shapes.<br>• That food ingredients should be combined according to their sensory characteristics.<br>• The correct technical vocabulary for the projects they are undertaking. | Pupils should know:<br>• That all food comes from plants or animals.<br>• That food has to be farmed, grown elsewhere or caught.<br>• How to name and sort foods into the five groups in the Eatwell Guide.<br>• That everyone should eat at least five portions of fruit and vegetables every day.<br>• How to prepare simple dishes safely and hygienically; without using a heat source.<br>• How to use techniques such as cutting, peeling and grating. | **Year 1:**<br>Design, designing, drawing, labels, model, purpose, template, user, appearance, combine, construction materials, cut, decorations, equipment, fabric, finish, join, making, mark out, materials, plan, shaping, tools, change, compare, materials, repeat, axles, build, explore, stuff, strong, wheels, animals, caught, chop, healthy, farmed, food safety, grate, grown, ingredients, plants, slice, sort, weigh.<br><br>**Year 2:**<br>Annotated drawings, appealing, communicate, computing software, creative, design criteria, develop, function, intended user, mock-up, practical, products, purposeful, accuracy, assemble, characteristics, components, finishing techniques, hand tools, manipulate, running stitch, score, textiles, design criteria, discuss, evaluate, improve, improvements, positive, process, refine, stages, strengths, successes, characteristics, components, create, levers, mechanisms, sliders, stable, structures. Design, Eatwell Guide, food groups, hazard, hygiene, juicer, originate, peel, portions, prepare, safe knives, varied diet, zest, zester. |

| KS2<br>Skills, Knowledge & Concepts | DESIGN:<br>• Understanding contexts, users and purposes.<br>• Generating, developing, modelling and communicating ideas. | MAKE:<br>• Planning<br>• Practical skills and techniques | EVALUATE:<br>• Own ideas and products<br>• Existing products<br>• Key events and individuals | TECHNICAL KNOWLEDGE:<br>• Making products work | COOKING AND NUTRITION:<br>• Where food comes from<br>• Food preparation, cooking and nutrition | VOCABULARY: |
|---|---|---|---|---|---|---|
| **LOWER KS2** | Pupils should:<br>• Work confidently within a range of contexts such as the home, school, leisure, culture, enterprise, industry and the wider environment.<br>• Describe the purpose of their products.<br>• Indicate the design features of their products that will appeal to intended users.<br>• Explain how particular parts of their products work.<br>• Gather information about the needs and wants of particular individuals and groups.<br>• Develop their own design criteria and use these to inform their ideas. | Pupils should:<br>• Select tools and equipment suitable for the task.<br>• Explain their choice of tools and equipment in relation to the skills and techniques they will be using.<br>• Select materials and components suitable for the task.<br>• Explain their choice of materials and components according to functional properties and aesthetic qualities.<br>• Order the main stages of making.<br>• Follow procedures for safety and hygiene.<br>• Use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components.<br>• Measure, mark out, cut and shape materials and components with some accuracy.<br>• Assemble, join and combine materials and components with some accuracy.<br>• Apply a range of finishing techniques, including those from art and design, with some accuracy. | Pupils should:<br>• Identify the strengths and areas for development in their ideas and products.<br>• Consider the views of others, including intended users, to improve their work.<br>• Refer to the design criteria as they design and make.<br>• Use their design criteria to evaluate their completed products.<br>• investigate and analyse:<br>• How well products have been designed.<br>• How well products have been made.<br>• Why materials have been chosen.<br>• What methods of construction have been used.<br>• How well products work.<br>• How well products achieve their purposes.<br>• How well products meet users needs and wants.<br>• Who designed and made the products.<br>• Where the products were designed and made.<br>• When the products were designed and made.<br>• Whether the products can be recycled or reused.<br><br>• Across KS2, pupils should know about inventors, designers, engineers, chefs and manufacturers who have developed ground breaking products. | Pupils should know:<br>• How to use learning from science to help design and make products that work.<br>• How to use learning from mathematics to help design and make products that work.<br>• That materials have both functional properties and aesthetic qualities.<br>• That materials can be combined and mixed to create more useful characteristics.<br>• That mechanical and electrical systems have an input, process and output.<br>• The correct technical vocabulary for the projects they are undertaking.<br>• How mechanical systems such as levers and linkages or pneumatic systems create movement.<br>• How simple electrical circuits and components can be used to create functional products.<br>• How to program a computer to control their products.<br>• How to make strong, stuff shell structures.<br>• That a single fabric shape can be used to make a 3D textiles product.<br>• That food ingredients can be fresh, pre-cooked or processed. | Pupils should know:<br>• That a recipe can be adapted by adding or substituting one or more ingredients.<br>• 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.<br>• How to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source.<br>• How to use a range of techniques such as peeling, chopping, slicing, grating, mixing, kneading and baking.<br>• That a healthy diet is made up from a variety and balance of different food and drink, as depicted in the Eatwell Guide.<br>• That to be active and healthy, food and drink are needed to provide energy for the body. | **Year 3:**<br>Annotated sketches, computer-aided design, develop, fit for purpose, functional, pattern pieces, research, fabric paint, functional properties, kits, mechanical components, select, sewing technique, stages, tie-dye, alter, existing products, key events, key individuals, investigate, views, cams, gears, input process, linkages, mechanical systems, output process, program, pulleys, stiffen, strengthen, bake, balance, crush, energy, gram, heat source, hob, hygiene procedures, knead, mash, millilitre, oven, preparation, processed, reared, recipe, savoury, sweet, temperature, varied diet, whisk.<br><br>**Year 4:**<br>Aesthetics, cross-sectional diagram, exploded diagrams, generate, innovative, prototypes, specific user, aesthetic qualities, digital graphics, electrical components, finishing technique, hemming, systematic order, analyse, technological developments, bulb, buzzer, complex structure, control, electrical systems, monitor, motor, parallel circuits, reinforce, series circuits, switch, active, balanced diet, cooking utensils, hygienically, menu, nutrition, nutritious, seasonality, variety. |

| KS2<br>Skills, Knowledge & Concepts | DESIGN:<br>• Understanding contexts, users and purposes.<br>• Generating, developing, modelling and communicating ideas. | MAKE:<br>• Planning<br>• Practical skills and techniques | EVALUATE:<br>• Own ideas and products<br>• Existing products<br>• Key events and individuals | TECHNICAL KNOWLEDGE:<br>• Making products work | COOKING AND NUTRITION:<br>• Where food comes from<br>• Food preparation, cooking and nutrition | VOCABULARY: |
|---|---|---|---|---|---|---|
| **UPPER KS2** | • Pupils should:<br>• Work confidently within a range of contexts such as the home, school, leisure, culture, enterprise, industry and the wider environment.<br>• Describe the purpose of their products.<br>• Indicate the design features of their products that will appeal to intended users.<br>• Explain how particular parts of their products work.<br>• Carry out research, using surveys, interviews, questionnaires and web-based resources.<br>• Identify the needs, wants, preferences and values of particular individuals and groups.<br>• Develop a simple design specification to guide their thinking. | Pupils should:<br>• Select tools and equipment suitable for the task.<br>• Explain their choice of tools and equipment in relation to the skills and techniques they will be using.<br>• Select materials and components suitable for the task.<br>• Explain their choice of materials and components according to functional properties and aesthetic qualities.<br>• Produce appropriate lists of tools, equipment and materials that they need.<br>• Formulate step-by-step plans as a guide to making.<br>• Follow procedures for safety and hygiene.<br>• Use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components.<br>• Accurately measure, mark out, cut and shape materials and components.<br>• Accurately assemble, join and combine materials and components.<br>• Accurately apply a range of finishing techniques, including those from art and design.<br>• Use techniques that involve a number of steps.<br>• Demonstrate resourcefulness when tackling practical problems. | Pupils should:<br>• Identify the strengths and areas for development in their ideas and products.<br>• Consider the views of others, including intended users, to improve their work.<br>• Critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make.<br>• Evaluate their ideas and products against their original design specification.<br>• investigate and analyse:<br>• How well products have been designed.<br>• How well products have been made.<br>• Why materials have been chosen.<br>• What methods of construction have been used.<br>• How well products work.<br>• How well products achieve their purposes.<br>• How well products meet users needs and wants.<br>• How much products cost to make.<br>• How innovative products are.<br>• How sustainable the materials in products are.<br>• What impact products have beyond their intended purpose.<br>• Across KS2, pupils should know about inventors, designers, engineers, chefs and manufacturers who have developed ground breaking products. | Pupils should know:<br>• How to use learning from science to help design and make products that work.<br>• How to use learning from mathematics to help design and make products that work.<br>• That materials have both functional properties and aesthetic qualities.<br>• That materials can be combined and mixed to create more useful characteristics.<br>• That mechanical and electrical systems have an input, process and output.<br>• The correct technical vocabulary for the projects they are undertaking.<br>• How mechanical systems such as cams or pulleys and gears create movement.<br>• How more complex electrical circuits and components can be used to create functional products.<br>• How to program a computer to monitor changes in the environment and control their products.<br>• How to reinforce and strengthen a 3D framework.<br>• That a 3D textiles product can be made from a combination of fabric shapes.<br>• That a recipe can be adapted by adding or substituting one or more ingredients. | Pupils should know:<br>• That a recipe can be adapted by adding or substituting one or more ingredients.<br>• 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.<br>• How to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source.<br>• How to use a range of techniques such as peeling, chopping, slicing, grating, mixing, kneading and baking.<br>• That recipes can be adapted to change the appearance, taste, texture and aroma.<br>• That different food and drink contain different substances – nutrients, water and fibre – that are needed for health. | **Year 5:**<br>Industry, leisure, resources, target market, backstitch, blanket stitch, precision, sanding, step-by-step-step plan, competitor analysis, fitness for purpose, manufacture, quality, monitor, boiling, cattle, frying, griddling, grilling, processed, protein.<br><br>**Year 6:**<br>Availability, coatings, conservation, culture, enterprise, seam allowance, whip stitch, competitor analysis, market, incorporate, aroma, poultry, ratios, refine, scale down, scale up, substances, substitute. |