# Design and Technology Curriculum Progression

***'Technology may change rapidly, but people change slowly. The principals [of design] come from understanding people. They remain true forever.' - Donald A Norman***

## Curriculum Intent:

At Milldown CE Academy, we are committed to providing a high-quality DT education for all our children. By doing so we will equip them with the knowledge, skills and cultural capital they need to succeed beyond the school gates, in the wider world. Underpinning all lessons will be a rigorous focus on developing and securing DT skills whilst also ensuring sound progression of technical knowledge and sequenced understanding of key concepts. Our core aims are:

- **To be inspired to be inquisitive and curious designers,** who can ask, answer, analyse and draw contrasts about different products.
- **To have their beliefs challenged and be critical and reflective designers** who are able to discuss and talk about strengths and weakness in their own and others' work.
- **To achieve excellent standards in DT,** by applying a range practical skills to create products for a range of users and purposes and using a rich subject-specific language to discuss their work.

## How will the curriculum be delivered? The implementation.

As per our teaching and learning policy, the approach taken with all subjects is to ensure that memory is strengthened at all opportunities. As Kirschner, Sweller and Clarke (2006) stated: "Learning is a change in the long term memory. If nothing has been changed in the long term memory then nothing has been learned."

**How do we ensure this in DT?**

Our curriculum is underpinned by the National Curriculum and has been mapped to be progressive and build on prior learning. Through the use of high quality resources, children will be given the opportunity to explore designing and making linked to real world contexts.

All teaching of DT should follow the design, make and evaluate cycle, with well-planned sequences of lessons immersing the children in the design and making process, from analysing the existing products, through to evaluating the finished version made by the children.

We work on the principle that all learners, with effort and excellent teaching, will meet expectations. Where possible and appropriate, links are made with other subjects and our wider curriculum themes and Christian values, encouraging deeper thinking and reflection. Our drivers – critical thinking, communication and challenge – are also woven through our DT provision.

The exact skills and technical knowledge to be learnt is set out for staff in detailed medium term plans, which are based on the 'Projects on a Page scheme' from the D and T association.

## Curriculum Review (Impact):

The teaching of the use of tools, cooking equipment and sewing equipment is progressive, building year on year, ensuring that by the end of Key Stage 2, pupils have a full range of skills and understand how to use equipment safely. Their application of their new technical knowledge and skills is assessed through the product that pupils design and make as part of each unit of work. The impact of our DT curriculum is also reviewed through lesson drop-ins and pupil discussions.

# Curriculum Progressions

| Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| Mechanisms (moving parts)<br><br>Structures (combining materials)<br><br>Food (following recipes) | Mechanisms (sliders and levers)<br><br>Structures (freestanding structures)<br><br>Food (preparing fruit and vegetables) | Mechanisms (wheels and axles) – toy car<br><br>Food (preparing fruit and vegetables)<br><br>Textiles (templates and joining) | Structures (shell structures)<br><br>Food (healthy and varied diet)<br><br>Textiles (2D shapes to 3D product) | Mechanical systems (levers and linkages)<br><br>Electrical systems (simple circuits and switches)<br><br>Food (healthy and varied diet) | Structures (frame structures)<br><br>Food (celebrating culture and seasonality)<br><br>Textiles (combining different shapes) | Electrical systems (complex circuits and switches)<br><br>Food (celebrating culture and seasonality)<br><br>Mechanical systems (pulleys or cams) |

| | | EYFS | Key Stage 1 | Key Stage 2 |
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| Designing | Understanding contexts, users and purposes | Through a combination of child-initiated and adult directed activities pupils should have the chance to:<br>• explore the textures, movement, feel and look of different materials<br>• respond to a range of media and materials developing an understanding that thy can manipulate and create effects with these<br>• use different media and materials to express their own ideas<br>• construct with a purpose in mind using a variety of resources<br>• develop skills to use simple tools and techniques competently and appropriately<br>• talk about their design ideas and what they are making<br>• think about alternative ways of doing something<br>• use existing products to compare/influence designs | Across KS1 pupils should:<br>• work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry 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 products will work<br>• say how they will make their products suitable for their intended users<br>• -use simple design criteria to help develop their ideas | Across 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><br>In early KS2 pupils should also:<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<br><br>In late KS2 pupils should also:<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 |
| | Generating, developing, modelling and communicating ideas | | Across KS1 pupils should:<br>• generate ideas by drawing on their own experiences<br>• use knowledge of existing products 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 information and communication technology, where appropriate, to develop and communicate their ideas | Across KS2 pupils should:<br>• share and clarify ideas through discussion<br>• model their ideas using prototypes and pattern pieces<br>• use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas<br>• use computer-aided design to develop and communicate their ideas<br><br>In early KS2 pupils should also:<br>• generate realistic ideas, focusing on the needs of the user<br>• make design decisions that take account of the availability of resources<br><br>In late KS2 pupils should also:<br>• generate innovative ideas, drawing on research<br>• make design decisions, taking account of constraints such as time, resources and cost |

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| Making | Planning | | Across KS1 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 | Across KS2 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><br>In early KS2 pupils should also:<br>• order the main stages of making<br><br>In late KS2 pupils should also:<br>• produce appropriate lists of tools, equipment and materials that they need<br>• formulate step-by-step plans as a guide to making |
| | Practical skills and techniques | | Across KS1 pupils should:<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 | Across KS2 pupils should:<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><br>In early KS2 pupils should also:<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<br><br>In late KS2 pupils should also:<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 |
| Evaluating | Own ideas and products | | Across KS1 pupils should:<br>• talk about their design ideas 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 | Across KS2 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><br>In early KS2 pupils should also:<br>• refer to their design criteria as they design and make<br>• use their design criteria to evaluate their completed products<br><br>In late KS2 pupils should also:<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 |
| | Existing products | | Across KS1 pupils should explore:<br>• what products are<br>• who products are for<br>• what products are for<br>• how products work<br>• how products are used<br>• where products might be used<br>• what materials products are made from<br>• what they like and dislike about products | Across KS2 pupils should 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 user needs and wants<br><br>In early KS2 pupils should also investigate and analyse:<br>• who designed and made the products<br>• where products were designed and made<br>• when products were designed and made<br>• whether products can be recycled or reused<br><br>In late KS2 pupils should also investigate and analyse:<br>• how much products cost to make |

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| | | | | • how innovative products are<br>• how sustainable the materials in products are<br>• what impact products have beyond their intended purpose |
| | Key events and individuals | | x | Across KS2 pupils should know:<br>• about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products |
| Technical knowledge | Making products work | | Across KS1 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 3-D textiles product can be assembled from two identical fabric shapes<br>• that food ingredients should be combined according to their sensory characteristics<br>• the correct technical vocabulary for the projects they are undertaking | Across KS2 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>In early KS2 pupils should also know:<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, stiff 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 and processed<br>In late KS2 pupils should also know:<br>• how mechanical systems such as cams or pulleys or 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 |
| Cooking and nutrition | Where food comes from | | Across KS1 pupils should know:<br>• that all food comes from plants or animals<br>• that food has to be farmed, grown elsewhere (e.g.home) or caught | Across KS2 pupils should know:<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>In late KS2 pupils should also know:<br>• that seasons may affect the food available<br>• how food is processed into ingredients that can be eaten or used in cooking |
| | Food preparation, cooking and nutrition | | Across KS1 pupils should know:<br>• how to name and sort foods into the five groups in The eatwell plate<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 | Across KS2 pupils should know:<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, spreading, kneading and baking<br>In early KS2 pupils should also know:<br>• that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The eatwell plate<br>• that to be active and healthy, food and drink are needed to provide energy for the body<br>In late KS2 pupils should also know:<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 |

## Progression of our Key Concepts

| Structure and function | | | |
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| *In order to fulfil users' needs, wants and purposes products need to work and function effectively.* | | | |
| **End of EYFS** | **End of KS1** | **End of LKS2** | **End of UKS2** |
| • Explore objects and designs to identify likes and dislikes. | • Know how products have been created and how they work.<br>• Identify design decisions that have been made in existing products | • Disassemble products to understand how they work.<br>• Know how the materials and components they use assist the functionality of the product | • Distinguish between how well products are designed and how well they are made.<br>• Understand that the functionality of a product may depend on their accuracy and precision when using materials and components |

| Audience and purpose | | | |
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| Products are designed and made with an audience and purpose in mind. Products are designed to perform one or more defined tasks and are evaluated by their intended user against this. The purpose of a product is fulfilled when it meets a range of requirements, including technical, functional and aesthetic qualities. | | | |
| **End of EYFS** | **End of KS1** | **End of LKS2** | **End of UKS2** |
| • Construct with purpose in mind, using a variety of resources. | • Understand designs serve a user and so must fit what they need (and applies this so as to make useful, workable products that are appealing to others. | • Understand the concept of 'fit for purpose'.<br>• Know that a design brief can be used to identify and | • Identify whether their own and existing products have an impact beyond their intended purpose.<br>• Evaluate the design of products so as to suggest improvements to the user experience. |

| Design and innovation | | | |
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| *Design is the initial stage in the creation of a product where ideas are captured through notes and diagrams. Designers often produce several different versions of a design before beginning construction of a prototype. Innovation occurs as design, ideas, prototypes and products evolve based on identified strengths and weaknesses and in response to consumer and customer need.* | | | |
| **End of EYFS** | **End of KS1** | **End of LKS2** | **End of UKS2** |
| • Represent and communicate ideas by drawing them. | • Design products that have a clear purpose based on a design criteria. | • Improve upon existing designs, giving reasons for choices. | • Generate, develop, model and communicate their ideas through discussion, |

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| • Select appropriate resources and adapt work where necessary. | • Suggest improvements to existing designs.<br>• Understands that designs use pictures and ideas to suggest solutions to problems before building them. | • When planning, explain their choice of materials and components according to function and aesthetic.<br>• Know about inventors, designers, engineers, chefs and manufacturers who have developed ground -breaking products. | annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces.<br>• Plan the order of their work, choosing appropriate materials, tools and techniques and suggest alternative methods of making if the first attempts fail.<br>• Understand how the work of individuals in design and technology has helped shape the world. |