# The STM Design & Technology Curriculum

| National Curriculum aims & purpose: | Curriculum Design and Intent |
|---|---|
| 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. 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.<br><br>Aims:<br>• Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate in an increasingly technological world<br>• 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<br>• Critique, evaluate and test their ideas and products and the work of others<br>• Understand the principles of nutrition and learn to cook. | At St Thomas More, we want our children to become confident, independent problem solvers, who view challenges with curiosity and a 'what about trying…' mindset - both at school and in their wider life beyond.<br><br>When presented with practical problems, our children will be able to combine their skills and prior knowledge to come up with a range of possible solutions, and then use their experience and understanding to focus in on what they consider to be the best design choice. They will have the practical and technical skills needed to put that idea into practice - and the ability to overcome whatever barriers may present themselves on the way to a completed solution to their initial problem.<br><br>To that end, children in every class will be given opportunities to explore new materials, tools, mechanisms and designs, and will be encouraged to explore all of these to find both their potential and their limitations. Each unit of work will have a clear, practical goal as its outcome, accompanied by design criteria against which finished products can be tested and evaluated. Our children will also learn how to use these materials and tools safely and responsibly, and over time will begin to consider the impact that products (and material choices) can have on the wider world. |

| Links to learning in EYFS: | STM Connections Curriculum | STM Plus Curriculum |
|---|---|---|
| • Uses various construction materials, e.g. joining pieces, stacking vertically and horizontally, balancing, making enclosures and creating spaces<br>• Uses tools for a purpose<br>• Uses their increasing knowledge and understanding of tools and materials to explore their interests and enquiries and develop their thinking<br>• Develops their own ideas through experimentation with diverse materials, e.g. light, projected image, loose parts, watercolours, powder paint, to express and communicate their discoveries and understanding. | • Solving problems linked to materials or contexts being explored in science<br>• Measuring, estimating and interpreting scales, calculating costs or capacities links to maths<br>• Exploring foods from different cultures and festivals links to geography and RE topics<br>• Use of electrical systems or discussion of forces involved in movement ties in with science<br>• Large crossover with art skills when considering finish, choice of materials & product appearance<br>• 'Learning to use equipment safely and independently' elements have strong PSHE link | • Produce something of their own that makes them go, "Wow!"<br>• Have opportunities to use things they have made - recognising that their work really is purposeful and practical<br>• Take things to bits to find out how they're held together and how they work<br>• See something they have constructed move under its own power<br>• Use saws, hammers, hand drills and other 'grown-up' tools (and know how to use them safely)<br>• Build something bigger than them |

# D&T Long Term Plan

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| **Year 1** | | Food<br>**Sandwiches** | | Textiles<br>**Easter bonnet** | | Structures<br>**Houses** |
| **Year 2** | | Food<br>**Fruit Salad** | | Textiles<br>**Puppets** | | Mechanisms<br>**Vehicles** |
| **Year 3** | | Food<br>**Bread** | | Textiles<br>**Bags** | | Structures<br>**Packaging** |
| **Year 4** | | Food<br>**Savoury dish** | | Electrical<br>**Battery nightlight** | | Mechanisms<br>**Pop-up/lever books** |
| **Year 5** | | Food<br>**Soup** | | Textiles<br>**Clothing with recycled materials** | | Structures<br>**Electric moon buggy** |
| **Year 6** | | Food<br>**Seasonal meal** | | Electrical<br>**Remote-controlled product** | | Mechanisms<br>**Automata toys** |

| Year group | Structures | Mechanisms | Textiles | Food |
|---|---|---|---|---|
| Year 1 | Discuss what makes a building 'strong' (eg. with reference to houses built by 3 little pigs)<br><br>Select appropriate materials (which can be cut or shaped, eg. cardboard)<br><br>Use cutting, gluing, tying, taping to shape and join materials<br><br>Test models<br><br>Suggest ways they could be strengthened and improved | Explore and evaluate books and products with moving parts, including those with sliders and levers<br><br>Develop understanding of the way sliders and levers can create movement<br><br>& taping to shape and join materials<br><br>Use art & design techniques to create a finished product | Generate ideas for a product by drawing on their own experiences<br><br>Say how the product will suit its intended user<br><br>Cut, shape and join materials to make a product with a particular purpose (eg. a safety jacket or sun hat for a storybook character)<br><br>Say what they like and dislike about finished products | Know that all food comes from plants or animals<br><br>Talk about what foods we should eat to stay healthy<br><br>Practise stirring, mixing, pouring, blending<br><br>Discuss how to make an activity safe and hygienic (e.g. wash hands & clean surfaces)<br><br>Compare the taste and texture of different foods |
| Year 2 | Explore existing freestanding structures & identify features that make them strong<br><br>Generate design ideas for a given context (eg. chairs for story characters or pet cages)<br><br>Agree design criteria<br><br>Measure, mark-out, cut and shape materials<br><br>Select tools / methods for cutting, joining and assembling | Explore different vehicles - what is similar and different about them? Identify wheels, axles, chassis etc.<br><br>Build models from construction kits / materials (eg. Lego, Knex)<br><br>Explore ways of joining wheels to allow movement<br><br>Build models and suggest ways they could be tested out | Design a functional, appealing product for a chosen user<br><br>Use templates to mark-out materials for cutting<br><br>Choose materials based on their functional and aesthetic properties<br><br>Thread a needle using a needle threader<br><br>Join fabrics using a running stitch (eg. to make a puppet)<br><br>Tie knots in thread<br><br>Suggest how products could be improved | Know that food can be farmed, grown elsewhere (eg. at home) or caught<br><br>Use home-grown ingredients in cooking (eg. tomatoes, beans, strawberries)<br><br>Name and sort foods into the five groups shown in the Eatwell Guide<br><br>Prepare fruit and vegetables for eating (without using a heat source)<br><br>Use cutting, peeling and grating to prepare ingredients<br><br>Evaluate through taste-testing |

| Year group | Structures | Mechanisms | Electrical Systems | Textiles | Food |
|---|---|---|---|---|---|
| Year 3 | Investigate and evaluate shell structures (boxes, packaging, nets of shapes etc)<br><br>Develop practical ideas to solve a real-world problem (eg. packaging foods / toys)<br><br>Select materials and tools appropriate to the task<br><br>Measure, shape, cut, make holes and join materials with some accuracy<br><br>Begin to make strong structures<br><br>Continue working on product even if the original didn't work<br><br>Use art and design skills to finish the product attractively | Investigate the use of pneumatics to create movement<br><br>Have a purpose in mind when designing a product<br><br>Measure, shape, cut and join materials with some accuracy<br><br>Alter product after checking, to make it better | Use a simple circuit in product<br><br>Begin to know how to use electricity safely<br><br>Learn about how to program computer to control a product | Develop ideas for a real-world design problem (eg. money containers or shopping bags) by gathering information on the wants and needs of users<br><br>Share and model ideas using sketches and diagrams<br><br>Justify choice of materials<br><br>Measure, shape, cut and join materials with some accuracy<br><br>Develop skills in stitching (running stitch and whip stitch)<br><br>Begin to thread a needle independently<br><br>Name the tools and materials they have used<br><br>Sew on buttons, handles, tags etc to finish the product<br><br>Evaluate and suggest how products could be improved | Begin to understand food comes from UK and wider world<br><br>Know a range of appropriate ingredients, and whether they are grown, reared or caught<br><br>Explain what constitutes a healthy diet and how food and drink are needed for active and healthy bodies<br><br>Generate ideas and plan a dish for a specific purpose<br><br>Make breads using kneading and baking, and compare different breads from around the world<br><br>Prepare and cook some dishes safely and hygienically<br><br>Make product look attractive<br><br>Evaluate through taste-testing and user feedback |

| | | | | | |
|---|---|---|---|---|---|
| **Year 4** | Create models to further understanding in other areas of the curriculum (eg. 3d models of river systems)<br><br>Use annotated sketches to develop and share ideas<br><br>Select materials based on their properties and availability<br><br>Use a wider range of techniques to shape and join materials accurately<br><br>Attempt to make product strong | Investigate the use of levers and linkages to create more complex movement (eg. in pop-up books or greetings cards)<br><br>Explore the effect of fixed and loose pivots on movement<br><br>Develop design ideas linked to a specific purpose<br><br>Use a wider range of techniques to shape and join materials (eg. saws, glue guns)<br><br>Identify strengths and areas for improvement in products | Examine and disassemble a simple battery-powered product, identifying key parts of the electrical circuit<br><br>Know how to use electricity safely<br><br>Design and make a battery powered product (eg. a night light or torch)<br><br>Use number of components in a circuit<br><br>Use a switch in a circuit<br><br>Evaluate using design criteria<br><br>Program a computer to control product | Analyse items of clothing using annotated sketches<br><br>Identify design features & develop design criteria<br><br>Use measurement and pattern pieces to create clothing.<br><br>Match the tool to the material<br><br>Develop skills in stitching (running stitch, whip stitch and cross stitch)<br><br>Evaluate finished pieces using agreed design criteria | Begin to understand about food being grown, reared or caught in the UK or wider world<br><br>Understand ingredients can be fresh, pre-cooked or processed<br><br>Know that, to be active and healthy, food and drink are needed to provide energy for the body<br><br>Prepare savoury dishes using peeling, chopping, slicing, grating and mixing<br><br>Recognise the steps needed to prepare food safely and hygienically<br><br>Think about presenting product in interesting/ attractive ways<br><br>Plan, carry out and record evaluations of food produced |
| **Year group** | **Structures** | **Mechanisms** | **Electrical Systems** | **Textiles** | **Food** |

| | | | | | |
|---|---|---|---|---|---|
| **Year 5** | Combine solid structures with mechanical systems to create movement (eg. electric cars)<br><br>Use cross-sectional drawings and exploded diagrams to develop and share ideas<br><br>Accurately measure, saw and sand wood and plastic for use in construction<br><br>Select materials carefully, considering intended use of product and appearance<br><br>Begin to reinforce and strengthen a 3D frame<br><br>Ensure product is strong and fit for purpose<br><br>Test, evaluate and improve prototypes before producing final products | Begin to use cams, pulleys or gears to create movement (construction kits)<br><br>Model ideas using diagrams, sketches and prototypes<br><br>Refine product after testing | Confidently use number of components in circuit<br><br>Explore and make different types of simple switches<br><br>Begin to be able to program a computer to monitor changes in environment and control a product | Explore the concept of sustainability and the long-term impact of products, specifically clothing.<br><br>Carry out research, using surveys, interviews and questionnaires<br><br>Use measurement and pattern pieces to create clothing fitted to a specific user.<br><br>Generate innovate ideas using recycled materials.<br><br>Accurately measure, mark, join and assemble materials<br><br>Develop skills in stitching (running stitch, whip stitch, cross stitch, back stitch)<br><br>Use different grades and uses of threads and needles<br><br>Justify design decisions | Understand food can be grown, reared or caught in the UK and the wider world<br><br>Know that seasons may affect the food that is available<br><br>Identify the different substances (nutrients, vitamins, fibre, protein etc) that are needed for health<br><br>Write a step-by-step recipe, including ingredients and equipment needed<br><br>Use boiling and simmering to cook food (eg. making soups)<br><br>Explain how to be safe and hygienic<br><br>Present product well - interesting, attractive, fit for purpose<br><br>Evaluate an describe how recipes can be adapted to change appearance, taste, texture, aroma |

| | | | | | |
|---|---|---|---|---|---|
| **Year 6** | Produce a large-scale construction (eg. bird hide, bombshelter etc)<br><br>Investigate and analyse existing / historical products based on sustainability, innovation and cost<br><br>Generate innovative ideas, based on research<br><br>Apply skills learnt across the key stage to construct, test evaluate and refine product | Use cams, pulleys and gears to create movement<br><br>Incorporate hydraulics and pneumatics<br><br>Design a product including a cam mechanism (eg. a moving toy), taking into consideration the needs, wants and preferences of users<br><br>Model ideas using diagrams, sketches and prototypes<br><br>Refine product after testing, considering aesthetics, functionality and purpose<br><br>Apply skills learnt across the key stage to construct, test evaluate and refine product | Develop a design for a functional product that responds automatically to changes in the environment (eg. security alarm or lights)<br><br>Think of ways in which adding a circuit would improve a product<br><br>Use different types of circuit in the product<br><br>Apply computing skills to program, monitor and control a product<br><br>Test and evaluate the system to demonstrate its effectiveness<br><br>Learn about famous inventors | Disassemble a real-world textile item (eg. slippers) & use exploded diagrams to identify how it is constructed, materials used etc<br><br>Separate design criteria into functional and aesthetic<br><br>Design product for a specific user, considering their needs<br><br>Develop skills in stitching (running stitch, whip stitch, cross stitch, back stitch, blanket stitch)<br><br>Apply skills learnt across the key stage to construct, test evaluate and refine product | Name some types of food that are grown, reared or caught in the UK or wider world<br><br>Understand the environmental impact of food decisions (eg. 'air miles' on out of season fruits and vegetables)<br><br>Describe some of the different substances in food and drink, and how they can affect health<br><br>Plan a meal for a specific occasion / festival, taking into account the needs and expectations of those who will eat it<br><br>Adapt recipes to change appearance, taste, texture or aroma.<br><br>Prepare this meal using a wide range of skills (peeling, chopping, slicing, grating, mixing, spreading, kneading and baking)<br><br>Explain how to be safe and hygienic and follow own guidelines<br><br>Present the meal and evaluate |