



St George and St Teresa Catholic Primary School

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Progression of Skills and Knowledge

Design and Technology

National Curriculum Aims and Purpose	School Aims and Intent: Skills, attitudes and knowledge that we want all children to develop on their journey through our school
<p>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.</p> <p>Aims: Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world</p> <ul style="list-style-type: none"> • 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 • critique, evaluate and test their ideas and products and the work of others • understand and apply the principles of nutrition and learn how to cook. 	<p>Through the teaching of design and technology at St George and St Teresa, we aim to inspire, challenge and provide pupils with many opportunities to be creative and imaginative. We deliver a broad, balanced and exciting curriculum that strives to ensure that all children achieve the highest possible attainment.</p> <p>Our children learn how to manage and control risks, work safely with a variety of tools and materials, become resourceful, innovative, enterprising and capable citizens. By taking part in an inspiring, exciting and practical subject, the children will use their creativity, imagination and social interaction skills to design and make products that solve real and relevant problems in a variety of contexts – understanding the processes involved from planning through making to evaluation and refinement.</p> <p>During the teaching of design and technology, a wide range of new skills will be acquired and the knowledge of other subjects, such as mathematics, science, engineering, I.C.T. and art, will be drawn upon and applied. Children will also develop the life skills and knowledge associated with healthy living, food nutrition and cookery. Through the evaluation of past and present design and technology, the children will develop a critical understanding of its impact on daily life and the wider world; gaining an appreciation that it is an on-going cycle of evaluation and re-invention.</p>



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	Links to other curriculum areas	Experiences every child should have
	<ul style="list-style-type: none"> • Solve problems linked to materials or contexts being explored in science • Measuring, estimating and interpreting scales, calculating costs or capacities links to maths • Exploring foods from different cultures and festivals links to geography and RE topics • Use of electrical systems or discussion of forces involved in movement ties in with science • Large crossover with art skills when considering finish, choice of materials and product appearance • 'Learning to use equipment safely and independently' elements have strong PSHE link 	<ul style="list-style-type: none"> • Produce something of their own that makes them go, "Wow!" • Have opportunities to use things they have made - recognising that their work really is purposeful and practical • Take things to bits to find out how they're held together and how they work • See something they have constructed move under its own power • Use cooking equipment such as graters, knives, peelers, tools such as saws, hammers, hand drills and other 'grown-up' equipment (and know how to use them safely)
	<p>Learning, spiritual, moral, social, vocational and cultural development: Design and Technology</p>	



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Opportunities to develop Catholic Social teaching, Catholic School Pupil Profile Virtues and British Values

	Opportunities to develop Catholic Social teaching, Catholic School Pupil Profile Virtues and British Values		
	<p>Catholic Social Teaching:</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> • Dignity of the human person • All made in the image and likeness of God. Appreciate others for their developing skills and talents • Family and community • Solidarity and the common good • Designing products that will support others in living healthier lives and gaining knowledge about living more sustainably • Dignity of work and rights of workers • Rights and responsibilities • An option for the poor and vulnerable • Stewardship of God's creation • A respect for God's creation in all that they do. 	<p>Catholic School Pupil Profile:</p> <p>Including, but not limited to:</p> <p>Grateful for their own gifts, for the gift of other people, and for the blessings of each day; and generous with their gifts, becoming men and women for others.</p> <p>Using and developing their God-given talents to the best of their ability.</p> <p>Attentive to their experience and to their vocation; and discerning about the choices they make and the effects of those choices.</p> <p>Compassionate towards others, near and far, especially the less fortunate; and loving by their just actions and forgiving words.</p> <p>When working collaboratively with others show care and compassion for and being mindful of their feelings.</p> <p>Faith-filled in their beliefs and hopeful for the future.</p> <p>Eloquent and truthful in what they say of themselves, the relations between people, and the world.</p> <p>Learned, finding God in all things; and wise in the ways they use their learning for the common good.</p>	<p>British Values:</p> <p>Including, but not limited to:</p> <ul style="list-style-type: none"> • Democracy <p>Understanding the need for different roles and responsibilities such as collaborative work and decision-making.</p> <ul style="list-style-type: none"> • The rule of law <p>Knowing rules about safety and respect.</p> <ul style="list-style-type: none"> • Individual liberty <p>Recognising the opportunity for them and others to express themselves in a supportive environment.</p> <p>An ethos where the views of individuals are listened to and respected.</p> <ul style="list-style-type: none"> • Mutual respect for and tolerance of those with different faiths and beliefs, and for those without faith <p>Positive behaviour is encouraged and rewarded.</p>



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		<p>Curious about everything; and active in their engagement with the world, changing what they can for the better.</p> <p>Curious to learn about how to develop products that will solve 'real life' problems.</p> <p>Intentional in the way they live and use the resources of the earth, guided by conscience; and prophetic in the example they set to others.</p>	
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Opportunities to develop and use Building Learning Power in our curriculum

Reciprocity



- Presenting and sharing work with others
- Working in teams to complete complex tasks that could not be accomplished independently
- Imitating the work and design of others - both peers and 'real world' designers and inventors
- Sharing resources, ingredients and tools
- Exploring textiles, foods and festivals from other cultures and treating these with respect
- Considering the needs, wants and preferences of others when designing

Resourcefulness



- Knowing when it's appropriate to learn on your own or with others
- Developing imaginative and innovative solutions to problems
- Selecting tools, materials and equipment, and justify choices
- Considering how to use materials, equipment and electricity safely and responsibly
- Understanding how to cook safely and hygienically
- Learning skills needed by independent adults (eg. cooking a range of meals, sewing on buttons, making simple repairs)

Reflectiveness



- Breaking complex problems down into small steps and developing logical thinking
- Investigating machines and mechanisms
- Taking things apart to find out how they work
- Evaluating products at several stages during the design and assembly process, and looking to continually revise and improve
- Developing own design criteria and ways in which these can be tested
- Using findings from enquiries, investigations, discussion or product analysis to draw conclusions
- Taking feedback from others and using this to make improvements to a design

Resilience



- Setting ambitious goals for a task - What can we do that will make this better? Can we come up with a more innovative, interesting solution to this problem?
- Showing commitment to finding out answers and solving problems
- Maintaining attention on a long-term project (eg. designing, shaping, assembling and testing over the course of several weeks)
- Coping with setbacks and demonstrate resourcefulness when tackling practical problems

Skills and Knowledge Progression in Design and Technology at St George and St Teresa Catholic Primary School

Year group	Communication and language	Physical development	Personal, social and emotional development	Expressive Arts and Design
Nursery	<ul style="list-style-type: none"> • Develop opportunities for pupils to explore and talk about simple products • Use talk to organise themselves and plan what they will make • Say what they like and dislike about their model. (Be able to express a point of view and debate when they disagree). 	<ul style="list-style-type: none"> • Explore simple tools within practical tasks and experiment with joining materials • Make simple structures with support from an adult using a range of materials • Skills: Begin to use a range of tools with adult support, safely and with increasing confidence – pencils, scissors, paintbrushes and glue spreaders • Use one handed tools such as a hole punch or scissors for example to: make snips in paper with scissors. • Choose the right resources to carry out their own plans. • Name and explore a range of everyday products and explore how things work 	<ul style="list-style-type: none"> • Select and use activities and resources, with help when needed – To achieve a goal. • Remember safety rules without needing an adult to remind them. (e.g. safe handling of scissors) • Make healthy choice about food and <i>drink</i> (Explore and try a range of foods and suggest where they come from.) • Help prepare a healthy snack 	<ul style="list-style-type: none"> • Explore different materials freely, to develop their ideas about how to use them and what to make • Create closed shapes with continuous lines and begin to these to represent objects • Join different materials and explore different textures • Develop their own ideas and decide which materials to represent them

	<p>Reception</p>	<ul style="list-style-type: none"> • Articulate their thoughts and ideas in well-formed sentences • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Clarify ideas for designs through discussion saying what they might do 'first' and 'next' 	<ul style="list-style-type: none"> • Skills: to use a range of tools competently, safely and confidently – pencils, scissors, paintbrushes and glue spreaders (making snips in thin card and cutting a simple shape out) • Begin to use a sellotape dispenser independently • Manipulate materials to achieve a planned effect 	<ul style="list-style-type: none"> • Demonstrate main features of familiar products, pupils observe, handle and discuss. • Show resilience and perseverance in the face of challenge • Follow rules and instructions to keep safe • Know and talk about the different factors that support their overall health and wellbeing – healthy eating 	<ul style="list-style-type: none"> • Create collaboratively, sharing ideas, resources and skills to make products inspired by existing products, stories or their own ideas, interests or experiences. • Draw a plan/picture showing outline shapes and use of colour • Return to and build on their previous learning, refining ideas and developing their ability to represent them
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	Structures		
	Design	Make	Evaluate
Year 1	<ul style="list-style-type: none"> Learning the importance of a clear design criteria Including individual preferences and requirements in a design 	<ul style="list-style-type: none"> Making stable structures from card, tape and glue Learning how to turn 2D nets into 3D structures Following instructions to cut and assemble the supporting structure Making functioning turbines and axles which are assembled into a main supporting structure 	<ul style="list-style-type: none"> Evaluating a structure according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't Suggest points for improvements
Year 2	<ul style="list-style-type: none"> Generating and communicating ideas using sketching and modelling 	<ul style="list-style-type: none"> Making a structure according to design criteria Creating joints and structures from paper/card and tape Building a strong and stiff structure by folding paper 	<ul style="list-style-type: none"> Testing the strength of own structures Identifying the weakest part of a structure Evaluating the strength, stiffness and stability of own structure
Year 3	<ul style="list-style-type: none"> Designing a structure with key features to appeal to a specific person/purpose Drawing and labelling a structure design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours Designing and/or decorating a structure on CAD software 	<ul style="list-style-type: none"> Constructing a range of 3D geometric shapes using nets Creating special features for individual designs Making facades from a range of recycled materials 	<ul style="list-style-type: none"> Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design Suggesting points for modification of the individual designs
Year 4	<ul style="list-style-type: none"> Designing a stable structure that is aesthetically pleasing and selecting materials to create a desired effect Building frame structures designed to support weight 	<ul style="list-style-type: none"> Creating a range of different shaped frame structures Making a variety of free standing frame structures of different shapes and sizes Selecting appropriate materials to build a strong structure and for the cladding Reinforcing corners to strengthen a structure Creating a design in accordance with a plan Learning to create different textural effects with materials 	<ul style="list-style-type: none"> Evaluating structures made by the class Describing what characteristics of a design and construction made it the most effective Considering effective and ineffective designs

<p>Year 5</p>	<ul style="list-style-type: none"> • Designing a stable structure that is able to support weight • Creating frame structure with focus on triangulation 	<ul style="list-style-type: none"> • Making a range of different shaped structures • Using triangles to create truss structures that span a given distance and supports a load • Building a wooden bridge structure • Independently measuring and marking wood accurately • Selecting appropriate tools and equipment for particular tasks • Using the correct techniques to saw safely • Identifying where a structure needs reinforcement and using card corners for support • Explaining why selecting appropriating materials is an important part of the design process • Understanding basic wood functional properties 	<ul style="list-style-type: none"> • Adapting and improving own bridge by identifying points of weakness and reinforcing them as necessary • Suggesting points for improvements for own bridges and those designed by others
<p>Year 6</p>	<ul style="list-style-type: none"> • Designing a structure featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs 	<ul style="list-style-type: none"> • Building a range of structures drawing upon new and prior knowledge of structures • Measuring, marking and cutting wood to create a range of structures • Using a range of materials to reinforce and add decoration to structures 	<ul style="list-style-type: none"> • Improving a design plan based on peer evaluation • Testing and adapting a design to improve it as it is developed • Identifying what makes a successful structure

Mechanisms / Mechanical systems			
	Design	Make	Evaluate
Year 1	<ul style="list-style-type: none"> Explaining how to adapt mechanisms, using bridges or guides to control the movement Designing a moving mechanism for a given audience 	<ul style="list-style-type: none"> Following a design to create moving models that use levers and sliders Adapting mechanisms 	<ul style="list-style-type: none"> Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move
2 units	<ul style="list-style-type: none"> Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move Creating clearly labelled drawings which illustrate movement 		
Year 2	<ul style="list-style-type: none"> Selecting a suitable linkage system to produce the desired motions Designing a wheel Selecting appropriate materials based on their properties 	<ul style="list-style-type: none"> Selecting materials according to their characteristics Following a design brief Making linkages using card for levers and split pins for pivots Experimenting with linkages adjusting the widths, lengths and thicknesses of card used Cutting and assembling components neatly 	<ul style="list-style-type: none"> Evaluating different designs Testing and adapting a design Evaluating own designs against design criteria Using peer feedback to modify a final design
2 units	<ul style="list-style-type: none"> Creating a class design criterion for a mechanical system Designing a mechanical system for a specific audience in accordance with a design criteria 		
Year 3	<ul style="list-style-type: none"> Designing a toy which uses a pneumatic system Developing design criteria from a design brief Generating ideas using thumbnail sketches and exploded diagrams Learning that different types of drawings are used in design to explain ideas clearly 	<ul style="list-style-type: none"> Creating a pneumatic system to create a desired motion Building secure housing for a pneumatic system Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy Selecting materials due to their functional and aesthetic characteristics 	<ul style="list-style-type: none"> Using the views of others to improve designs Testing and modifying the outcome, suggesting improvements Understanding the purpose of exploded-diagrams through the eyes of a designer and their client

		<ul style="list-style-type: none"> Manipulating materials to create different effects by cutting, creasing, folding, weaving 	
Year 4	<ul style="list-style-type: none"> Designing a shape that reduces air resistance Drawing a net to create a structure from Choosing shapes that increase or decrease speed as a result of air resistance Personalising a design 	<ul style="list-style-type: none"> Measuring, marking, cutting and assembling with increasing accuracy Making a model based on a chosen design 	<ul style="list-style-type: none"> Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance
Year 5	<ul style="list-style-type: none"> Designing a pop-up book which uses a mixture of structures and mechanisms Naming each mechanism, input and output accurately Storyboarding ideas for a book 	<ul style="list-style-type: none"> Following a design brief to make a pop-up book, neatly and with focus on accuracy Making mechanisms and/or structures using sliders, pivots and folds to produce movement Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result 	
Year 6	<ul style="list-style-type: none"> Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement Understanding how linkages change the direction of a force Making things move at the same time Understanding and drawing cross-sectional diagrams to show the inner-working 	<ul style="list-style-type: none"> Measuring, marking and checking the accuracy of the straw and dowel pieces required Measuring, marking and cutting components accurately using a ruler and scissors Assembling components accurately to make a stable frame Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set 	<ul style="list-style-type: none"> Evaluating the work of others and receiving feedback on own work Applying points of improvements Describing changes they would make/do if they were to do the project again

Electrical systems – KS2 only			
	Design	Make	Evaluate
Year 3	<ul style="list-style-type: none"> N/A Condensed long term plan does not include an electrical systems unit 		
Year 4	<ul style="list-style-type: none"> Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas 	<ul style="list-style-type: none"> Making a torch with a working electrical circuit and switch Using appropriate equipment to cut and attach materials Assembling a torch according to the design and success criteria 	<ul style="list-style-type: none"> Testing and evaluating the success of a final product and taking inspiration from the w
Year 5	<ul style="list-style-type: none"> Designing an electronic greetings card with a copper track circuit and components Creating a labelled circuit diagram showing positive and negative parts in relation to the LED and the battery Writing design criteria for an electronic greeting card Compiling a moodboard relevant to my chosen theme, purpose and recipient 	<ul style="list-style-type: none"> Making a functional series circuit Creating an electronics greeting card, referring to a design criteria Mapping out where different components of the circuit will go 	<ul style="list-style-type: none"> Evaluating a peer's product against design criteria and suggesting modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of circuit component
Year 6	<ul style="list-style-type: none"> Designing a steady hand game - identifying and naming the components required Drawing a design from three different perspectives Generating ideas through sketching and discussion Modelling ideas through prototypes 	<ul style="list-style-type: none"> Constructing a stable base for a game Accurately cutting, folding and assembling a net Decorating the base of the game to a high quality finish Making and testing a circuit Incorporating a circuit into a base 	<ul style="list-style-type: none"> Testing own and others finished games, identifying what went well and making suggestions for improvement

Cooking and Nutrition			
	Design	Make	Evaluate
Year 1	<ul style="list-style-type: none"> Designing smoothie carton packaging by-hand or on ICT software 	<ul style="list-style-type: none"> Chopping fruit and vegetables safely to make a smoothie Identifying if a food is a fruit or a vegetable Learning where and how fruits and vegetables grow 	<ul style="list-style-type: none"> Tasting and evaluating different food combinations Describing appearance, smell and taste Suggesting information to be included on packaging
Year 2	<ul style="list-style-type: none"> Designing a healthy wrap based on a food combination which work well together 	<ul style="list-style-type: none"> Slicing food safely using the bridge or claw grip Constructing a wrap that meets a design brief 	<ul style="list-style-type: none"> Describing the taste, texture and smell of fruit and vegetables Taste testing food combinations and final products Describing the information that should be included on a label Evaluating which grip was most effective
Year 3	<ul style="list-style-type: none"> Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish 	<ul style="list-style-type: none"> Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination Following the instructions within a recipe 	<ul style="list-style-type: none"> Establishing and using design criteria to help test and review dishes Describing the benefits of seasonal fruits and vegetables and the impact on the environment Suggesting points for improvement when making a seasonal tart
Year 4	<ul style="list-style-type: none"> Designing a biscuit within a given budget, drawing upon previous taste testing 	<ul style="list-style-type: none"> Following a baking recipe Cooking safely, following basic hygiene rules Adapting a recipe 	<ul style="list-style-type: none"> Evaluating a recipe, considering: taste, smell, texture and appearance Describing the impact of the budget on the selection of ingredients Evaluating and comparing a range of products Suggesting modifications
Year 5	<ul style="list-style-type: none"> Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients Writing an amended method for a recipe to incorporate the relevant changes to ingredients 	<ul style="list-style-type: none"> Cutting and preparing vegetables safely Using equipment safely, including knives, hot pans and hobs Knowing how to avoid cross-contamination 	<ul style="list-style-type: none"> Identifying the nutritional differences between different products and recipes Identifying and describing healthy benefits of food groups



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	<ul style="list-style-type: none"> • Designing appealing packaging to reflect a recipe 	<ul style="list-style-type: none"> • Following a step by step method carefully to make a recipe 	
Year 6	<ul style="list-style-type: none"> • Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken 	<ul style="list-style-type: none"> • Following a recipe, including using the correct quantities of each ingredient • Adapting a recipe based on research • Working to a given timescale • Working safely and hygienically with independence 	<ul style="list-style-type: none"> • Evaluating a recipe, considering: taste, smell, texture and origin of the food group • Taste testing and scoring final products • Suggesting and writing up points of improvements in productions • Evaluating health and safety in production to minimise cross contamination

	Design	Textiles Make	Evaluate
Year 1	<ul style="list-style-type: none"> Using a template to create a design for a puppet 	<ul style="list-style-type: none"> Cutting fabric neatly with scissors Using joining methods to decorate a puppet Sequencing steps for construction 	<ul style="list-style-type: none"> Reflecting on a finished product, explaining likes and dislikes
Year 2	<ul style="list-style-type: none"> Designing a pouch 	<ul style="list-style-type: none"> Selecting and cutting fabrics for sewing Threading a needle Sewing running stitch, with evenly spaced, neat, even stitches to join fabric Neatly pinning and cutting fabric using a template 	<ul style="list-style-type: none"> Troubleshooting scenarios posed by teacher
Year 3	<ul style="list-style-type: none"> Designing and making a template from an existing cushion and applying individual design criteria 	<ul style="list-style-type: none"> Following design criteria to create a cushion Selecting and cutting fabrics with ease using fabric scissors Threading needles with greater independence Tying knots with greater independence Sewing cross stitch to join fabric Decorating fabric using appliqué Completing design ideas with stuffing and sewing the edges 	<ul style="list-style-type: none"> Evaluating an end product and thinking of other ways in which to create similar items
Year 4	<ul style="list-style-type: none"> Writing design criteria for a product, articulating decisions made Designing a personalised book sleeve 	<ul style="list-style-type: none"> Making and testing a paper template with accuracy and in keeping with the design criteria Measuring, marking and cutting fabric using a paper template Selecting a stitch style to join fabric, working neatly sewing small neat stitches Incorporating fastening to a design 	<ul style="list-style-type: none"> Testing and evaluating an end product against the original design criteria Deciding how many of the criteria should be met for the product to be considered successful Suggesting modifications for improvement Articulating the advantages and disadvantages of different fastening types
Year 5	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a textile unit 		
Year 6	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a textile unit 		

Year	Digital world– KS2 only		
	Design	Make	Evaluate
Year 3	<ul style="list-style-type: none"> Problem solving by suggesting potential features on a Micro: bit and justifying my ideas Developing design ideas for a technology pouch Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge 	<ul style="list-style-type: none"> Using a template when cutting and assembling the pouch Following a list of design requirements Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch Applying functional features such as using foam to create soft buttons 	<ul style="list-style-type: none"> Analysing and evaluating an existing product Identifying the key features of a pouch
Year 4	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a Digital world unit 		
Year 5	<ul style="list-style-type: none"> Researching (books, internet) for a particular (user's) animal's needs Developing design criteria based on research Generating multiple housing ideas using building bricks Understanding what a virtual model is and the pros and cons of traditional and CAD modelling Placing and manoeuvring 3D objects, using CAD Changing the properties of, or combine one or more 3D objects, using CAD 	<ul style="list-style-type: none"> Understanding the functional and aesthetic properties of plastics Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range 	<ul style="list-style-type: none"> Stating an event or fact from the last 100 years of plastic history Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices Explaining key functions in my program (audible alert, visuals) Explaining how my product would be useful for an animal carer including programmed features
Year 6	<ul style="list-style-type: none"> Writing a design brief from information submitted by a client Developing design criteria to fulfil the client's request Considering and suggesting additional functions for my navigation tool Developing a product idea through annotated sketches Placing and manoeuvring 3D objects, using CAD 	<ul style="list-style-type: none"> Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo) Explaining material choices and why they were chosen as part of a product concept Programming an N,E, S,W cardinal compass 	<ul style="list-style-type: none"> Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool Developing an awareness of sustainable design Identifying key industries that utilise 3D CAD modelling and explain why Describing how the product concept fits the client's request and how it will benefit the customers



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	<ul style="list-style-type: none">• Changing the properties of, or combine one or more 3D objects, using CAD		<ul style="list-style-type: none">• Explaining the key functions in my program, including any additions• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool• Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch• Demonstrating a functional program as part of a product concept
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Design and Technology Progression of Knowledge

Structures		
	Technical	Additional
Year 1	<ul style="list-style-type: none"> To understand that the shape of materials can be changed to improve the strength and stiffness of structures To understand that certain shapes are a strong type of structure (e.g. the main shape used for windmills and lighthouses are cylinders) To understand that axles are used in structures and mechanisms to make parts turn in a circle To begin to understand that different structures are used for different purposes To know that a structure is something that has been made and put together 	<ul style="list-style-type: none"> To know that a client is the person I am designing for To know that design criteria is a list of points to ensure the product meets the client's needs and wants To know the purpose of my product e.g. that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity To know how my product works e.g. that windmill turbines use wind to turn and make the machines inside work To know details about my product e.g. that a windmill is a structure with sails that are moved by the wind and that the three main parts of a windmill are the turbine, axle and structure
Year 2	<ul style="list-style-type: none"> To know that materials can be manipulated to improve strength and stiffness To know that a structure is something which has been formed or made from parts To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move To know that a 'strong' structure is one which does not break easily To know that a 'stiff' structure or material is one which does not bend easily 	<ul style="list-style-type: none">
Year 3	<ul style="list-style-type: none"> To understand that wide and flat based objects are more stable To understand the importance of strength and stiffness in structures 	<ul style="list-style-type: none"> To know the features of their structure e.g. for a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose To know that a façade is the front of a structure To understand that products need certain qualities e.g. a castle needed to be strong and stable to withstand enemy attack To know that a paper net is a flat 2D shape that can become a 3D shape once assembled

<p>Year 4</p>	<ul style="list-style-type: none"> • To understand what a frame structure is • To know that a 'free-standing' structure is one which can stand on its own 	<ul style="list-style-type: none"> • To know that a design specification is a list of success criteria for a product • To know about my product in some detail e.g. that a pavilion is a decorative building or structure for leisure activities • To know that cladding can be applied to structures for different effects. • To know that aesthetics are how a product looks • To know that a product's function means its purpose • To understand that the target audience means the person or group of people a product is designed for • To know that architects consider light, shadow and patterns when designing
<p>Year 5</p>	<ul style="list-style-type: none"> • To understand some different ways to reinforce structures • To understand how triangles can be used to reinforce structures such as bridges • To know that properties are words that describe the form and function of materials • To understand why material selection is important based on their properties • To understand the material (functional and aesthetic) properties of wood 	<ul style="list-style-type: none"> • To know that structures can be strengthened by manipulating materials and shapes
<p>Year 6</p>	<ul style="list-style-type: none"> • To know that structures can be strengthened by manipulating materials and shapes 	<ul style="list-style-type: none"> • To understand what a 'footprint plan' is • To understand that in the real world, design , can impact users in positive and negative ways • To know that a prototype is a cheap model to test a design idea

Mechanisms / Mechanical systems		
	Technical	Additional
Year 1	<ul style="list-style-type: none"> To know that a mechanism is the parts of an object that move together To know that a slider mechanism moves an object from side to side To know that a slider mechanism has a slider, slots, guides and an object To know that bridges and guides are bits of card that purposefully restrict the movement of the slider To know that wheels need to be round to rotate and move To understand that for a wheel to move it must be attached to a rotating axle To know that an axle moves within an axle holder which is fixed to the vehicle or toy To know that the frame of a vehicle (chassis) needs to be balanced 	<ul style="list-style-type: none"> To know that in Design and Technology we call a plan a 'design' To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles
Year 2	<ul style="list-style-type: none"> To know that different materials have different properties and are therefore suitable for different uses To know that mechanisms are a collection of moving parts that work together as a machine to produce movement To know that there is always an input and output in a mechanism To know that an input is the energy that is used to start something working To know that an output is the movement that happens as a result of the input To know that a lever is something that turns on a pivot To know that a linkage mechanism is made up of a series of levers 	<ul style="list-style-type: none"> To know the features of my product e.g. a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder To know that it is important to test my design as I go along so that I can solve any problems that may occur To know some real-life objects that contain mechanisms
Year 3	<ul style="list-style-type: none"> To understand how pneumatic systems work To understand that pneumatic systems can be used as part of a mechanism To know that pneumatic systems operate by drawing in, releasing and compressing air 	<ul style="list-style-type: none"> To understand how sketches, drawings and diagrams can be used to communicate design ideas To know that exploded-diagrams are used to show how different parts of a product fit together To know that thumbnail sketches are small drawings to get ideas down on paper quickly

Year 4	<ul style="list-style-type: none"> • To know that air resistance is the level of drag on an object as it is forced through the air • To understand that the shape of a moving object will affect how it moves due to air resistance 	<ul style="list-style-type: none"> • To know that aesthetics means how an object or product looks in design and technology • To know that a template is a stencil you can use to help you draw the same shape accurately • To know that a birds-eye view means a view from a high angle (as if a bird in flight) • To know that graphics are images which are designed to explain or advertise something • To know that it is important to assess and evaluate design ideas and models against a list of design criteria.
Year 5	<ul style="list-style-type: none"> • To know that mechanisms control movement • To understand that mechanisms that can be used to change one kind of motion into another • To understand how to use sliders, pivots and folds to create paper-based mechanisms 	<ul style="list-style-type: none"> •
Year 6	<ul style="list-style-type: none"> • To understand that the mechanism in an automaton uses a system of cams, axles and followers • To understand that different shaped cams produce different outputs 	<ul style="list-style-type: none"> • To know that an automaton is a hand powered mechanical toy • To know that a cross-sectional diagram shows the inner workings of a product • To understand how to use a bench hook and saw safely • To know that a set square can be used to help mark 90° angles

Electrical systems – KS2 only		
	Technical	Additional
Year 3	<ul style="list-style-type: none"> N/A Condensed long term plan does not include an electrical systems unit 	<ul style="list-style-type: none">
Year 4	<ul style="list-style-type: none"> To know that an electrical circuit must be complete for electricity to flow To know that a switch can be used to complete and break an electrical circuit 	<ul style="list-style-type: none"> To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison
Year 5	<ul style="list-style-type: none"> To know the key components used to create a functioning circuit To know that copper is a conductor and can be used as part of a circuit To understand that breaks in a circuit will stop it from working To understand that a series circuit only has one path for the electrical current to flow from positive to negative To know that we use symbols to represent components in a circuit diagram To know the names of the components in a basic series circuit: crocodile wires, LED (light-emitting diode), battery holder, battery, cell 	<ul style="list-style-type: none"> To know that product analysis is critiquing the strengths and weaknesses of a product To know that a moodboard may include words, sketches, textures, colours, material samples etc. and can act as inspiration when designing
Year 6	<ul style="list-style-type: none"> To know that batteries contain acid, which can be dangerous if they leak To know the names of the components in a basic series circuit including a buzzer 	<ul style="list-style-type: none"> To understand the diagram perspectives 'top view', 'side view' and 'back'

	Cooking and nutrition
	Cooking and nutrition
Year 1	<ul style="list-style-type: none"> • Understanding the difference between fruits and vegetables • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber) • To know that a blender is a machine which mixes ingredients together into a smooth liquid • To know that a fruit has seeds and a vegetable does not • To know that fruits grow on trees or vines • To know that vegetables can grow either above or below ground • To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber)
Year 2	<ul style="list-style-type: none"> • To know that 'diet' means the food and drink that a person or animal usually eats • To understand what makes a balanced diet • To know where to find the nutritional information on packaging • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group • To know that nutrients are substances in food that all living things need to make energy, grow and develop • To know that 'ingredients' means the items in a mixture or recipe • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'
Year 3	<ul style="list-style-type: none"> • To know that not all fruits and vegetables can be grown in the UK • To know that climate affects food growth • To know that vegetables and fruit grow in certain seasons • To know that cooking instructions are known as a 'recipe' • To know that imported food is food which has been brought into the country • To know that exported food is food which has been sent to another country. • To understand that imported foods travel from far away and this can negatively impact the environment • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health • To know safety rules for using, storing and cleaning a knife safely • To know that similar coloured fruits and vegetables often have similar nutritional benefits



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Year 4	<ul style="list-style-type: none">• To know that the amount of an ingredient in a recipe is known as the 'quantity'• To know that it is important to use oven gloves when removing hot food from an oven• To know the following cooking techniques: sieving, creaming, rubbing method, cooling• o understand the importance of budgeting while planning ingredients for biscuits
Year 5	<ul style="list-style-type: none">• To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues• To know that I can adapt a recipe to make it healthier by substituting ingredients• To know that I can use a nutritional calculator to see how healthy a food option is• To understand that 'cross-contamination' means that bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects
Year 6	<ul style="list-style-type: none">• To know that 'flavour' is how a food or drink tastes• To know that many countries have 'national dishes' which are recipes associated with that country• To know that 'processed food' means food that has been put through multiple changes in a factory• To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides• To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)

	Textiles
	Knowledge
Year 1	<ul style="list-style-type: none"> To know that 'joining technique' means connecting two pieces of material together To know that there are various temporary methods of joining fabric by using staples, glue or pins To understand that different techniques for joining materials can be used for different purposes To understand that a template (or fabric pattern) is used to cut out the same shape multiple times To know that drawing a design idea is useful to see how an idea will look
Year 2	<ul style="list-style-type: none"> To know that sewing is a method of joining fabric To know that different stitches can be used when sewing To understand the importance of tying a knot after sewing the final stitch To know that a thimble can be used to protect my fingers when sewing
Year 3	<ul style="list-style-type: none"> To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric To know that when two edges of fabric have been joined together it is called a seam To know that it is important to leave space on the fabric for the seam To understand that some products are turned inside out after sewing so the stitching is hidden
Year 4	<ul style="list-style-type: none"> To know that a fastening is something which holds two pieces of material together e.g. a zipper, toggle, button, press stud and velcro To know that different fastening types are useful for different purposes To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions
Year 5	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a Textiles unit
Year 6	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a Textiles unit

Digital world - KS2 only		
	Technical	Additional
Year 3	<ul style="list-style-type: none"> To understand that in programming a 'loop' is code that repeats something again and again until stopped To know that a Micro:bit is a pocket-sized, codeable computer Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm 	<ul style="list-style-type: none"> To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result To know that in Design and technology the term 'smart' means a programmed product To know the difference between analogue and digital technologies To understand what is meant by 'point of sale display' To know that CAD stands for Computer-aided design
Year 4	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a Digital world unit 	<ul style="list-style-type: none">
Year 5	<ul style="list-style-type: none"> To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met 	<ul style="list-style-type: none"> To understand key developments in thermometer history To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future To know the 6Rs of sustainability To understand what a virtual model is and the pros and cons of traditional vs CAD modelling
Year 6	<ul style="list-style-type: none"> To know that accelerometers can detect movement To understand that sensors can be useful in products as they mean the product can function without human input 	<ul style="list-style-type: none"> To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request To know that 'multifunctional' means an object or product has more than one function To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing

Design and Technology Curriculum Plan

Kapow Scheme of Work

<u>Year Group</u>	<u>Cooking and nutrition</u>	<u>Mechanisms</u>	<u>Structures</u>	<u>Textiles</u>	<u>Electrical Systems</u>	<u>Digital World</u> KS2 only
<u>Nursery</u>	<ul style="list-style-type: none"> • Healthy Soup 		<ul style="list-style-type: none"> • Space Models • 3 Bears Furniture • Animal Homes 			
Reception	<ul style="list-style-type: none"> • Food/ Fruit Salad 		<ul style="list-style-type: none"> • Building Houses • Bridges 	<ul style="list-style-type: none"> • Puppets 		
1	<ul style="list-style-type: none"> • Fruits and vegetables • Smoothie 	<ul style="list-style-type: none"> • Making a moving storybook • Wheels and axles 	<ul style="list-style-type: none"> • Constructing a windmill 	<ul style="list-style-type: none"> • Puppets 		
2	<ul style="list-style-type: none"> • A balanced diet • Healthy wrap 	<ul style="list-style-type: none"> • Fairground wheel • Making a moving monster 	<ul style="list-style-type: none"> • Baby bear's chair 	<ul style="list-style-type: none"> • Pouches 		
3	<ul style="list-style-type: none"> • Eating seasonally • Savoury tart 	<ul style="list-style-type: none"> • Pneumatic toys 	<ul style="list-style-type: none"> • Constructing a castle 	<ul style="list-style-type: none"> • Cushions 	<ul style="list-style-type: none"> • N/A Condensed long term plan does not include an electrical unit 	<ul style="list-style-type: none"> • Electronic charm
4	<ul style="list-style-type: none"> • Adapting a recipe 	<ul style="list-style-type: none"> • Making a slingshot car 	<ul style="list-style-type: none"> • Pavilions 	<ul style="list-style-type: none"> • Fastenings 	<ul style="list-style-type: none"> • Torches 	<ul style="list-style-type: none"> • N/A Condensed long term plan does not



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	<ul style="list-style-type: none"> Biscuit 					include a Digital world unit
5	<ul style="list-style-type: none"> What could be healthier 	<ul style="list-style-type: none"> Pop-up book 	<ul style="list-style-type: none"> Bridges 	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a Textiles unit for Yr5 	<ul style="list-style-type: none"> Electronic greeting card 	<ul style="list-style-type: none"> Monitoring devices
6	<ul style="list-style-type: none"> Come dine with me 	<ul style="list-style-type: none"> Automata toys 	<ul style="list-style-type: none"> Playgrounds 	<ul style="list-style-type: none"> N/A Condensed long term plan does not include a Textiles unit for Yr6 	<ul style="list-style-type: none"> Steady hand game 	<ul style="list-style-type: none"> Navigating the world



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SEND Support

Opportunities and resources that may support SEND children in Design and Technology:

- Differentiated tasks. See: Kapow, Twinkl, Oak Academy
- Video tutorials on Kapow to embed concepts and allow children to go at their own pace.
- Small group/1:1 session.
- Considered use of equipment: laptop/desktop/iPad.
- Peer support.
- Subject lead support.
- Consider enlarging font on screen/adjusting colours of paper and font
- Use of apps/features within a programme such as dictate and immersive reader.
- Additional support resources for Parents/Carers such as Kapow to reinforce concepts at home