St Peter and St Paul Catholic School

Skills and knowledge progression – Design and technology

National Curriculum Aims and purpose	School aims - skills, attitudes and knowledge that we would like all children to develop on their journey through the school
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. Aims: • Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate in an increasingly technological world • 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 the principles of nutrition and learn to cook.	At SSPP, 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. 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 wherewithal to overcome whatever barriers may present themselves on the way to a completed solution to their initial problem. 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: EAD: • Exploring & using media and materials • Manipulates materials to achieve a planned effect • Constructs with a purpose in mind, using a variety of resources • Selects appropriate resources and adapts work where necessary • Selects tools and techniques needed to shape, assemble and join materials they are using. • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function	**Experiences every child should have:** • Termly visits to Forest school where they will have opportunity to explore open-ended building and making of structures including bridges, rope swings and animal homes. • 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 saws, hammers, hand drills and other 'grown-up' tools (and know how to use them safely) • Build something bigger than them • Learn about design giants that have impacted our lives today

Knowledge progression						
	Structures	mechanisms	Textiles	Food and nutrition	Electrical	National curriculum End Points:
Year 1	• Discuss what makes a building/ home 'strong' • Select appropriate materials (which can be cut or shaped, eg. cardboard) • Use cutting, gluing, tying, taping to shape and join materials • Test models • Suggest ways they could be strengthened and improved	• Explore and evaluate books and products with moving parts, including those with sliders and levers • Develop understanding of the way sliders and levers can create movement • Develop & share design ideas • Use cutting, gluing & taping to shape and join materials • Use art & design techniques to create a finished product	• Generate ideas for a product by drawing on their own experiences • Say how the product will suit its intended user • Cut, shape and join materials to make a product with a particular purpose (eg. a safety jacket or sun hat for a storybook character) • Thread a needle • Say what they like and dislike about finished products	• Know that all food comes from plants or animals • Talk about what foods we should eat to stay healthy • Prepare fruit and vegetables for eating safely and hygienically (without using a heat source) • Compare the taste and texture of different foods • Use mixing to make cakes, pastries or crumbles	[redacted]	National curriculum end points: 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.
Year 2	• Explore existing freestanding structures & identify features that make them strong	• Explore different vehicles - what is similar and different about them? Identify wheels, axles, chassis etc.	• Design a functional, appealing product for a chosen user • Use templates to mark-out materials for cutting	• Know that food can be farmed, grown elsewhere (eg. at home) or caught • Name and sort foods into the five groups		

	• Generate design ideas for a given context (eg. chairs for story characters or pet cages) • Agree design criteria • Measure, mark-out, cut and shape materials • Select tools / methods for cutting, joining and assembling	• Build models from construction kits / materials (eg. Lego, Knex) • Explore ways of joining wheels to allow movement • Build models and suggest ways they could be tested out	• Choose materials based on their functional and aesthetic properties • Join fabrics using a running stitch (eg. to make a pinny) • Thread a needle with chosen length of thread • Suggest how products could be improved	shown in the Eatwell Guide • Use cutting, peeling and grating to prepare ingredients • Use ovens to bake cakes etc • Evaluate through taste-testing and user feedback • Make breads using kneading and baking, and compare different breads		➢ use the basic principles of a healthy and varied diet to prepare dishes ➢ understand where food comes from.
Year 3	• Investigate and evaluate shell structures (boxes, packaging, nets of shapes etc) • Develop practical ideas to solve a real-world problem (eg. packaging foods / toys) • Select materials and tools appropriate to the task • Measure, shape, cut and join materials with some accuracy	• Investigate the use of levers and linkages to create more complex movement (eg. in pop-up books or greetings cards) • Explore the effect of fixed and loose pivots on movement • Develop design ideas linked to a specific purpose • Measure, shape, cut and join materials with some accuracy	• Develop ideas for a real-world design problem (eg. money containers or shopping bags) by gathering information on the wants and needs of users • Share and model ideas using sketches and diagrams • Justify choice of materials • Measure, shape, cut and join materials with some accuracy • Sew using running and whip	• Use home-grown ingredients in cooking (eg. tomatoes, beans, strawberries) • Generate ideas and plan a dish for a specific purpose • Know a range of appropriate ingredients, and whether they are grown, reared or caught • Understand the idea of seasonality and fairtrade products	Know how to use computer aided software (Tinkercad) to plan and design simple 3D structures	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

	• Use art and design skills to finish the product attractively	• Identify strengths and areas for improvement in products	stitching with seam allowance	• Understand the main impact of airmiles on freshness		• 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. ➢ understand and apply the principles of a healthy and varied diet ➢ prepare and cook a variety of predominantly savoury
Year 4	• Create models to further understanding in other areas of the curriculum (eg. 3d models of river systems) • Use annotated sketches to develop and share ideas • Select materials based on their properties and availability • Use a wider range of techniques to shape and join materials (eg. saws, glue guns)	• Examine and disassemble a simple battery-powered product, identifying key parts of the electrical circuit • Explore and make different types of simple switches • Know how to use electricity safely • Design and make a battery-powered product (eg. a night light or torch) • Evaluate using design criteria	• Analyse items of clothing linked to another area of the curriculum using annotated sketches • Identify design features & develop design criteria • Use measurement and pattern pieces to create clothing fitted to a specific user • Use equipment independently, choosing the best thread • Apply a seam allowance • Evaluate finished pieces using agreed design criteria	• Know that, to be active and healthy, food and drink are needed to provide energy for the body • Prepare savoury dishes using peeling, chopping, slicing and mixing • Recognise the steps needed to prepare food safely and hygienically • Plan, carry out and record evaluations of food produced	• Understand and use electrical systems in their products linked to science coverage. • Apply their understanding of computing to program and control their products. • Know and use technical vocabulary relevant to the project.	
Year 5	• Combine solid structures with mechanical systems to create movement (eg. electric cars)	• Explore the effect of differently shaped cams on movement (construction kits)	• Explore the concept of sustainability and the long-term impact of products	• Know that seasons may affect the food that is available • Identify the different substances	Know how to use computer aided software (Tinkercad) to plan and design a 3D structure with annotations	

	• Use cross-sectional drawings and exploded diagrams to develop and share ideas • Accurately measure, saw and sand wood and plastic for use in construction • Test, evaluate and improve prototypes before producing final products	• Design a product including a cam mechanism (eg. a moving toy), taking into consideration the needs, wants and preferences of users • Model ideas using diagrams, sketches and prototypes • Accurately apply a range of finishing techniques	• Carry out research, using surveys, interviews and questionnaires • Generate innovate ideas (eg. for creating products from recycled materials) • Accurately measure, mark, join and assemble materials • Use a range of stitches including blanket, running, whip stitch • Justify design decisions	(nutrients, vitamins, fibre, protein etc) that are needed for health • Use boiling and simmering to cook food (eg. making soups) • Write a step-by-step recipe, including ingredients and equipment needed • Decorate and present food		dishes using a range of cooking ➢ techniques ➢ understand seasonality, and know where and how a variety of ingredients are grown, ➢ reared, caught and processed.
Year 6	• Produce a large-scale construction (eg. bird hide, bomb shelter etc) • Investigate and analyse existing / historical products based on sustainability, innovation and cost • Generate innovative	• Develop a design for a functional product that responds automatically to changes in the environment (eg. security alarm or lights) • Apply computing skills to program, monitor and control products • Test and evaluate the	• Disassemble a real-world textile item (eg. slippers) & use exploded diagrams to identify how it is constructed, materials used etc • Separate design criteria into functional and aesthetic • Design product for a specific user,	• Understand the environmental impact of food decisions (eg. 'air miles' on out of season fruits and vegetables) and international trade • Plan a meal for a specific occasion / festival, taking into account the needs and expectations of	• Understand and use electrical systems in their products linked to science coverage. • Apply their understanding of computing to program, monitor and control their products. • Know and use technical vocabulary relevant to the project Use micro-bits to create a message prompt	

	ideas, based on research • Apply skills learnt across keystage to construct, test evaluate and refine product	system to demonstrate its effectiveness • Learn about famous inventors	considering their needs • Apply skills learnt across keystage to construct, test evaluate and refine product	those who will eat it • Prepare this meal using a wide range of skills • Present the meal and evaluate		

Skills progression

	Generating ideas	Making	Design and evaluation	Vocabulary
EYFS	I can explain my own knowledge and understanding. I can ask appropriate questions of others. I can use talk to organise, sequence and clarify thinking and ideas. I can link statements and stick to a main theme or intention. I can explain how some technology works by exploring parts by pressing, lifting, twisting to say how it works. *ELG* *• I can use what I know about media and materials in original ways, thinking about uses and purposes.* *I can represent my own ideas through design technology*	I can manipulate materials to achieve a planned effect. I can purposely construct something using a variety of resources. I can use simple tools and techniques competently & appropriately. I can select appropriate resources I can hold tools correctly once shown I thread and weave through loops and hoops *ELG* *• I can use what I know about media and materials in original ways, thinking about uses and purposes.*	*I can adapt my work where necessary. *I can explain my own knowledge and understanding of what I have made to evaluate it.	Plan, ideas, design, make, build, construct, join, shape, tools, change, like, dislike, different, improve, healthy, unhealthy, fruit, vegetable, clean, safe, ingredients, cut, sew
Year 1	Design appealing products for a particular user based on simple design criteria. Generate initial ideas and design criteria through own experiences. Develop and communicate these ideas through talk and drawings and mock ups where relevant.	• Select and use simple utensils, tools and equipment to perform a job e.g. peel, cut, slice, squeeze, grate and chop safely; marking out cutting, joining and finishing; cut, shape and join paper and card. • Select from a range of ingredients and materials according to their characteristics to create a chosen product thread a needle with large eye and previously cut material select materials from a range given	• Taste, explore and evaluate a range of products to determine the intended user's preferences for the product • Evaluate their ideas throughout and finished products against design criteria, including intended user and purpose.	planning, investigating design, evaluate, make, user, purpose, ideas, product,
Year 2	Generate ideas based on simple design criteria and their own experiences, explaining what they could make. Develop, model and communicate their ideas through talking, mock-ups and drawings.	Plan by suggesting what to do next. • Select and use tools, equipment, skills and techniques to perform practical tasks, explaining their choices. • Select new and materials, components, reclaimed materials and construction	• Explore a range of existing products related to their design criteria. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.	investigating, planning, design, make, evaluate, user, purpose, ideas, design criteria, product, function

		kits to build and create their products. • Use simple finishing techniques suitable for the products they are creating thread needle with chosen allowance of thread.		
Year 3	• Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. • Use annotated sketches, prototypes, final product sketches and pattern pieces; communication technology, such as web-based recipes, to develop and communicate ideas	• Plan the main stages of making. • Select from and use a range of appropriate utensils, tools and equipment with some accuracy related to their product. • Select from and use finishing techniques suitable for the product they are creating. Choose own quality and quantity of thread suitable for the product Thread own needle and select the thread allowance so that it doesn't run out	• Investigate a range of 3-D textile products, ingredients and lever and linkage products relevant to their project. • Test their product against the original design criteria and with the intended user. • Evaluate the ongoing work and the final product with reference to the design criteria and the views of others. Evaluate product success through questionnaires/ consumer feedback	user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, function, planning, design criteria, annotated sketch, appealing, prototype, consumer
Year 4	• Generate and clarify ideas through discussion with peers to develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. • Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. • Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.	Order the main stages of making. • Select and use appropriate tools to measure, mark out, cut, score, shape and combine with some accuracy related to their products. • Explain their choice of materials according to functional properties and aesthetic qualities. • Select from and use materials and components, including ingredients, construction and electrical components according to their function and properties	• Investigate and evaluate a range of products including the ingredients, materials, components and techniques that are used. • Test and evaluate their own products against design criteria and the intended user and purpose. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work Evaluate product and suggest improvements/ design adjustments. Produce consumer feedback evaluations	evaluating, design brief design criteria, innovative, prototype, user, purpose, function, prototype, design criteria, innovative, appealing, design brief, planning, annotated sketch, sensory evaluations, consumer

Year 5	• Generate innovative ideas through research including surveys, interviews and Questionnaires .and discussion with peers to develop a design brief and criteria for a design specification. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. and, where appropriate, computer-aided design	Produce detailed lists of equipment and fabrics relevant to their tasks .• Write a step-by-step plan, including a list of resources required. • Select from and use, a range of appropriate utensils, tools and equipment accurately to measure and combine appropriate ingredients, materials and resources.	• Investigate and analyse products linked to their final product. • Compare the final product to the original design specification and record the evaluations. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work	design decisions, functionality, authentic, user, purpose, design specification, design brief, innovative, research, evaluate, design criteria, annotate, evaluate, mock-up, prototype
Year 6	• Use research using surveys, interviews, questionnaires and web-based resources. To develop a design specification for a range of functional products. • Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate and develop innovative ideas and share and clarify these through discussion. • Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams	Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components • Competently select from and use appropriate tools to accurately measure, mark, cut and assemble materials, and securely connect electrical components to produce reliable, functional products. • Use finishing and decorative techniques suitable for the product they are designing and making.	Continually evaluate and modify the working features of the product to match the initial design specification. • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. • Test the system to demonstrate its effectiveness for the intended user and purpose.	function, innovative, design specification, design brief, user, purpose prototype, annotated sketch, purpose, user, innovation, research, functional, mock-up,

Product/ design long term overview 2024-25

		EYFS			
		Structures - Junk modelling/ Outdoor construction			Food and nutrition – Gruffalo crumble
		Key stage 1			
	Year 1	Textiles – make your own book mark for a Christmas gift (Autumn 2)	Structures (Freestanding) Design and make a moveable prototype of play equipment for the park (Autumn 1)	Mechanisms- sliders and levers Moving storyboard – Easter/ RE/ Science (Spring 2)	Food and nutrition-Design and make ice-cream sundaes (Summer 2)
	Year 2	Textiles – make a pinny that is useful for a nurse (Spring 1)	Mechanisms – wheels and axles Transport (Summer 1)	structures - Build a bridge that can carry the weight of….	Food and nutrition – Compare different breads/make a flat bread (Autumn 1)
		Key Stage 2			
	Year 3	Textiles- Make a Bronze age bag to carry the beaker/ Stone age garment fit for Ug – 2D to 3D product (Autumn 1)	Mechanisms – make a shaduf that can transport water to a different place (Summer 1) Pnuematics (Science link) – recreate the muscle movement (Autumn 2)	Structures using computer aided design: CAD design linked to Computing unit – Packaging for smoothies (Spring 2)	Food and nutrition Seasonal produce- superfood smoothies (Spring 2)
	Year 4	Shell Structures- Recyclable lunchbox/packaging (Summer 2)	Electrical: Simple circuits – create a torch (Summer 1)	Mechanisms- design and make a catapult that will launch successfully (Spring 2)	Food and nutrition – prepare, cook and adapt from a recipe- adapt a Roman recipe to make it healthier (Autumn 1)
	Year 5	Computer aided Structures: recreate Mayan temple structures (Autumn 1)	Textiles: Make a pillow for a workhouse child with left over fabric… (Summer 2)	Electrical- Complex circuits- create an automatic light for space craft (Spring 1)	Food and nutrition – healthy Greek menu – hot and cold (Spring 2)
	Year 6	Mechanisms/ Electrical: Pullies and gears – make a prototype of an electrically-powered car (Spring 1)	Framed structures – Bird hides for adapted creatures/ Picture frames for photography pieces (Summer 2)	Textiles: Make do and mend – make a_____ fit for _____ (Autumn 2)	Food and nutrition- research, plan and cook a Spanish tapas meal from adapted recipes (Summer 1)