Design and Technology Progression St Mary's

Design and Technology Curriculum *Intent*...	*At St Mary's,* we aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. We aim to build pupils' awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens, preparing them for living in a modern world with rapidly changing and advancing technology. Through the study of design and technology, children will combine practical skills with an understanding of the aesthetic, social and environmental issues, as well as functions and industrial practices.

Exploring and using media and materials' focuses on how young children engage with the many materials and creative experiences presented to them. For children within the EYFS, this will be through their senses and whole-body movements, as they discover the properties of materials (what they can and can't do), and how they can express themselves through, for example, colour and materials. The development of children's artistic and cultural awareness supports their imagination and creativity. It is through this variety of experiences that children recreate their world and interpret their own ideas. This lies at the heart of creativity and expression and has many links to the other areas of learning. Children in EYFS will have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials.

EYFS –Development Matters 2021 for detailed examples of how to support learning in EYFS

3-4 YEARS	RECEPTION
Personal, Social, Emotional Development • Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen or one which is suggested to them. **Physical Development** • Use large-muscle movements to wave flags and streamers, paint and make marks. • Choose the right resources to carry out their own plan. • Use one-handed tools and equipment, for example, making snips in paper with scissors. **Understanding the World** • Explore how things work. **Expressive Arts and Design** • Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings and a park.	**Physical Development** • Develop their small motor skills so that they can use a range of tools competently, safely and confidently. • Use their core muscle strength to achieve a good posture when sitting at a table or sitting on the floor. **Expressive Arts and Design** • Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills. **ELG: PD: Fine motor skills: Children at the expected level of development will:** • Use a range of small tools, including scissors, paintbrushes and cutlery. **ELG: EAD: Creating with materials: Children at the expected level of development will: -** • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.

• Explore different materials freely, in order to develop their ideas about how to use them and what to make. • Develop their own ideas and then decide which materials to use to express them. Create closed shapes with continuous lines, and begin to use these shapes to represent objects.			Share their creations, explaining the process they have used.			
AREA OF STUDY	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**	**YEAR 6**
DESIGN	**National Curriculum:** **Pupils should be taught to: -** - 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 -		**National Curriculum:** **Pupils should be taught to: -** • 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 -			
	▪ Use pictures and words to convey what they want to design/make. ▪ Propose more than one idea for their product. ▪ Use kits/reclaimed materials to develop more than one idea. ▪ Model ideas with kits, reclaimed materials. ▪ Select appropriate technique explaining: First… Next… Last…. ▪ Explore ideas by rearranging materials. ▪ Select pictures to help develop ideas. ▪ Use drawings to record ideas as they are developed. ▪ Add notes to drawings to help explanations. Describe their models and drawings of ideas and intentions.		▪ Develop more than one design or adaptation of an initial design. ▪ Plan a sequence of actions to make a product. ▪ Record the plan by drawing using annotated sketches. ▪ Begin to use cross-sectional and exploded diagrams. ▪ Use prototypes to develop and share ideas. ▪ Think ahead about the order of their work and decide upon tools and materials. ▪ Propose realistic suggestions as to how they can achieve their design ideas. ▪ Consider aesthetic qualities of materials chosen. ▪ Use CAD where appropriate.		▪ List tools needed before starting the activity. ▪ Plan the sequence of work e.g. using a storyboard. ▪ Record ideas using annotated diagrams. ▪ Use models, kits and drawings to help formulate design ideas. ▪ Combine modelling and drawing to refine ideas. ▪ Devise step by step plans which can be read / followed by someone else. ▪ Use exploded diagrams and cross-sectional diagrams to communicate ideas. ▪ Sketch and model alternative ideas. ▪ Decide which design idea to develop.	
MAKE	**National Curriculum:** **Pupils should be taught to:** • - select from and use a range of tools and equipment to perform practical tasks [for		**National Curriculum:** **Pupils should be taught to:** • - select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. • select from and use a wider range of materials and components, including construction			

	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	materials, textiles and ingredients, according to their functional properties and aesthetic qualities	
	▪ Discuss their work as it progresses. ▪ Select materials from a limited range that will meet the design criteria. ▪ Select and name the tools needed to work the materials. ▪ Explain what they are making. ▪ Explain which materials they are using and why. ▪ Name the tools they are using. Describe what they need to do next.	▪ . Prepare pattern pieces as templates for their design. ▪ Cut slots. ▪ Cut internal shapes. ▪ Select from a range of tools for cutting shaping joining and finishing. ▪ Use tools with accuracy. ▪ Select from techniques for different parts of the process. ▪ Select from materials according to their functional properties. ▪ Plan the stages of the making process. ▪ Use appropriate finishing techniques.	▪ Make prototypes. ▪ Develop one idea in depth. ▪ Use researched information to inform decisions. ▪ Produce detailed lists of ingredients / components / materials and tools. ▪ Use a computer to model ideas. ▪ Select from and use a wide range of tools. ▪ Cut accurately and safely to a marked line. ▪ Select from and use a wide range of materials. ▪ Use appropriate finishing techniques for the project. ▪ Refine their product – review and rework/improve.
EVALUATE	**National Curriculum:** **Pupils should be taught to:** • - explore and evaluate a range of existing products. • evaluate their ideas and products against design criteria.	**National Curriculum. Pupils should be taught to:** • - 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.	
	• Explore existing products and investigate how they have been made. • Decide how existing products do/do not achieve their purpose. • Talk about their design as they develop and identify good and bad points.	• Investigate similar products to the one to be made to give starting points for a design. • Draw/sketch products to help analyse and understand how products are made. • Research needs of user.	• Research and evaluate existing products (including book and web based research). • Consider user and purpose. • Identify the strengths and weaknesses of their design ideas.

	• Note changes made during the making process as annotation to plans/drawings. • Say what they like and do not like about items they have made and attempt to say why. • Discuss how closely their finished product meets their design criteria and how well it meets the needs of the user.	• Identify the strengths and weaknesses of their design ideas in relation to purpose/user. • Decide which design idea to develop. • Consider and explain how the finished product could be improved. • Discuss how well the finished product meets the design criteria of the user. • Investigate key events and individuals in Design and Technology	• Give a report using correct technical vocabulary. • Consider and explain how the finished product could be improved related to design criteria. • Discuss how well the finished product meets the design criteria of the user. Test on the user! • Understand how key people have influenced design.
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. ▪	▪ 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	
Food Technology (link to CST & Fair trade products/ climate change)	<u>Y1 make fruit salad/ kebabs</u> <u>Y2: design and make Salads</u> ▪ Develop a food vocabulary using taste, smell, texture and feel. ▪ Group familiar food products e.g. fruit and vegetables. ▪ Explain where food comes from. ▪ Cut, peel, grate, chop a range of ingredients ▪ Work safely and hygienically. ▪ Understand the need for a variety of foods in a diet. ▪ Measure and weigh food items, non-statutory measures e.g. spoons, cups	<u>Y3 design and make a picnic food</u> <u>Y4 design and make dish from local farm foods.</u> ▪ Develop sensory vocabulary/knowledge using, smell, taste, texture and feel. ▪ Analyse the taste, texture, smell and appearance of a range of foods (predominantly savoury). ▪ Follow simple instructions/recipes. To know that the amount of an ingredient in a recipe is known as the 'quantity ▪ Make healthy eating choices – use the *Eatwell plate*. ▪ Join and combine a range of ingredients. ▪ Explore seasonality of vegetables and fruit. ▪ Find out which fruit and vegetables are grown in countries/continents studied in Geography. ▪ Develop understanding of how meat/fish are reared/caught.	<u>Y5 to design and make food from another culture for a celebration</u> <u>Y6 to design and make a healthy, economical and enjoyable school meal.</u> ▪ To know that I can adapt a recipe to make it healthier by substituting ingredients. ▪ To know that it is important to use oven gloves when removing hot food from an oven ▪ To know the cooking techniques of sieving, creaming, rubbing method, cooling. ▪ Prepare food products taking into account the properties of ingredients and sensory characteristics. ▪ Weigh and measure using scales. ▪ Select and prepare foods for a particular purpose. ▪ Work safely and hygienically.

			▪ Show awareness of a healthy diet (using the eatwell plate). ▪ Use a range of cooking techniques. ▪ Know where and how ingredients are grown and processed. ▪ Consider influence of chefs e.g. Jamie Oliver and school meals, Hugh Fearnley-Whittingstall and sustainable fishing etc.
Textiles	<u>Y2: make Wind in the willow puppets</u> ▪ Cut out shapes which have been created by drawing round a template onto the fabric. ▪ Join fabrics by using e.g. running stitch, glue, staples, over sewing, tape. ▪ Decorate fabrics with attached items e.g. buttons, beads, sequins, braids, ribbons. ▪ Colour fabrics using a range of techniques e.g. fabric paints, printing, painting. ▪ Using a template to create a design for a puppet. ▪ Cutting fabric neatly with scissors. ▪ Using joining methods to decorate a puppet.	<u>Y4: make passport covers/ purses</u> Selecting and cutting fabrics for sewing. Decorating a pouch using fabric glue or running stitch. Threading a needle. Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. Neatly pinning and cutting fabric using a template. ▪ Develop vocabulary for tools materials and their properties. ▪ Understand seam allowance. ▪ Join fabrics using running stitch, over sewing, blanket stitch. ▪ Prototype a product using J cloths. ▪ Use prototype to make pattern. ▪ Explore strengthening and stiffening of fabrics. ▪ Explore fastenings (inventors?) and recreate some. ▪ Sew on buttons and make loops. ▪ Use appropriate decoration techniques	<u>Y5: Amazon adventure 3d textile</u> 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. Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots. Learning different decorative stitches. Sewing accurately with evenly spaced, neat stitches. ▪ Use the correct vocabulary appropriate to the project. ▪ Create 3D products using patterns pieces and seam allowance. ▪ Understand pattern layout. ▪ Decorate textiles appropriately (often before joining components). ▪ Pin and tack fabric pieces together. ▪ Join fabrics using over sewing, back stitch, blanket stitch or machine stitching (closer supervision). ▪ Combine fabrics to create more useful properties. ▪ Make quality products.

Structures	▪ Y1 – make playground equipment: design: giving careful consideration to how the structures will be used, considering effective and ineffective designs. Make: Building a range of play apparatus 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. ▪ Explore how to make structures stronger. ▪ Investigate different techniques for stiffening a variety of materials. ▪ Test different methods of enabling structures to remain stable. ▪ Join appropriately for different materials and situations e.g. glue, tape. ▪ Mark out materials to be cut using a template. ▪ Use a glue gun with close supervision. ▪ Making stable structures from card, tape and glue. ▪ Learning how to turn 2D nets into 3D structures. ▪ Following instructions to cut and assemble a supporting structure. ▪ Making functioning turbines and axles which are assembled into a main supporting structure. .	▪ Y3: Make a planter/ frame structure- use shells. ▪ Develop vocabulary related to the project. ▪ Create shell or frame structures. ▪ Strengthen frames with diagonal struts. ▪ Make structures more stable by giving them a wide base. ▪ Measure and mark square section, strip and dowel accurately to 1cm. ▪ Measuring, marking, cutting and assembling with increasing accuracy. ▪ Making a model based on a chosen design.	Y6: make a fairground ride/ illumination. ▪ Use the correct terminology for tools materials and processes. ▪ Use bradawl to mark hole positions. ▪ Use hand drill to drill tight and loose fit holes. ▪ Cut strip wood, dowel, square section wood accurately to 1mm. ▪ Join materials using appropriate methods. ▪ Build frameworks to support mechanisms. ▪ Stiffen and reinforce complex structures. Measuring, marking and checking the accuracy of the jelutong 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
Mechanisms	Y1 Pop up cards with a lever: Explaining how to adapt mechanisms, using bridges or guides to control the movement. Y2: Space buggies linked to explorers topic ▪ Join appropriately for different materials and situations e.g. glue, tape. ▪ Try out different axle fixings and their strengths and weaknesses. ▪ Make vehicles with construction kits which contain free running wheels.	**Includes Electrical and ICT linked DT** Y3 make a pop up book linked to the Iron Man topic: levers and linkages Y4: make a quiz: electric linked to Sparks will fly topic ▪ Develop vocabulary related to the project. ▪ Use mechanical systems such as gears, pulleys, levers and linkages. ▪ To know that a lever is something that turns on a pivot.	**Includes Electrical and ICT linked DT** ▪ Y5: inventors- make a vehicle with a pulley system or a device to move heavy objects with a a pulley system. ▪ Y6 Fairground rides- electrical systems/ cams and pulleys. ▪ Develop a technical vocabulary appropriate to the project.

	▪ Use a range of materials to create models with wheels and axles e.g. tubes, dowel, cotton reels. ▪ Roll paper to create tubes. ▪ Cut dowel using hacksaw and bench hook. ▪ Attach wheels to a chassis using an axle. ▪ Mark out materials to be cut using a template. ▪ Fold, tear and cut paper and card. ▪ Cut along lines, straight and curved. ▪ Use a hole punch. ▪ Insert paper fasteners for card. Experiment with levers and sliders to find different ways of making things move in a 2D plane.	▪ To know that a linkage mechanism is made up of a series of levers. ▪ Incorporate a circuit into a model. ▪ Use electrical systems such as switches bulbs and buzzers. ▪ Use ICT to control products. ▪ Use lolly sticks/card to make levers and linkages. ▪ Use linkages to make movement larger or more varied. 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.	▪ To know the features of 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 that a cross-sectional diagram shows the inner workings of a product. ▪ To understand that different shaped cams produce different outputs ▪ Use mechanical systems such as cams, pulleys and gears. ▪ Use electrical systems such as motors. ▪ Program, monitor and control using ICT. 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.
Additional		<u>Digital world</u> 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, codable computer. 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 know that 'form' means the shape and appearance of an object. To know the difference between 'form' and 'function'. To understand that 'fit for purpose' means that a product works how it should and is easy to use. To know that form over purpose means that a product looks good but does not work very well.

		To understand what is meant by ‘point of sale display.’ To know that CAD stands for	To know the importance of ‘form follows function’ when designing: the product must be designed primarily with the function in mind. To understand the diagram perspectives 'top view', 'side view' and 'back' 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.