St Ann's Heath Junior School – DT knowledge progression

Curriculum Intent	• Ensure that the Design and Technology scheme of work enables pupils to meet the end-of-key-stage attainment targets in the National Curriculum. • Inspire pupils to be innovative and creative thinkers in the field of Design and Technology. • Foster an appreciation for the entire product design cycle, including ideation, creation, and evaluation. • Develop children's confidence to take risks in their design process. • Encourage drafting design concepts, modelling, and testing as integral parts of the creative journey. • Cultivate reflective learners who regularly evaluate their own work. • Promote critical assessment of the work of others, fostering a culture of continuous improvement. • Build an awareness of the impact of design and technology on everyday life. • Highlight the significance of design advancements and technological contributions to society. • Encourage children to become resourceful and enterprising citizens. • Equip children with skills that contribute to future design advancements, fostering a sense of responsibility.

		Year 3	Year 4	Year 5	Year 6
Structures	• **Technical**	Constructing A Castle • To understand that wide and flat based objects are more stable • To understand the importance of strength and stiffness in structures	Pavilions • To understand what a frame structure is • To know that a 'free-standing' structure is one that can stand on its own	Bridges • To understand some different ways to reinforce structures • To understand how triangles can be used to reinforce bridges • To know that properties are words that describe the form and function of materials	Playgrounds • To know that structures can be strengthened by manipulating materials and shapes

				• To understand why material selection is important based on properties • To understand the material (functional and aesthetic) properties of wood	
	• **Additional**	• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gate house – and their purpose • To know that a façade is the front of a structure • To understand that 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 • To know that a design specification is a list of success criteria for a product	• To know 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 products function means its purpose • To understand that the target audience means the person or groups of people the product is designed for • To know that architects consider light, shadow and patterns when designing	• To understand the difference between arch, beam, truss and suspension bridges • To understand how to carry and use a saw correctly	• 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
Mechanics/ Mechanical Systems	• **Technical**	<u>Pneumatic Toys</u> • To understand how pneumatic toys work • To understand that pneumatic toys can be used as part of a mechanism	<u>Making A Slingshot Car</u> • To know that air resistance is the level of drag on an object as it is forced through the air	<u>Pop Up Book</u> • To know that mechanisms control movement • To understand that mechanisms can be used to change one kind of motion into another	<u>Automata Toys</u> • To understand that the mechanism in an automata uses a system of cams, axles and followers

		• To know that pneumatic systems operate by drawing in, releasing and compressing air	• To understand that the shape of a moving object will affect how it moves due to air resistance	• To understand how to use sliders, pivots and folds to create paper-based mechanisms	• To understand that different shaped cams produce different outputs
	• **Additional**	• 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	• 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 repeatedly 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	• To know that a design brief is a description of what I am going to design and make • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing	• To understand that an automata 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 90^0 angles
Electrical Systems	• **Technical**	• N/A	• Torches • 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	• Doodlers • To know that series circuits only have one direction for the electricity to flow • To know when there is a break in a series circuit, all components turn off	Steady Hand Game • To know that batteries contain acid, which can be dangerous if they leak • To know the basic components in a basic series circuit, including a buzzer

				• To know that an electric motor converts electrical energy into rotational movement, causing the motors axle to spin • To know a motorised product is one which uses a motor to function	
	• **Additional**	• N/A	• 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 lightbulb(s) – by Sir Joseph Swan and Thomas Edison	• To know that product analysis is critiquing the strengths and weaknesses of a product • To know that 'configuration' means how the parts of a product are arranged	• To understand the diagram perspectives 'top view', 'side view' and 'back'
Cooking and Nutrition	• **Technical**	Eating Seasonally • 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'	Adapting A Recipe • 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 • To understand the importance of budgeting	What Could Be Healthier? • To understand where meat comes from – learning that beef is from cattle and how beef is reared and processed, and 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	Come Dine With Me • 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

		• 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 understand safety rules for using, storing and cleaning a knife safely • To know that similar coloured fruits and vegetables often have similar nutritional benefits	while planning ingredients for biscuits	• To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects	remove any dirt and insecticides • To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork)
Textiles	• **Technical**	Cushions or Egyptian Collars • To know that applique is a way of mending or decorating a textile by	Fastenings • To know that a fastening is something which holds two pieces of material together,	• N/A	• N/A

		applying smaller pieces of fabric to larger pieces • 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 out after sewing so the stitching is hidden	for example 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		
Digital World	• **Technical**	Electronic Charm • To understand that, in programming, a 'loop' is a code that repeats something again and again until stopped • To know that a Micro:bit is a pocket sized, codable computer	• N/A	Monitoring Devices • 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	Navigating The World • To know that accelerometers can detect movement • To understand that sensors can be useful as they mean the product can function without human input

	• **Additional**	• 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	• N/A	• 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	• 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 Earths magnetic field to determine which direction you are facing