ST BERNADETTE'S RC PRIMARY SCHOOL

DESIGN &TECHNOLOGY MILESTONES

St Bernadette's RC Primary School

D&T– Subject Progression

STRUCTURES				
	Milestone 1 – End of EYFS	**Milestone 2 – End of Year 2**	**Milestone 3 – End of Year 4**	**Milestone 4 – End of Year 6**
Design	• Make verbal plans & material choices. • Think of ideas – know what they are going to make before they make it. • Design & develop own models. • Use knowledge from exploration to inform design. • Create simple representations of events, people & objects • Plan & make decisions about how to approach a task, solve a problem & reach a goal • Represent own ideas, thoughts & feelings through D&T	• Learn the importance of a clear design criteria • Include individual preferences & requirements in a design. • Generate & communicate ideas using sketches & models • Learn about different types of structures, found in the natural world & in everyday objects	• Design with key features to appeal to a specific person/purpose • Draw & label shapes that will create the features. • Label materials, need & colours. • Design &/or decorate on CAD software. • Design a stable structure that is aesthetically pleasing & select materials to create a desired effect • Build frame structures designed to support weight	• Design a stable structure that is able to support weight • Create frame structure with focus on triangulation • Design the features of a variety of different structures, considering how the structures will be used, & their effective & ineffective designs
Make	• Improve fine motor/scissor skills with a variety of materials. • Join materials in a variety of ways (temporary & permanent)- exploring a range of adhesives • Consider material choice • Describe their design & how they intend to make it. • Engage in open-ended activity • Changing strategy as needed • Use technical vocab when appropriate • Make simple 2D & 3Dstructures	• Make stable structures from card, tape & glue • Follow instructions • Learn how to turn 2D nets into 3D structures • Make a structure according to design criteria. • Create joints & structures from paper/card & tape. • Build a strong & stiff structure by folding paper.	• Construct a range of 3D geometric shapes using nets. • Create special features for individual designs. • Use a range of recycled materials. • Create a range of frame structures – free standing of different shapes & sizes. • Select appropriate materials • Reinforce corners to strengthen a structure. • Create a design in accordance with a plan. • Learn to create different textural effects with materials	• Build a range of play apparatus structures drawing upon new & prior knowledge of structures • Measure, mark & cut wood to create a range of structures using a range of materials to reinforce & add decoration to structures • Select appropriate tools & equipment for particular tasks • Explain why selecting appropriate materials is an important part of the design process • Use the correct techniques to saws safely • Understanding basic wood functional properties
Evaluate	• Give a verbal evaluation of own & others' finished products • Check to see if what they have made matches their plan • Test their design & consider what they would do differently if they did it again. • Describe their favourite & least favourite part of what they have made.	• Explore the features of structures • Compare the stability of different shapes • Test the strength of own structures • Identify the weakest part of a structure • Evaluate the strength, stiffness & stability of own structure	• Evaluate own work & others work based on the aesthetic of the finished product & in comparison, to the original design. • Suggest points for modification of their designs. • Evaluate structures made by the class.	• Improve a design plan based on peer evaluation. • Test & adapting a design to improve it as it is developed. • Identify what makes a successful structure.

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	• Find ways to solve problems / find new ways to do things / test their ideas • Checking how well their activities are going • Return to a design & build upon previous learning - make changes/learn from experiences.		• Describe the characteristics of a design/ construction that made it the most effective. • Consider effective & ineffective designs	
Technical Knowledge	• Show curiosity about objects, events & people • Questions why things happen • Use senses to explore the world around them	• Understand that the shape of materials can be changed to improve the strength & stiffness of structure • Understand that cylinders are a strong type of structure (e.g. the main shape used for windmills & lighthouses) • Understand that axles are used in structures & mechanisms to make parts turn in a circle • Begin to Understand that different structures are used for different purpose • Know that a structure is something that has been made & put together • Know that shapes & structures with wide, flat bases or legs are the most stable • Understand that the shape of a structure affects its strength • Know that materials can be manipulated to improve strength & stiffness • Know that a structure is something which has been formed or made from parts • Know that a 'stable' structure is one which is firmly fixed & unlikely to change or move • Know that a 'strong' structure is one which does not break easily • Know that a 'stiff' structure or material is one which does not bend easily	• Understand that wide & flat based objects are more stable • Understand the importance of strength & stiffness in structures • Understand what a frame structure is • Know that a 'free-standing' structure is one which can stand on its own	• Understand some different ways to reinforce structures • Understand how triangles can be used to reinforce bridges • Know that properties are words that describe the form & function of materials • Understand why material selection is important based on their properties • Understand the material (functional & aesthetic) properties of wood • Know that structures can be strengthened by manipulating materials & shapes

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MECHANISMS				
	Milestone 1 – End of EYFS	**Milestone 2 – End of Year 2**	**Milestone 3 – End of Year 4**	**Milestone 4 – End of Year 6**
Design	• Use talk to clarify ideas for a design • Begin to plan a design before starting • Make decisions about how to approach a task, solve a problem & reach a goal	• Create clearly labelled drawings which illustrate movement • Create a class design criterion • Design for a specific audience in accordance with a design criterion • Select a suitable linkage system to produce the desired motions • Select appropriate materials based on their properties	• Design a shape that reduces air resistance • Draw a net to create a structure from • Choose shapes that increase or decrease speed as a result of air resistance • Personalise a design	• Design a product which uses a mixture of structures & mechanisms • Name each mechanism, input & output accurately • Storyboard ideas for a book
Make	• Explore & select appropriate tools & materials in order to assemble & join materials. • Handle tools & materials safely • Use simple tools to effect changes in materials • Change strategy as needed • Construct with a purpose in mind.	• Select materials according to their characteristics. • Follow a design brief. • Make linkages using card for levers & split pins for pivots. • Experiment with linkages adjusting the widths, lengths an & thicknesses of card used. • Cut & assemble components neatly.	• Measure, mark, cut & assemble with increasing accuracy. • Make a model based on a chosen design.	• Follow a design brief to make a pop-up book, neatly & with focus on accuracy • Make mechanisms &/or structures using sliders, pivots & folds to produce movement • Use layers & spacers to hide the workings of mechanical parts for an aesthetically pleasing result
Evaluate	• Check how well an activity is going • Review how well their approach worked • Discuss their work as it progresses • Return to & build on previous learning, refining ideas & developing their ability to represent them • Share their creations, explaining the process they have used.	• Evaluate different designs. • Test & adapt a design. • Evaluate own designs against design criteria. • Use peer feedback to modify a final design.	• Evaluate the speed of a final product based on the effect of shape on speed & the accuracy of workmanship on performance.	• Evaluate the work of others & receiving feedback on own work. • Suggest points for improvement.
Technical Knowledge	• Use technical vocab when appropriate	• Know that wheels need to be round to rotate & move • Understand that for a wheel to move it must be attached to a rotating axle • Know that an axle moves within an axle holder which is fixed to the vehicle or toy • Know that the frame of a vehicle (chassis) needs to be balanced	• Understand how pneumatic systems work • Understand that pneumatic systems can be used as part of a mechanism • Know that pneumatic systems operate by drawing in, releasing & compressing air • Understand that all moving things have kinetic energy	• Know that mechanisms control movement • Understand that mechanisms that can be used to change one kind of motion into another • Understand how to use sliders, pivots & folds to create paper-based mechanisms • Understand that the mechanism in an automaton uses a system of cams, axles & followers

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		• Know that different materials have different properties & are therefore suitable for different uses	• Understand that kinetic energy is the energy that something (object/person) has by being in motion • Know that air resistance is the level of drag on an object as it is forced through the air • Understand that the shape of a moving object will affect how it moves due to air resistance	• Understand that different shaped cams produce different output

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D&T– Subject Progression

ELECTRICAL SYSTEMS				
	Milestone 1 – End of EYFS	**Milestone 2 – End of Year 2**	**Milestone 3 – End of Year 4**	**Milestone 4 – End of Year 6**
Design			• Design a torch, considering the target audience & creating both design & success criteria focusing on features of individual design ideas	• Identify factors that could be changed on existing products & explain how these would alter the form & function of the product • Develop design criteria based on findings from investigating existing products • Develop design criteria that clarifies the target user • Design a steady h& game - identifying & naming the components require • Draw a design from three different perspectives • Generate ideas through sketching & discussion • Model ideas through prototypes • Understand the purpose of products (toys), including what is meant by 'fit for purpose' & 'form over function'
ELECTRICAL SYSTEMS Make			• Make a torch with a working electrical circuit & switch • Use appropriate equipment to cut & attach materials • Assemble a torch according to the design & success criteria	• Alter a product's form & function by tinkering with its configuration. • Make a functional series circuit, incorporating a motor. • Construct a product with consideration for the design criteria. • Break down the construction process into steps so that others can make the product.
ELECTRICAL SYSTEMS Evaluate			• Learn to give & accept constructive criticism on own work & the work of others • Test the success of initial ideas against the design criteria & justifying opinions • Revisit the requirements of the client to review developing design ideas & check that they fulfil their needs • Evaluate electrical products • Test & evaluate the success of a final product & taking inspiration from the world	• Carry out a product analysis to look at the purpose of a product along with its strengths & weaknesses • Determine which parts of a product affect its function & which parts affect its form • Analyse whether changes in configuration positively or negatively affect an existing product • Peer evaluate a set of instructions to build a product

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				• Test own & others finished games, identifying what went well & making suggestions for improvement • Gather images & information about existing children's toys • Analyse a selection of existing children's toys
ELECTRICAL SYSTEMS **Technical Knowledge**			• Understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit • Understand common features of an electric product (switch, battery or plug, dials, buttons etc.) • List examples of common electric products (kettle, remote control etc.) • Understand that an electric product uses an electrical system to work (function) • Know the name & appearance of a bulb, battery, battery holder & crocodile wire to build simple circuits • Understand that electrical conductors are materials which electricity can pass through • Understand that electrical insulators are materials which electricity cannot pass through • Know that a battery contains stored electricity that can be used to power products • Know that an electrical circuit must be complete for electricity to flow • Know that a switch can be used to complete & break an electrical circuit	• Know that series circuits only have one direction for the electricity to flow • Know when there is a break in a series circuit, all components turn off • Know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin • Know a motorised product is one which uses a motor to function • Know that batteries contain acid, which can be dangerous if they leak • Know the names of the components in a basic series circuit including a buzzer

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DIGITAL WORLD				
	Milestone 1 – End of EYFS	**Milestone 2 – End of Year 2**	**Milestone 3 – End of Year 4**	**Milestone 4 – End of Year 6**
DIGITAL WORLD **Design**			**ELECTRONIC CHARM (AUTUMN 2: YEAR B)** • Problem solve by suggesting potential features on a Micro: bit & justifying my ideas. • Develop design ideas for technology pouch. • Draw & manipulate 2D shapes, using computer-aided design, to produce a point of sale badge.	**NAVIGATING THE WORLD (SUMMER 1: YEAR A)** • Write a design brief from information submitted by a client. • Develop design criteria to fulfil the client's request. • Consider & suggest additional functions for my navigation tool. • Develop a product idea through annotated sketches. • Place & manoeuvre 3D objects, using CAD. • Change the properties of, or combine one or more 3D objects, using CAD.
DIGITAL WORLD **Make**			• Use a template when cutting & assembling the pouch • Follow a list of design requirement • Select & use the appropriate tools & equipment for cutting, joining, shaping & decorating a foam pouch • Apply functional features such as using foam to create soft buttons	• Consider materials & their functional properties, especially those that are sustainable & recyclable (for example, cork & bamboo) • Explain material choices & why they were chosen as part of a product concept • Programme an N,E, S,W cardinal compass
DIGITAL WORLD **Evaluate**			• Analyse & evaluate an existing product • Identify the key features of a pouch • Investigate & analyse a range of timers by identifying & comparing their advantages & disadvantages • Evaluate my micro:bit program against points on my design criteria & amend them to include any changes I made • Document & evaluate my project • Understanding what a logo is & why they are important in the world of design & business • Test my program for bugs (errors in the code • Find & fix the bugs (debug) in my code	• State an event or fact from the last 100 years of plastic history • Explain how plastic is affecting planet Earth & suggest ways to make more sustainable choices • Explain key functions in my program (audible alert, visuals) • Explain how my product would be useful for an animal carer including programmed feature • Explain how my program fits the design criteria & how it would be useful as part of a navigation tool • Develop an awareness of sustainable design • Identify key industries that utilise 3D CAD modelling & explain why

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				• Describe how the product concept fits the client's request & how it will benefit the customers • Explain the key functions in my program, including any additions • Explain how my program fits the design criteria & how it would be useful as part of a navigation tool • Explain the key functions & features of my navigation tool to the client as part of a product concept pitch • Demonstrate a functional program as part of a product concept
DIGITAL WORLD **Technical Knowledge**			• Understand that in programming a 'loop' is code that repeats something again & again until stopped • Know that a Micro:bit is a pocket-sized, codeable computer • Write a program to control (button press) &/or monitor (sense light) that will initiate a flashing LED algorithm • Understand what variables are in programming • Know some of the features of a Micro:bit • Know that an algorithm is a set of instructions to be followed by the computer • Know that it is important to check my code for errors (bugs) • Know that a simulator can be used as a way of checking your code works before installing it onto an electronic device	• Know that a 'device' means equipment created for a certain purpose or job & that monitoring devices observe & record • Know that a sensor is a tool or device that is designed to monitor, detect & respond to changes for a purpose • Understand that conditional statements (&, or, if Booleans) in programming are a set of rules which are followed if certain conditions are met • Know that accelerometers can detect movement • Understand that sensors can be useful in products as they mean the product can function without human input

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COOKING & NUTRITION				
	Milestone 1 – End of EYFS	**Milestone 2 – End of Year 2**	**Milestone 3 – End of Year 4**	**Milestone 4 – End of Year 6**
Design	• Design a healthy "plate"; lunchbox; snack	• Design a smoothie carton packaging by-hand or on ICT software • Design a healthy wrap based on a food combination which work well together.	• Create a healthy & nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell & appearance of the dish • Design a biscuit within a given budget, drawing upon previous taste testing	• Adapt a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients • Write an amended method for a recipe to incorporate the relevant changes to ingredients • Design appealing packaging to reflect a recipe • Write a recipe, explaining the key steps, method & ingredients Including facts & drawings from research undertaken
Make	• Chop fruit & vegetables with support • Practise stirring, mixing, pouring, blending • Begin to understand some food preparation tools, techniques & processes • Measure & weigh food items, non-statutory measures e.g. spoons, cups.	• Chop fruit & vegetables safely to make a smoothie • Identify if a food is a fruit or a vegetable • Learn where & how fruits & vegetables grow • Slice food safely using the bridge or claw grip • Construct a wrap that meets a design brief	• Know how to prepare themselves & a work space to cook safely in, learning the basic rules to avoid food contamination. • Follow the instructions within a recipe. • Cook safely, following basic hygiene rules • Adapt a recipe deciding what can be changed successfully	• Cut & prepare vegetables safely. • Use equipment safely, including knives, hot pans & hobs. • Know how to avoid cross-contamination. • Follow a step by step method carefully to make a recipe • Follow a recipe, including using the correct quantities of each ingredient • Adapt a recipe based on research • Work to a given timescale • Work safely & hygienically with independence
Evaluate	• Evaluate choices made e.g. would a fizzy drink or water be a healthier choice.	• Taste & evaluate different food combinations • Describe appearance, smell & taste • Suggest information to be included on packaging • Describe the taste, texture & smell of fruit & vegetables • Taste testing food combinations & final products	• Establish & use design criteria to help test & review dishes • Describe the benefits of seasonal fruits & vegetables & the impact on the environment • Suggest points for improvement when making a seasonal tart • Evaluate a recipe, considering: taste, smell, texture & appearance	• Identify the nutritional differences between different products & recipes • Identify & describing healthy benefits of food groups • Evaluate a recipe, considering: taste, smell, texture & origin of the food group • Taste testing & scoring final products • Suggest & write up points of improvements in productions

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D&T– Subject Progression

		• Describe the information that should be included on a label • Evaluate which grip was most effective	• Describe the impact of the budget on the selection of ingredients • Evaluate & compare a range of products • Suggest modifications	• Evaluate health & safety in production to minimise cross contamination
Technical Knowledge	• Discuss how to make an activity safe & hygienic • Begin to develop a food vocabulary using taste, smell, texture & feel. • Understand the need for variety in food • Begin to understand that eating well contributes to good health • Makes healthy choices • Know the importance for good health of a healthy diet	• Describe textures • Wash hands & clean surfaces & begin to explain hygiene & begin to keep a hygienic work space. • Say where some foods come from, (i.e. plant, animal, underground) • Describe differences between some food groups (i.e. sweet, vegetable etc.) • Discuss how fruit & vegetables are healthy • Cut & peel safely, with support • Describe how food is farmed or grown • Describe "five a day" • Use the basic principles of a healthy & varied diet to prepare dishes • Understand where food comes from.	• Create a healthy & nutritious recipe using seasonal ingredients, considering the taste, texture, smell & appearance of the dish.	• Adapt a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.

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TEXTILES				
	Milestone 1 – End of EYFS	**Milestone 2 – End of Year 2**	**Milestone 3 – End of Year 4**	**Milestone 4 – End of Year 6**
Design	• Discussing what a good design needs. • Choose from available materials. • Explore, sort & group textiles by texture, colour etc	• Cut fabric neatly with scissor • Use joining methods • Sequence steps taken during construction	• Design & make a template & apply individual design criteria • Write design criteria for a product, articulating decisions made • Design a personalised book sleeve	• Use a template when cutting fabric to ensure they achieve the correct shape. • Use pins effectively to secure a template to fabric without creases or bulges. • Mark & cut fabric accurately, in accordance with their design. • Sew a strong running stitch, making small, neat stitches & following the edge. • Tie strong knots. • Decorate a waistcoat, attaching features (such as appliqué) using thread. • Finish the waistcoat with a secure fastening (such as buttons). • Learn different decorative stitches. • Sew accurately with evenly spaced, neat stitches.
Make	• Develop fine motor/cutting skills with scissors. • Explore fine motor/threading & weaving (under, over technique) with a variety of materials. • Use a prepared needle & wool to practise threading • Apply simple finishing techniques	• Cut fabric neatly with scissors • Use joining methods to decorate a puppet • Sequence steps for construction • Select & cut fabrics for sewing • Decorate a pouch using fabric glue or running stitch • Thread a needle • Sew running stitch, with evenly spaced, neat, even stitches to join fabric • Neatly pinning & cutting fabric using a template	• Follow design criteria to create a cushion or Egyptian collar • Select & cut fabrics with ease using fabric scissors • Thread needles with greater independence • Tie knots with greater independence • Sew cross stitch to join fabric • Decorate fabric using applique • Complete design ideas with stuffing & sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars) • Make & test a paper template with accuracy & in keeping with the design criteria • Measure, mark & cut fabric using a paper template	• Create a 3D stuffed toy from a 2D design • Measure, mark & cut fabric accurately & independently • Create strong & secure blanket stitches when joining fabric • Thread needles independently • Use applique to attach pieces of fabric decoration • Sew blanket stitch to join fabric • Apply blanket stitch so the space between the stitches are even & regular • Use a template when pinning panels onto fabric • Mark & cut fabric accurately, in accordance with a design • Sew a strong running stitch, making small, neat stitches & following the edge • Tie strong knots

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			• Select a stitch style to join fabric, working neatly sewing small neat stitches • Incorporate fastening to a design	• Decorate a waistcoat -attaching objects using thread & adding a secure fastening • Learn different decorative stitches • Sew accurately with even regularity of stitches
Evaluate	• Talk about the finished product	• Reflect upon a finished product, explaining likes & dislikes • Troubleshoot scenarios posed by teacher • Evaluate the quality of the stitching on others' work • Discuss as a class, the success of their stitching against the success criteria • Identify aspects of their peers' work that they particularly like & why	• Evaluate an end product & think of other ways in which to create similar items • Test & evaluate an end product against the original design criteria • Decide how many of the criteria should be met for the product to be considered successful • Suggest modifications for improvement • Articulate the advantages & disadvantages of different fastening types	• Test & evaluate an end product & giving point for further improvements • Evaluate work continually as it is created
Technical Knowledge	• Handle tools & materials safely • Use simple tools to effect changes in materials. • Explore a range of materials, tools & techniques. • Construct with a purpose in mind using a range of resources. • Select tools & techniques in order to assemble & join materials • Manipulate materials to create a planned effect.	• Know that 'joining technique' means connecting two pieces of material together • Know that there are various temporary methods of joining fabric by using staples. glue or pins • Understand that different techniques for joining materials can be used for different purposes • Understand that a template (or fabric pattern) is used to cut out the same shape multiple times • Know that drawing a design idea is useful to see how an idea will loo • Know that sewing is a method of joining fabric • Know that different stitches can be used when sewing • Understand the importance of tying a knot after sewing the final stitch • Know that a thimble can be used to protect my fingers when sewing	• Know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric • Know that when two edges of fabric have been joined together it is called a sea • Know that it is important to leave space on the fabric for the sea • Understand that some products are turned inside out after sewing so the stitching is hidden • Know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud & Velcro • Know that different fastening types are useful for different purposes • Know that creating a mock up (prototype) of their design is useful for checking ideas & proportions	Know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric Understand that it is easier to finish simpler designs to a high standard Know that soft toys are often made by creating appendages separately & then attaching them to the main body Know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong & holds the stuffing securely Understand that it is important to design clothing with the client/ target customer in mind Know that using a template (or clothing pattern) helps to accurately mark out a design on fabric Understand the importance of consistently sized stitches