



Stoke By Nayland C of E Primary School

KS2 Design and Technology 4 Year Knowledge and Skills Cycle

Cycle 1					
	Skills			Knowledge	
	Purpose (Design)	Technique (Make)	Evaluation (Evaluate)	Technical	Additional
Autumn 1 Eating Seasonally	<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 	<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 	
Spring 1 Digital World Electronic Charm	<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 	<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
Summer 1 Structures Constructing a Castle	<ul style="list-style-type: none"> Designing a castle with key features to appeal to a specific person/purpose Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours Designing and/or decorating a castle tower 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 	<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 following features of 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 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

Cycle 2					
	Skills			Knowledge	
	Purpose (Design)	Technique (Make)	Evaluation (Evaluate)	Technical	Additional
Autumn 2 Structures - Pavilions	<ul style="list-style-type: none"> Designing a stable pavilion 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 	<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 pavilions ia 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
Spring 2 Mechanical Systems: making a slingshot car	<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 	<ul style="list-style-type: none"> To understand that all moving things have kinetic energy To understand that kinetic energy is the energy that something (object/person) has by being in motion 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 understand that products change and evolve over time 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.
Summer 2 Electrical Systems: Torches	<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"> Evaluating electrical products Testing and evaluating the success of a final product 	<ul style="list-style-type: none"> To understand that electrical conductors are materials which electricity can pass through To understand that electrical insulators are materials which electricity cannot pass through To know that a battery contains stored electricity that can be used to power products 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

Cycle 3					
	Skills			Knowledge	
	Purpose (Design)	Technique (Make)	Evaluation (Evaluate)	Technical	Additional
Autumn 1 Electrical Systems - Electronic Greeting Cards	<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 • Stating what Sir Rowland Hill invented and why it was important for greeting cards • Analysing and evaluating a range of existing greeting cards 	<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 product • To know that 'mass production' is when a product is made in large quantities by a machine, usually in a factory • To know that one-off production is when only one of a product is made by hand • To know that 'bespoke' means a product was made for a particular reason or person • To understand the development of personal message exchange through to the invention of the Penny Black stamp, and exchanging of greeting cards • To know that a moodboard may include words, sketches, textures, colours, material samples etc. and can act as inspiration when designing
Spring 1 Mechanical Systems - Making a Pop-up Book	<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 aesthetically pleasing result 	<ul style="list-style-type: none"> • Evaluating the work of others and receiving feedback on own work • Suggesting points for improvement 	<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"> • 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
Summer 1 Food: What could be Healthier?	<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 • Designing appealing packaging to reflect a recipe 	<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 • Following a step by step method carefully to make a recipe 	<ul style="list-style-type: none"> • Identifying the nutritional differences between different products and recipes • Identifying and describing healthy benefits of food groups 	<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 	

Cycle 4					
Skills			Knowledge		
	Purpose (Design)	Technique (Make)	Evaluation (Evaluate)	Technical	Additional
Autumn 2 Textiles: Waistcoats	<ul style="list-style-type: none"> • Designing a waistcoat in accordance to specification linked to set of design criteria to fit a specific theme • Annotating designs 	<ul style="list-style-type: none"> • Using a template when pinning panels onto fabric • Marking and cutting fabric accurately, in accordance with a design • Sewing a strong running stitch, making small, neat stitches and following the edge • Tying strong knots • Decorating a waistcoat -attaching objects using thread and adding a secure fastening • Learning different decorative stitches • Sewing accurately with even regularity of stitches 	<ul style="list-style-type: none"> • Evaluating work continually as it is created 	<ul style="list-style-type: none"> • To understand that it is important to design clothing with the client/ target customer in mind • To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric • To understand the importance of consistently sized stitches 	
Spring 2 Structures - Playgrounds	<ul style="list-style-type: none"> • Designing a playground 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 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 	<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 	<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
Summer 2 Digital World: Navigating the World	<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 • Changing the properties of, or combine one or more 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 • 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 	<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

			<ul style="list-style-type: none">• Demonstrating a functional program as part of a product concept		
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