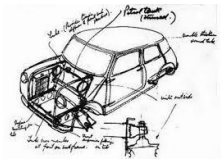
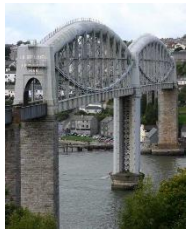
Design & Technology - Curriculum Overview - Year B

Year	Subject specific Vocabulary	'The Greats'	Autumn 2 Structures	Spring 2 Cooking and Nutrition (KS1) Electrical Systems (KS2)	Summer 2 Mechanisms/ Mechanical systems (KS1) Digital World (KS2)
Year 1	Client Design Evaluation Net Stable Strong Test Weak Windmill	**Alec Issigonis** 	**Constructing a Windmill** **Design** -Learning the importance of a clear design criteria -Including individual preferences and requirements in a design **Make** -Making stable structures from card, tape and glue -Following instructions to cut and assemble the supporting structure of a windmill -Making functioning turbines and axles which are assembled into a main supporting structure **Evaluate** -Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't -Suggest points for improvements **Technical Language** -Describing the purpose of structures, including windmills -Learning how to turn 2D nets into 3D structures -Learning that the shape of materials can be changed to improve the strength and stiffness of structures -Understanding that cylinders are a strong type of structure that are often used for windmills and lighthouses -Understanding that windmill turbines use wind to turn and make the machines inside work	**Fruit and Vegetables** **Design** -Designing smoothie carton packaging by-hand or on ICT software **Make** -Chopping fruit and vegetables safely to make a smoothie -Identifying if a food is a fruit or a vegetable -Learning where and how fruits and vegetables grow **Evaluate** -Tasting and evaluating different food combinations -Describing appearance, smell and taste -Suggesting information to be included on packaging **Technical Language** -Understanding the difference between fruits and vegetables -Describing and grouping fruits by texture and taste	**Wheels and Axels** **Design** -Explaining how to adapt mechanisms, using bridges or guides to control the movement -Designing a moving story book for a given audience -Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move -Creating clearly labelled drawings which illustrate movement **Make** -Following a design to create moving models that use levers and sliders -Adapting mechanisms **Evaluate** -Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed -Reviewing the success of a product by testing it with its intended audience -Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move **Technical Language** -Learning that levers and sliders are mechanisms and can make things move -Identifying whether a mechanism is a lever or slider and determining what movement the mechanism will make -Using the vocabulary: up, down, left, right, vertical and horizontal to describe movement -Identifying what mechanism makes a toy or vehicle roll forwards -Learning that for a wheel to move it must be attached to an axle

			-Understanding that axles are used in structures and mechanisms to make parts turn in a circle -Developing awareness of different structures for different purposes		
Year 2	Function Man-made Mould Natural Stable Stiff Strong Structure Test Weak	**Marcel Breuer** 	**Baby Bear's Chair** **Design** -Generating and communicating ideas using sketching and modelling -Learning about different types of structures, found in the natural world and in everyday objects **Make** -Making a structure according to design criteria -Creating joints and structures from paper/card and tape **Evaluate** -Exploring the features of structures -Comparing the stability of different shapes -Testing the strength of own structures -Identifying the weakest part of a structure -Evaluating the strength, stiffness and stability of own structure **Technical Language** -Identifying natural and man-made structures -Identifying when a structure is more or less stable than another -Knowing that shapes and structures with wide, flat bases or legs are the most stable -Understanding that the shape of a structure affects its strength -Using the vocabulary: strength, stiffness and stability -Knowing that materials can be manipulated to improve strength and stiffness -Building a strong and stiff structure by folding paper	**A Balanced Diet** **Design** -Designing a healthy wrap based on a food combination which work well together **Make** -Slicing food safely using the bridge or claw grip -Constructing a wrap that meets a design brief **Evaluate** -Describing the taste, texture and smell of fruit and vegetables -Taste testing food combinations and final products -Describing the information that should be included on a label -Evaluating which grip was most effective **Technical Language** -Understanding what makes a balanced diet -Knowing where to find the nutritional information on packaging -Knowing the five food groups	**Fairground Wheel** **Design** -Creating a class design criterion for a moving monster -Designing a moving monster for a specific audience in accordance with a design criterion -Selecting a suitable linkage system to produce the desired motions -Designing a wheel Selecting appropriate materials based on their properties **Make** -Making linkages using card for levers and split pins for pivots -Experimenting with linkages adjusting the widths, lengths and thicknesses of card used -Cutting and assembling components neatly -Selecting materials according to their characteristics -Following a design brief **Evaluate** -Evaluating own designs against design criteria -Using peer feedback to modify a final design -Evaluating different designs -Testing and adapting a design **Technical Language** -Learning that mechanisms are a collection of moving parts that work together in a machine -Learning that there is an input and output in a mechanism -Identifying mechanisms in everyday objects -Learning that a lever is something that turns on a pivot -Learning that a linkage is a system of levers that are connected by pivots -Exploring wheel mechanisms -Learning how axels help wheels to move a vehicle

Year 3	2-D shapes 3-D shapes Castle Design criteria Evaluate Façade Feature Flag Net Recyclable Scoring Stable Strong Structure Tab Weak Attract Component Constructive-criticism Electrostatic Motion Repel Test	**Pieter van Musschenbroek** 	**Constructing a castle** **Design** -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 need and colours -Designing and/or decorating a castle tower on CAD software **Make** -Constructing a range of 3D geometric shapes using nets -Creating special features for individual designs -Making facades from a range of recycled materials **Evaluate** -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 **Technical Language** -Identifying features of a castle -Identifying suitable materials to be selected and used for a castle, considering weight, compression, tension -Extending the knowledge of wide and flat based objects are more stable -Understanding the terminology of strut, tie, span, beam -Understanding the difference between frame and shell structure	**Static Electricity** **Design** -Designing a game that works using static electricity, including the instructions for playing the game -Identifying a design criteria and a target audience. **Make** -Making an electrostatic game, referring to the design criteria -Using a wider range of materials and equipment safely -Using electrostatic energy to move objects in isolation as well as in part of a system **Evaluate** -Learning to give constructive criticism on own work and the work of others -Testing the success of a product against the original design criteria and justifying opinions **Technical Language** -Understanding what static electricity is and how it moves objects through attraction or repulsion -Generating static electricity independently -Using static electricity to make objects move in a desired way	**Digital World; Electronic Charm** **Design** -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 **Make** -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 **Evaluate** -Analysing and evaluating an existing product -Identifying the key features of a pouch **Technical Language** -Identifying key product developments that occurred as a result of the digital revolution -Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm -Understanding what a loop is in programming -Explaining the basic functionality of my eCharm program -Understanding what is meant by 'point of sale display'

Year 4	Aesthetic Cladding Frame structure Function Inspiration Pavilion Reinforce Stable Structure Target Audience Texture Theme Battery Bulb Buzzer Cell Component Conductor Copper Electricity Insulator Series circuit Switch		**Pavilions** **Design** -Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect -Building frame structures designed to support weight **Make** -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 **Evaluate** -Evaluating structures made by the class -Describing what characteristics of a design and construction made it the most effective -Considering effective and ineffective designs **Technical Language** -Learning what pavilions are and their purpose -Building on prior knowledge of net structures and broadening knowledge of frame structures -Learning that architects consider light, shadow and patterns when designing -Implementing frame and shell structure knowledge -Considering effective and ineffective designs	**Torches** **Design** -Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. **Make** -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 **Evaluate** -Evaluating electrical products -Testing and evaluating the success of a final product and taking inspiration from the work of peers **Technical Language** -Learning how electrical items work -Identifying electrical products -Learning what electrical conductors and insulators are -Understanding that a battery contains stored electricity and can be used to power products -Identifying the features of a torch -Understanding how a torch works -Articulating the positives and negatives about different torches	**Mindful moments timer** **Design** -Writing design criterion for a programmed timer (Micro:bit) -Exploring different mindfulness strategies -Applying the results of my research to further inform my design criteria -Developing a prototype case for my mindful moment timer -Using and manipulating shapes and clipart, using computer-aided design (CAD), to produce a logo -Following a list of design requirements **Make** -Developing a prototype case for my mindful moment timer -Creating a 3D structure using a net **Evaluate** -Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages -Evaluating my micro:bit program against points on my design criteria and amending them to include any changes I made -Documenting and evaluating my project - Understanding what a logo is and why they are important in the world of design and business **Technical Language** -Writing design criterion for a programmed timer (Micro:bit) -Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press -Testing my program for bugs (errors in the code) -Finding and fixing the bugs (debug) in my code

Year 5	Abutment Accurate Arched bridge Beam bridge Bridge Compression Coping saw Evaluation Predict Reinforce Suspension bridge Tension Truss bridge Circuit Graphite Innovative Insulator Parallel circuit Series circuit	**Isambard Kingdom Brunel** 	**Bridges** **Design** -Designing a stable structure that is able to support weight -Creating frame structure with focus on triangulation **Make** -Making a range of different shaped beam bridges -Using triangles to create truss bridges that span a given distance/support a load -Building a wooden bridge structure Independently measuring and marking wood accurately -Selecting appropriate tools and equipment for particular tasks -Using the correct techniques to saws safely -Identifying where a structure needs reinforcement and using card corners for support -Explaining why selecting appropriating materials is an important part of the design process -Understanding basic wood functional properties **Evaluate** -Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary -Suggesting points for improvements for own bridges and those designed by others **Technical Language** -Exploring how to create a strong beam Identifying arch and beam bridges and understanding the terms: compression and tension -Identifying stronger and weaker structures -Finding different ways to reinforce structures -Understanding how triangles can be used to reinforce bridges	**Electronic Greetings Card** **Design** -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 mood board relevant to my chosen theme, purpose and recipient **Make** -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 **Evaluate** -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. **Technical Language** -Learning the key components used to create a functioning circuit -Learning that copper is a conductor and can be used as part of a circuit -Understanding that breaks in a circuit will stop it from working - Explaining how a series circuit will work in my card -Identifying the negative and positive leg of an LED -Drawing a series circuit diagram and symbols	**Monitoring Devices** **Design** -Researching (books, internet) for a particular (user's) animal's needs -Developing design criteria based on research -Generating multiple housing ideas using building bricks -Understanding what a virtual model is and the pros and cons of traditional and CAD modelling -Placing and manoeuvring 3D objects, using CAD -Changing the properties of, or combine one or more 3D objects, using CAD **Make** -Understanding the functional and aesthetic properties of plastics **Evaluate** -Stating an event or fact from the last 100 years of plastic history -Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices **Technical Language** -Describing key developments in thermometer history -Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range -Explaining key functions in my program (audible alert, visuals) -Explaining how my product would be useful for an animal carer including programmed features

			-Articulating the difference between beam, arch, truss and suspension bridges		
Year 6	Adapt Apparatus Bench hook Cladding Coping saw Dowel Jelutong Landscape Modify Prototype Vice Assemble Component Pliers Symmetrical Perspective Drawing	**Antonio Gaudi** 	**Playgrounds** **Design** -Designing a playground featuring a variety of different structures, 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 **Evaluate** -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 **Technical Language** -Knowing that structures can be strengthened by manipulating materials and shapes -Identifying the shell structure in everyday life (cars, aeroplanes, tins, cans) -Understanding man-made and natural structures	**Steady Hand Game** **Design** -Designing a steady hand game - identifying and naming the components required -Drawing a design from three different perspectives -Generating ideas through sketching and discussion • Modelling ideas through prototypes -Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function' **Make** -Constructing a stable base for a game -Accurately cutting, folding and assembling a net -Decorating the base of the game to a high-quality finish -Making and testing a circuit Incorporating a circuit into a base **Evaluate** -Testing own and others finished games, identifying what went well and making suggestions for improvement -Gathering images and information about existing children's toys -Analysing a selection of existing children's toys **Technical Language** -Learning that batteries contain acid, which can be dangerous if they leak -Identifying and naming the circuit components in a steady hand game	**Navigating the world** **Design** -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 **Make** -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 **Evaluate** -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 **Technical Language** -Programming an N, E, S, W cardinal compass -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 -Demonstrating a functional program as part of a product concept