



# St Joseph's Catholic Primary School



## Design and Technology – Structures

### Knowledge & Skills Progression

#### EYFS (Reception)

Please note: this DT progression chart is currently under review and is subject to change

#### Example: Junk modelling

#### Example: Boats

|           |            | Example: Junk modelling   | Example: Boats   |
|-----------|------------|---|--|
| Skills    | Design     | <ul style="list-style-type: none"> <li>• Making verbal plans and material choices.</li> <li>• Developing a junk model.</li> </ul>   | <ul style="list-style-type: none"> <li>• Designing a junk model boat.</li> <li>• Using knowledge from exploration to inform design.</li> </ul>   |
|           | Make       | <ul style="list-style-type: none"> <li>• Improving fine motor/scissor skills with a variety of materials.</li> <li>• Joining materials in a variety of ways (temporary and permanent).</li> <li>• Joining different materials together.</li> <li>• Describing their junk model, and how they intend to put it together.</li> </ul>                                      | <ul style="list-style-type: none"> <li>• Making a boat that floats and is waterproof, considering material choices.</li> </ul>   |
|           | Evaluate   | <ul style="list-style-type: none"> <li>• Giving a verbal evaluation of their own and others' junk models with adult support.</li> <li>• Checking to see if their model matches their plan.</li> <li>• Considering what they would do differently if they were to do it again.</li> <li>• Describing their favourite and least favourite part of their model.</li> </ul> | <ul style="list-style-type: none"> <li>• Making predictions about, and evaluating different materials to see if they are waterproof.</li> <li>• Making predictions about, and evaluating existing boats to see which floats best.</li> <li>• Testing their design and reflecting on what could have been done differently.</li> <li>• Investigating the how the shapes and structure of a boat affect the way it moves.</li> </ul> |
| Knowledge | Technical  | <ul style="list-style-type: none"> <li>• To know there are a range to different materials that can be used to make a model and that they are all slightly different.</li> <li>• Making simple suggestions to fix their junk model.</li> </ul>   | <ul style="list-style-type: none"> <li>• To know that 'waterproof' materials are those which do not absorb water.</li> </ul>   |
|           | Additional |   | <ul style="list-style-type: none"> <li>• To know that some objects float and others sink.</li> <li>• To know the different parts of a boat.</li> </ul>   |

# Design and Technology – Structures

## Knowledge & Skills Progression

|           |            | Year 1  | Year 2  |
|-----------|------------|---|---|
|           |            | Example: Constructing a windmill  | Example: Baby bear's chair  |
| Skills    | Design     | <ul style="list-style-type: none"> <li>• Learning the importance of a clear design criteria.</li> <li>• Including individual preferences and requirements in a design.</li> </ul>   | <ul style="list-style-type: none"> <li>• Generating and communicating ideas using sketching and modelling.</li> <li>• Learning about different types of structures, found in the natural world and in everyday objects.</li> </ul>  |
|           | Make       | <ul style="list-style-type: none"> <li>• Making stable structures from card, tape and glue .</li> <li>• Learning how to turn 2D nets into 3D structures.</li> <li>• Following instructions to cut and assemble the supporting structure of a windmill.</li> <li>• Making functioning turbines and axles which are assembled into a main supporting structure.</li> </ul>  | <ul style="list-style-type: none"> <li>• Making a structure according to design criteria.</li> <li>• Creating joints and structures from paper/card and tape.</li> <li>• Building a strong and stiff structure by folding paper.</li> </ul>   |
|           | Evaluate   | <ul style="list-style-type: none"> <li>• Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't.</li> <li>• Suggest points for improvements.</li> </ul>   | <ul style="list-style-type: none"> <li>• Exploring the features of structures.</li> <li>• Comparing the stability of different shapes.</li> <li>• Testing the strength of own structures.</li> <li>• Identifying the weakest part of a structure.</li> <li>• Evaluating the strength, stiffness and stability of own structure.</li> </ul>  |
| Knowledge | Technical  | <ul style="list-style-type: none"> <li>• To understand that the shape of materials can be changed to improve the strength and stiffness of structures.</li> <li>• To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses).</li> <li>• To understand that axles are used in structures and mechanisms to make parts turn in a circle.</li> <li>• To begin to understand that different structures are used for different purposes.</li> <li>• To know that a structure is something that has been made and put together.</li> </ul>   | <ul style="list-style-type: none"> <li>• To know that shapes and structures with wide, flat bases or legs are the most stable.</li> <li>• To understand that the shape of a structure affects its strength.</li> <li>• To know that materials can be manipulated to improve strength and stiffness.</li> <li>• To know that a structure is something which has been formed or made from parts.</li> <li>• To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.</li> <li>• To know that a 'strong' structure is one which does not break easily.</li> <li>• To know that a 'stiff' structure or material is one which does not bend easily.</li> </ul> |
|           | Additional | <ul style="list-style-type: none"> <li>• To know that a client is the person I am designing for.</li> <li>• To know that design criteria is a list of points to ensure the product meets the clients needs and wants.</li> <li>• To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity.</li> <li>• To know that windmill turbines use wind to turn and make the machines inside work.</li> <li>• To know that a windmill is a structure with sails that are moved by the wind.</li> <li>• To know the three main parts of a windmill are the turbine, axle and structure.</li> </ul> | <ul style="list-style-type: none"> <li>• To know that natural structures are those found in nature.</li> <li>• To know that man-made structures are those made by people.</li> </ul>  |

# Design and Technology – Structures

## Knowledge & Skills Progression

|                  |                   | Year 3   | Year 4   |
|------------------|-------------------|--|--|
|                  |                   | Example: Constructing a castle   | Example: Pavilions   |
| <b>Skills</b>    | <b>Design</b>     | <ul style="list-style-type: none"> <li>• Designing a castle with key features to appeal to a specific person/purpose.</li> <li>• Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours.</li> <li>• Designing and/or decorating a castle tower on CAD software.</li> </ul>  | <ul style="list-style-type: none"> <li>• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect.</li> <li>• Building frame structures designed to support weight.</li> </ul>  |
|                  | <b>Make</b>       | <ul style="list-style-type: none"> <li>• Constructing a range of 3D geometric shapes using nets.</li> <li>• Creating special features for individual designs.</li> <li>• Making facades from a range of recycled materials.</li> </ul>   | <ul style="list-style-type: none"> <li>• Creating a range of different shaped frame structures.</li> <li>• Making a variety of free standing frame structures of different shapes and sizes.</li> <li>• Selecting appropriate materials to build a strong structure and cladding.</li> <li>• Reinforcing corners to strengthen a structure.</li> <li>• Creating a design in accordance with a plan.</li> <li>• Learning to create different textural effects with materials.</li> </ul>  |
|                  | <b>Evaluate</b>   | <ul style="list-style-type: none"> <li>• Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design.</li> <li>• Suggesting points for modification of the individual designs.</li> </ul>   | <ul style="list-style-type: none"> <li>• Evaluating structures made by the class.</li> <li>• Describing what characteristics of a design and construction made it the most effective.</li> <li>• Considering effective and ineffective designs.</li> </ul>   |
| <b>Knowledge</b> | <b>Technical</b>  | <ul style="list-style-type: none"> <li>• To understand that wide and flat based objects are more stable.</li> <li>• To understand the importance of strength and stiffness in structures.</li> </ul>   | <ul style="list-style-type: none"> <li>• To understand what a frame structure is.</li> <li>• To know that a 'free-standing' structure is one which can stand on its own.</li> </ul>  |
|                  | <b>Additional</b> | <ul style="list-style-type: none"> <li>• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose.</li> <li>• To know that a façade is the front of a structure.</li> <li>• To understand that a castle needed to be strong and stable to withstand enemy attack.</li> <li>• To know that a paper net is a flat 2D shape that can become a 3D shape once assembled.</li> <li>• To know that a design specification is a list of success criteria for a product.</li> </ul> | <ul style="list-style-type: none"> <li>• To know that a pavilion is a decorative building or structure for leisure activities.</li> <li>• To know that cladding can be applied to structures for different effects.</li> <li>• To know that aesthetics are how a product looks.</li> <li>• To know that a product's function means its purpose.</li> <li>• To understand that the target audience means the person or group of people a product is designed for.</li> <li>• To know that architects consider light, shadow and patterns when designing.</li> </ul> |

# Design and Technology – Structures

## Knowledge & Skills Progression

**Year 5**

**Year 6**

Example: Bridges

Example: Playgrounds

|                  |                   | Year 5   | Year 6   |
|------------------|-------------------|--|--|
|                  |                   | Example: Bridges   | Example: Playgrounds   |
| <b>Skills</b>    | <b>Design</b>     | <ul style="list-style-type: none"> <li>• Designing a stable structure that is able to support weight.</li> <li>• Creating a frame structure with a focus on triangulation.</li> </ul>  | <ul style="list-style-type: none"> <li>• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.</li> </ul>  |
|                  | <b>Make</b>       | <ul style="list-style-type: none"> <li>• Making a range of different shaped beam bridges.</li> <li>• Using triangles to create truss bridges that span a given distance and support a load.</li> <li>• Building a wooden bridge structure.</li> <li>• Independently measuring and marking wood accurately.</li> <li>• Selecting appropriate tools and equipment for particular tasks.</li> <li>• Using the correct techniques to saws safely.</li> <li>• Identifying where a structure needs reinforcement and using card corners for support.</li> <li>• Explaining why selecting appropriating materials is an important part of the design process.</li> <li>• Understanding basic wood functional properties.</li> </ul> | <ul style="list-style-type: none"> <li>• Building a range of play apparatus structures drawing upon new and prior knowledge of structures.</li> <li>• Measuring, marking and cutting wood to create a range of structures.</li> <li>• Using a range of materials to reinforce and add decoration to structures.</li> </ul> |
|                  | <b>Evaluate</b>   | <ul style="list-style-type: none"> <li>• Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary.</li> <li>• Suggesting points for improvements for own bridges and those designed by others.</li> </ul>   | <ul style="list-style-type: none"> <li>• Improving a design plan based on peer evaluation.</li> <li>• Testing and adapting a design to improve it as it is developed.</li> <li>• Identifying what makes a successful structure.</li> </ul>   |
| <b>Knowledge</b> | <b>Technical</b>  | <ul style="list-style-type: none"> <li>• To understand some different ways to reinforce structures.</li> <li>• To understand how triangles can be used to reinforce bridges.</li> <li>• To know that properties are words that describe the form and function of materials.</li> <li>• To understand why material selection is important based on properties.</li> <li>• To understand the material (functional and aesthetic) properties of wood.</li> </ul>  | <ul style="list-style-type: none"> <li>• To know that structures can be strengthened by manipulating materials and shapes.</li> </ul>  |
|                  | <b>Additional</b> | <ul style="list-style-type: none"> <li>• To understand the difference between arch, beam, truss and suspension bridges.</li> <li>• To understand how to carry and use a saw safely.</li> </ul>   | <ul style="list-style-type: none"> <li>• To understand what a 'footprint plan' is.</li> <li>• To understand that in the real world, design, can impact users in positive and negative ways.</li> <li>• To know that a prototype is a cheap model to test a design idea.</li> </ul>   |

# Design and Technology – Mechanisms/Mechanical systems

## Knowledge & Skills Progression

|                  |                   | Year 1  |   | Year 2   |  |
|------------------|-------------------|---|---|--|--|
|                  |                   | Examples: Moving storybook / Wheels & axles   |   | Examples: Fairground wheel / Moving monsters   |  |
| <b>Skills</b>    | <b>Design</b>     | <ul style="list-style-type: none"> <li>Explaining how to adapt mechanisms, using bridges or guides to control the movement.</li> <li>Designing a moving story book for a given audience.</li> </ul>   | <ul style="list-style-type: none"> <li>Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move.</li> <li>Creating clearly labelled drawings that illustrate movement.</li> </ul>  | <ul style="list-style-type: none"> <li>Selecting a suitable linkage system to produce the desired motion.</li> <li>Designing a wheel.</li> </ul>   | <ul style="list-style-type: none"> <li>Creating a class design criteria for a moving monster.</li> <li>Designing a moving monster for a specific audience in accordance with a design criteria.</li> </ul>   |
|                  | <b>Make</b>       | <ul style="list-style-type: none"> <li>Following a design to create moving models that use levers and sliders.</li> </ul>   | <ul style="list-style-type: none"> <li>Adapting mechanisms, when:                             <ul style="list-style-type: none"> <li>they do not work as they should.</li> <li>to fit their vehicle design.</li> <li>to improve how they work after testing their vehicle.</li> </ul> </li> </ul>   | <ul style="list-style-type: none"> <li>Selecting materials according to their characteristics.</li> <li>Following a design brief.</li> </ul>   | <ul style="list-style-type: none"> <li>Making linkages using card for levers and split pins for pivots.</li> <li>Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.</li> <li>Cutting and assembling components neatly.</li> </ul>   |
|                  | <b>Evaluate</b>   | <ul style="list-style-type: none"> <li>Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed.</li> <li>Reviewing the success of a product by testing it with its intended audience.</li> </ul>  | <ul style="list-style-type: none"> <li>Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.</li> </ul>   | <ul style="list-style-type: none"> <li>Evaluating different designs.</li> <li>Testing and adapting a design.</li> </ul>  | <ul style="list-style-type: none"> <li>Evaluating own designs against design criteria.</li> <li>Using peer feedback to modify a final design.</li> </ul>   |
| <b>Knowledge</b> | <b>Technical</b>  | <ul style="list-style-type: none"> <li>To know that a mechanism is the parts of an object that move together.</li> <li>To know that a slider mechanism moves an object from side to side.</li> <li>To know that a slider mechanism has a slider, slots, guides and an object.</li> <li>To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.</li> </ul> | <ul style="list-style-type: none"> <li>To know that wheels need to be round to rotate and move.</li> <li>To understand that for a wheel to move it must be attached to a rotating axle.</li> <li>To know that an axle moves within an axle holder which is fixed to the vehicle or toy.</li> <li>To know that the frame of a vehicle (chassis) needs to be balanced.</li> </ul> | <ul style="list-style-type: none"> <li>To know that different materials have different properties and are therefore suitable for different uses.</li> </ul>  | <ul style="list-style-type: none"> <li>To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.</li> <li>To know that there is always an input and output in a mechanism.</li> <li>To know that an input is the energy that is used to start something working.</li> <li>To know that an output is the movement that happens as a result of the input.</li> <li>To know that a lever is something that turns on a pivot.</li> <li>To know that a linkage mechanism is made up of a series of levers.</li> </ul> |
|                  | <b>Additional</b> | <ul style="list-style-type: none"> <li>To know that in Design and technology we call a plan a 'design'.</li> </ul>  | <ul style="list-style-type: none"> <li>To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.</li> </ul>   | <ul style="list-style-type: none"> <li>To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder.</li> <li>To know that it is important to test my design as I go along so that I can solve any problems that may occur.</li> </ul> | <ul style="list-style-type: none"> <li>To know some real-life objects that contain mechanisms.</li> </ul>  |

# Design and Technology – Mechanisms/Mechanical systems

## Knowledge & Skills Progression

|                  |                   | Year 3  | Year 4   |
|------------------|-------------------|---|--|
|                  |                   | Example: Pneumatic toys   | Example: Slingshot car   |
| <b>Skills</b>    | <b>Design</b>     | <ul style="list-style-type: none"> <li>• Designing a toy which uses a pneumatic system.</li> <li>• Developing design criteria from a design brief.</li> <li>• Generating ideas using thumbnail sketches and exploded diagrams.</li> <li>• Learning that different types of drawings are used in design to explain ideas clearly.</li> </ul>   | <ul style="list-style-type: none"> <li>• Designing a shape that reduces air resistance.</li> <li>• Drawing a net to create a structure from.</li> <li>• Choosing shapes that increase or decrease speed as a result of air resistance.</li> <li>• Personalising a design.</li> </ul>   |
|                  | <b>Make</b>       | <ul style="list-style-type: none"> <li>• Creating a pneumatic system to create a desired motion.</li> <li>• Building secure housing for a pneumatic system.</li> <li>• Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.</li> <li>• Selecting materials due to their functional and aesthetic characteristics.</li> <li>• Manipulating materials to create different effects by cutting, creasing, folding and weaving.</li> </ul> | <ul style="list-style-type: none"> <li>• Measuring, marking, cutting and assembling with increasing accuracy.</li> <li>• Making a model based on a chosen design.</li> </ul>   |
|                  | <b>Evaluate</b>   | <ul style="list-style-type: none"> <li>• Using the views of others to improve designs.</li> <li>• Testing and modifying the outcome, suggesting improvements.</li> <li>• Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.</li> </ul>   | <ul style="list-style-type: none"> <li>• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.</li> </ul>   |
| <b>Knowledge</b> | <b>Technical</b>  | <ul style="list-style-type: none"> <li>• To understand how pneumatic systems work.</li> <li>• To understand that pneumatic systems can be used as part of a mechanism.</li> <li>• To know that pneumatic systems operate by drawing in, releasing and compressing air.</li> </ul>   | <ul style="list-style-type: none"> <li>• To understand that all moving things have kinetic energy.</li> <li>• To understand that kinetic energy is the energy that something (object/person) has by being in motion.</li> <li>• To know that air resistance is the level of drag on an object as it is forced through the air.</li> <li>• To understand that the shape of a moving object will affect how it moves due to air resistance.</li> </ul>   |
|                  | <b>Additional</b> | <ul style="list-style-type: none"> <li>• To understand how sketches, drawings and diagrams can be used to communicate design ideas.</li> <li>• To know that exploded-diagrams are used to show how different parts of a product fit together.</li> <li>• To know that thumbnail sketches are small drawings to get ideas down on paper quickly.</li> </ul>  | <ul style="list-style-type: none"> <li>• To understand that products change and evolve over time.</li> <li>• To know that aesthetics means how an object or product looks in design and technology.</li> <li>• To know that a template is a stencil you can use to help you draw the same shape accurately.</li> <li>• To know that a birds-eye view means a view from a high angle (as if a bird in flight).</li> <li>• To know that graphics are images which are designed to explain or advertise something.</li> <li>• To know that it is important to assess and evaluate design ideas and models against a list of design criteria.</li> </ul> |

# Design and Technology – Mechanisms/Mechanical systems

## Knowledge & Skills Progression

|           |            | Year 5  | Year 6  |
|-----------|------------|---|---|
|           |            | Example: Pop-up books   | Example: Automata toys  |
| Skills    | Design     | <ul style="list-style-type: none"> <li>Designing a pop-up book which uses a mixture of structures and mechanisms.</li> <li>Naming each mechanism, input and output accurately.</li> <li>Storyboarding ideas for a book.</li> </ul>  | <ul style="list-style-type: none"> <li>Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement.</li> <li>Understanding how linkages change the direction of a force.</li> <li>Making things move at the same time.</li> <li>Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.</li> </ul>  |
|           | Make       | <ul style="list-style-type: none"> <li>Following a design brief to make a pop up book, neatly and with focus on accuracy.</li> <li>Making mechanisms and/or structures using sliders, pivots and folds to produce movement.</li> <li>Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.</li> </ul> | <ul style="list-style-type: none"> <li>Measuring, marking and checking the accuracy of the jelutong and dowel pieces required.</li> <li>Measuring, marking and cutting components accurately using a ruler and scissors.</li> <li>Assembling components accurately to make a stable frame.</li> <li>Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles.</li> <li>Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.</li> </ul> |
|           | Evaluate   | <ul style="list-style-type: none"> <li>Evaluating the work of others and receiving feedback on own work.</li> <li>Suggesting points for improvement.</li> </ul>   | <ul style="list-style-type: none"> <li>Evaluating the work of others and receiving feedback on own work.</li> <li>Applying points of improvement to their toys.</li> <li>Describing changes they would make/do if they were to do the project again.</li> </ul>   |
| Knowledge | Technical  | <ul style="list-style-type: none"> <li>To know that mechanisms control movement.</li> <li>To understand that mechanisms can be used to change one kind of motion into another.</li> <li>To understand how to use sliders, pivots and folds to create paper-based mechanisms.</li> </ul>   | <ul style="list-style-type: none"> <li>To understand that the mechanism in an automata uses a system of cams, axles and followers.</li> <li>To understand that different shaped cams produce different outputs.</li> </ul>  |
|           | Additional | <ul style="list-style-type: none"> <li>To know that a design brief is a description of what I am going to design and make.</li> <li>To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.</li> </ul>  | <ul style="list-style-type: none"> <li>To know that an automata is a hand powered mechanical toy.</li> <li>To know that a cross-sectional diagram shows the inner workings of a product.</li> <li>To understand how to use a bench hook and saw safely.</li> <li>To know that a set square can be used to help mark 90° angles.</li> </ul>  |

# Design and Technology – Electrical systems

## Knowledge & Skills Progression

|                  |                   | Year 3   | Year 4  |
|------------------|-------------------|--|---|
|                  |                   | Example: Electric poster   | Example: Torches  |
| <b>Skills</b>    | <b>Design</b>     | <ul style="list-style-type: none"> <li>• Carry out research based on a given topic (e.g. The Romans) to develop a range of initial ideas.</li> <li>• Generate a final design for the electric poster with consideration to the client's needs and design criteria.</li> <li>• Design an electric poster that fits the requirements of a given brief.</li> <li>• Plan the positioning of the bulb (circuit component) and its purpose.</li> </ul>   | <ul style="list-style-type: none"> <li>• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.</li> </ul>   |
|                  | <b>Make</b>       | <ul style="list-style-type: none"> <li>• Create a final design for the electric poster.</li> <li>• Mount the poster onto corrugated card to improve its strength and allow it to withstand the weight of the circuit on the rear.</li> <li>• Measure and mark materials out using a template or ruler.</li> <li>• Fit an electrical component (bulb).</li> <li>• Learn ways to give the final product a higher quality finish (e.g. framing to conceal a roughly cut edge).</li> </ul>   | <ul style="list-style-type: none"> <li>• Making a torch with a working electrical circuit and switch.</li> <li>• Using appropriate equipment to cut and attach materials.</li> <li>• Assembling a torch according to the design and success criteria.</li> </ul>  |
|                  | <b>Evaluate</b>   | <ul style="list-style-type: none"> <li>• Learning to give and accept constructive criticism on own work and the work of others.</li> <li>• Testing the success of initial ideas against the design criteria and justifying opinions.</li> <li>• Revisiting the requirements of the client to review developing design ideas and check that they fulfil their needs.</li> </ul>   | <ul style="list-style-type: none"> <li>• Evaluating electrical products.</li> <li>• Testing and evaluating the success of a final product.</li> </ul>   |
| <b>Knowledge</b> | <b>Technical</b>  | <ul style="list-style-type: none"> <li>• To understand that an electrical system is a group of parts (components) that work together to transport electricity around a circuit.</li> <li>• To understand common features of an electric product (switch, battery or plug, dials, buttons etc.).</li> <li>• To list examples of common electric products (kettle, remote control etc.).</li> <li>• To understand that an electric product uses an electrical system to work (function).</li> <li>• To know the name and appearance of a bulb, battery, battery holder and crocodile wire to build simple circuits.</li> </ul> | <ul style="list-style-type: none"> <li>• To understand that electrical conductors are materials which electricity can pass through.</li> <li>• To understand that electrical insulators are materials which electricity cannot pass through.</li> <li>• To know that a battery contains stored electricity that can be used to power products.</li> <li>• To know that an electrical circuit must be complete for electricity to flow.</li> <li>• To know that a switch can be used to complete and break an electrical circuit.</li> </ul> |
|                  | <b>Additional</b> | <ul style="list-style-type: none"> <li>• To understand the importance and purpose of information design.</li> <li>• To understand how material choices (such as mounting paper to corrugated card) can improve a product to serve its purpose (remain rigid without bending when the electrical circuit is attached).</li> </ul>   | <ul style="list-style-type: none"> <li>• To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens.</li> <li>• To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.</li> </ul>  |

# Design and Technology – Electrical systems

## Knowledge & Skills Progression

|           |            | Year 5   | Year 6   |
|-----------|------------|--|--|
|           |            | Example: Doodlers  | Example: Steady-hand game  |
| Skills    | Design     | <ul style="list-style-type: none"> <li>Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product.</li> <li>Developing design criteria based on findings from investigating existing products.</li> <li>Developing design criteria that clarifies the target user.</li> </ul>  | <ul style="list-style-type: none"> <li>Designing a steady hand game - identifying and naming the components required.</li> <li>Drawing a design from three different perspectives.</li> <li>Generating ideas through sketching and discussion.</li> <li>Modelling ideas through prototypes.</li> <li>Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'.</li> </ul>   |
|           | Make       | <ul style="list-style-type: none"> <li>Altering a product's form and function by tinkering with its configuration.</li> <li>Making a functional series circuit, incorporating a motor.</li> <li>Constructing a product with consideration for the design criteria.</li> <li>Breaking down the construction process into steps so that others can make the product.</li> </ul>  | <ul style="list-style-type: none"> <li>Constructing a stable base for a game.</li> <li>Accurately cutting, folding and assembling a net.</li> <li>Decorating the base of the game to a high quality finish.</li> <li>Making and testing a circuit.</li> <li>Incorporating a circuit into a base.</li> </ul>  |
|           | Evaluate   | <ul style="list-style-type: none"> <li>Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses.</li> <li>Determining which parts of a product affect its function and which parts affect its form.</li> <li>Analysing whether changes in configuration positively or negatively affect an existing product.</li> <li>Peer evaluating a set of instructions to build a product.</li> </ul> | <ul style="list-style-type: none"> <li>Testing own and others finished games, identifying what went well and making suggestions for improvement.</li> <li>Gathering images and information about existing children's toys.</li> <li>Analysing a selection of existing children's toys.</li> </ul>  |
| Knowledge | Technical  | <ul style="list-style-type: none"> <li>To know that series circuits only have one direction for the electricity to flow.</li> <li>To know when there is a break in a series circuit, all components turn off.</li> <li>To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin.</li> <li>To know a motorised product is one which uses a motor to function.</li> </ul>        | <ul style="list-style-type: none"> <li>To know that batteries contain acid, which can be dangerous if they leak.</li> <li>To know the names of the components in a basic series circuit, including a buzzer.</li> </ul>  |
|           | Additional | <ul style="list-style-type: none"> <li>To know that product analysis is critiquing the strengths and weaknesses of a product.</li> <li>To know that 'configuration' means how the parts of a product are arranged.</li> </ul>  | <ul style="list-style-type: none"> <li>To know that 'form' means the shape and appearance of an object.</li> <li>To know the difference between 'form' and 'function'.</li> <li>To understand that 'fit for purpose' means that a product works how it should and is easy to use.</li> <li>To know that form over purpose means that a product looks good but does not work very well.</li> <li>To know the importance of 'form follows function' when designing: the product must be designed primarily with the function in mind.</li> <li>To understand the diagram perspectives 'top view', 'side view' and 'back'.</li> </ul> |

# Design and Technology – Cooking and nutrition

## Knowledge & Skills Progression

|                  |                 | EYFS (Reception)  | Year 1   | Year 2   |
|------------------|-----------------|---|--|--|
|                  |                 | Examples: Soup  | Examples: Fruit and vegetables   | Examples: A balanced diet  |
| <b>Skills</b>    | <b>Design</b>   | <ul style="list-style-type: none"> <li>• Designing a soup recipe as a class.</li> <li>• Designing soup packaging.</li> </ul>  | <ul style="list-style-type: none"> <li>• Designing smoothie carton packaging by-hand or on ICT software.</li> </ul>  | <ul style="list-style-type: none"> <li>• Designing a healthy wrap based on a food combination which work well together.</li> </ul>   |
|                  | <b>Make</b>     | <ul style="list-style-type: none"> <li>• Chopping plasticine safely.</li> <li>• Chopping vegetables with support.</li> </ul>  | <ul style="list-style-type: none"> <li>• Chopping fruit and vegetables safely to make a smoothie.</li> </ul>   | <ul style="list-style-type: none"> <li>• Slicing food safely using the bridge or claw grip.</li> <li>• Constructing a wrap that meets a design brief.</li> </ul>   |
|                  | <b>Evaluate</b> | <ul style="list-style-type: none"> <li>• Tasting the soup and giving opinions.</li> <li>• Describing some of the following when tasting food: look, feel, smell and taste.</li> <li>• Choosing their favourite packaging design and explaining why.</li> </ul>  | <ul style="list-style-type: none"> <li>• Tasting and evaluating different food combinations.</li> <li>• Describing appearance, smell and taste.</li> <li>• Suggesting information to be included on packaging.</li> </ul>  | <ul style="list-style-type: none"> <li>• Describing the taste, texture and smell of fruit and vegetables.</li> <li>• Taste testing food combinations and final products.</li> <li>• Describing the information that should be included on a label.</li> <li>• Evaluating which grip was most effective.</li> </ul>   |
| <b>Knowledge</b> |                 | <ul style="list-style-type: none"> <li>• To know that soup is ingredients (usually vegetables and liquid) blended together.</li> <li>• To know that vegetables are grown.</li> <li>• To recognise and name some common vegetables.</li> <li>• To know that different vegetables taste different.</li> <li>• To know that eating vegetables is good for us.</li> <li>• To discuss why different packages might be used for different foods.</li> </ul> | <ul style="list-style-type: none"> <li>• Understanding the difference between fruits and vegetables.</li> <li>• To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber).</li> <li>• To know that a blender is a machine which mixes ingredients together into a smooth liquid.</li> <li>• To know that a fruit has seeds and a vegetable does not.</li> <li>• To know that fruits grow on trees or vines.</li> <li>• To know that vegetables can grow either above or below ground.</li> <li>• To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).</li> </ul> | <ul style="list-style-type: none"> <li>• To know that 'diet' means the food and drink that a person or animal usually eats.</li> <li>• To understand what makes a balanced diet.</li> <li>• To know where to find the nutritional information on packaging.</li> <li>• To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar.</li> <li>• To understand that I should eat a range of different foods from each food group, and roughly how much of each food group.</li> <li>• To know that nutrients are substances in food that all living things need to make energy, grow and develop.</li> <li>• To know that 'ingredients' means the items in a mixture or recipe.</li> <li>• To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy.</li> <li>• To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.</li> </ul> |

# Design and Technology – Cooking and nutrition

## Knowledge & Skills Progression

|                  |                 | Year 3  | Year 4   |
|------------------|-----------------|---|--|
|                  |                 | Example: Eating seasonally  | Example: Adapting a recipe   |
| <b>Skills</b>    | <b>Design</b>   | <ul style="list-style-type: none"> <li>• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.</li> </ul>   | <ul style="list-style-type: none"> <li>• Designing a biscuit within a given budget, drawing upon previous taste testing judgements.</li> </ul>   |
|                  | <b>Make</b>     | <ul style="list-style-type: none"> <li>• Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination.</li> <li>• Following the instructions within a recipe.</li> </ul>  | <ul style="list-style-type: none"> <li>• Following a baking recipe, from start to finish, including the preparation of ingredients.</li> <li>• Cooking safely, following basic hygiene rules.</li> <li>• Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet).</li> </ul>  |
|                  | <b>Evaluate</b> | <ul style="list-style-type: none"> <li>• Establishing and using design criteria to help test and review dishes.</li> <li>• Describing the benefits of seasonal fruits and vegetables and the impact on the environment.</li> <li>• Suggesting points for improvement when making a seasonal tart.</li> </ul>  | <ul style="list-style-type: none"> <li>• Evaluating a recipe, considering: taste, smell, texture and appearance.</li> <li>• Describing the impact of the budget on the selection of ingredients.</li> <li>• Evaluating and comparing a range of food products.</li> <li>• Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins).</li> </ul> |
| <b>Knowledge</b> |                 | <ul style="list-style-type: none"> <li>• To know that not all fruits and vegetables can be grown in the UK.</li> <li>• To know that climate affects food growth.</li> <li>• To know that vegetables and fruit grow in certain seasons.</li> <li>• To know that cooking instructions are known as a 'recipe'.</li> <li>• To know that imported food is food which has been brought into the country.</li> <li>• To know that exported food is food which has been sent to another country..</li> <li>• To understand that imported foods travel from far away and this can negatively impact the environment.</li> <li>• To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre.</li> <li>• To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health.</li> <li>• To know safety rules for using, storing and cleaning a knife safely.</li> <li>• To know that similar coloured fruits and vegetables often have similar nutritional benefits.</li> </ul> | <ul style="list-style-type: none"> <li>• To know that the amount of an ingredient in a recipe is known as the 'quantity'</li> <li>• To know that it is important to use oven gloves when removing hot food from an oven.</li> <li>• To know the following cooking techniques: sieving, creaming, rubbing method, cooling.</li> <li>• To understand the importance of budgeting while planning ingredients for biscuits.</li> </ul> |

# Design and Technology – Cooking and nutrition

## Knowledge & Skills Progression

|                  |                 | Year 5   | Year 6  |
|------------------|-----------------|--|---|
|                  |                 | Example: What could be healthier?  | Example: Come dine with me  |
| <b>Skills</b>    | <b>Design</b>   | <ul style="list-style-type: none"> <li>• Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.</li> <li>• Writing an amended method for a recipe to incorporate the relevant changes to ingredients.</li> <li>• Designing appealing packaging to reflect a recipe.</li> </ul>  | <ul style="list-style-type: none"> <li>• Writing a recipe, explaining the key steps, method and ingredients.</li> <li>• Including facts and drawings from research undertaken.</li> </ul>   |
|                  | <b>Make</b>     | <ul style="list-style-type: none"> <li>• Cutting and preparing vegetables safely.</li> <li>• Using equipment safely, including knives, hot pans and hobs.</li> <li>• Knowing how to avoid cross-contamination.</li> <li>• Following a step by step method carefully to make a recipe.</li> </ul>   | <ul style="list-style-type: none"> <li>• Following a recipe, including using the correct quantities of each ingredient.</li> <li>• Adapting a recipe based on research.</li> <li>• Working to a given timescale.</li> <li>• Working safely and hygienically with independence.</li> </ul>   |
|                  | <b>Evaluate</b> | <ul style="list-style-type: none"> <li>• Identifying the nutritional differences between different products and recipes.</li> <li>• Identifying and describing healthy benefits of food groups.</li> </ul>   | <ul style="list-style-type: none"> <li>• Evaluating a recipe, considering: taste, smell, texture and origin of the food group.</li> <li>• Taste testing and scoring final products.</li> <li>• Suggesting and writing up points of improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process.</li> <li>• Evaluating health and safety in production to minimise cross contamination.</li> </ul>  |
| <b>Knowledge</b> |                 | <ul style="list-style-type: none"> <li>• To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues.</li> <li>• To know that I can adapt a recipe to make it healthier by substituting ingredients.</li> <li>• To know that I can use a nutritional calculator to see how healthy a food option is.</li> <li>• 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.</li> </ul> | <ul style="list-style-type: none"> <li>• To know that 'flavour' is how a food or drink tastes.</li> <li>• To know that many countries have 'national dishes' which are recipes associated with that country.</li> <li>• To know that 'processed food' means food that has been put through multiple changes in a factory.</li> <li>• To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides.</li> <li>• To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).</li> </ul> |

# Design and Technology – Textiles

## Knowledge & Skills Progression

|                  |                 | EYFS (Reception)  | Year 1   | Year 2  |
|------------------|-----------------|---|--|---|
|                  |                 | Examples: Bookmarks   | Examples: Puppets  | Examples: Pouches   |
| <b>Skills</b>    | <b>Design</b>   | <ul style="list-style-type: none"> <li>• Discussing what a good design needs.</li> <li>• Designing a simple pattern with paper.</li> <li>• Designing a bookmark.</li> <li>• Choosing from available materials.</li> </ul>   | <ul style="list-style-type: none"> <li>• Using a template to create a design for a puppet.</li> </ul>  | <ul style="list-style-type: none"> <li>• Designing a pouch.</li> </ul>  |
|                  | <b>Make</b>     | <ul style="list-style-type: none"> <li>• Developing fine motor/cutting skills with scissors.</li> <li>• Exploring fine motor/threading and weaving (under, over technique) with a variety of materials.</li> <li>• Using a prepared needle and wool to practise threading.</li> </ul> | <ul style="list-style-type: none"> <li>• Cutting fabric neatly with scissors.</li> <li>• Using joining methods to decorate a puppet.</li> <li>• Sequencing steps for construction.</li> </ul>  | <ul style="list-style-type: none"> <li>• Selecting and cutting fabrics for sewing.</li> <li>• Decorating a pouch using fabric glue or running stitch.</li> <li>• Threading a needle.</li> <li>• Sewing running stitch, with evenly spaced, neat, even stitches to join fabric.</li> <li>• Neatly pinning and cutting fabric using a template.</li> </ul>    |
|                  | <b>Evaluate</b> | <ul style="list-style-type: none"> <li>• Reflecting on a finished product and comparing to their design.</li> </ul>   | <ul style="list-style-type: none"> <li>• Reflecting on a finished product, explaining likes and dislikes.</li> </ul>   | <ul style="list-style-type: none"> <li>• Troubleshooting scenarios posed by teacher.</li> <li>• Evaluating the quality of the stitching on others' work.</li> <li>• Discussing as a class, the success of their stitching against the success criteria.</li> <li>• Identifying aspects of their peers' work that they particularly like and why.</li> </ul> |
| <b>Knowledge</b> |                 | <ul style="list-style-type: none"> <li>• To know that a design is a way of planning our idea before we start.</li> <li>• To know that threading is putting one material through an object.</li> </ul>   | <ul style="list-style-type: none"> <li>• To know that 'joining technique' means connecting two pieces of material together.</li> <li>• To know that there are various temporary methods of joining fabric by using staples, glue or pins.</li> <li>• To understand that different techniques for joining materials can be used for different purposes.</li> <li>• To understand that a template (or fabric pattern) is used to cut out the same shape multiple times.</li> <li>• To know that drawing a design idea is useful to see how an idea will look.</li> </ul> | <ul style="list-style-type: none"> <li>• To know that sewing is a method of joining fabric.</li> <li>• To know that different stitches can be used when sewing.</li> <li>• To understand the importance of tying a knot after sewing the final stitch.</li> <li>• To know that a thimble can be used to protect my fingers when sewing.</li> </ul>          |

# Design and Technology – Textiles

## Knowledge & Skills Progression

|           |          | Year 3   | Year 4   |
|-----------|----------|--|--|
|           |          | Example: Cross-stitch  | Example: Fastenings  |
| Skills    | Design   | <ul style="list-style-type: none"> <li>• Designing and making a template from an existing cushion and applying individual design criteria.</li> </ul>  | <ul style="list-style-type: none"> <li>• Writing design criteria for a product, articulating decisions made.</li> <li>• Designing a personalised book sleeve.</li> </ul>   |
|           | Make     | <ul style="list-style-type: none"> <li>• Following design criteria to create a cushion or Egyptian collar.</li> <li>• Selecting and cutting fabrics with ease using fabric scissors.</li> <li>• Threading needles with greater independence.</li> <li>• Tying knots with greater independence.</li> <li>• Sewing cross stitch to join fabric.</li> <li>• Decorating fabric using appliqué.</li> <li>• Completing design ideas with stuffing and sewing the edges (Cushions) or embellishing the collars based on design ideas (Egyptian collars).</li> </ul> | <ul style="list-style-type: none"> <li>• Making and testing a paper template with accuracy and in keeping with the design criteria.</li> <li>• Measuring, marking and cutting fabric using a paper template.</li> <li>• Selecting a stitch style to join fabric.</li> <li>• Working neatly by sewing small, straight stitches.</li> <li>• Incorporating a fastening to a design.</li> </ul>                  |
|           | Evaluate | <ul style="list-style-type: none"> <li>• Evaluating an end product and thinking of other ways in which to create similar items.</li> </ul>   | <ul style="list-style-type: none"> <li>• Testing and evaluating an end product against the original design criteria.</li> <li>• Deciding how many of the criteria should be met for the product to be considered successful.</li> <li>• Suggesting modifications for improvement.</li> <li>• Articulating the advantages and disadvantages of different fastening types.</li> </ul>                          |
| Knowledge |          | <ul style="list-style-type: none"> <li>• To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces.</li> <li>• To know that when two edges of fabric have been joined together it is called a seam.</li> <li>• To know that it is important to leave space on the fabric for the seam.</li> <li>• To understand that some products are turned inside out after sewing so the stitching is hidden.</li> </ul>   | <ul style="list-style-type: none"> <li>• To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro.</li> <li>• To know that different fastening types are useful for different purposes.</li> <li>• To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.</li> </ul> |

# Design and Technology – Textiles

## Knowledge & Skills Progression

Year 5

Year 6

Example: Stuffed toys

Example: Waistcoats

|                  |                 | Year 5  | Year 6  |
|------------------|-----------------|---|---|
|                  |                 | Example: Stuffed toys   | Example: Waistcoats   |
| <b>Skills</b>    | <b>Design</b>   | <ul style="list-style-type: none"> <li>• Designing a stuffed toy, considering the main component shapes required and creating an appropriate template.</li> <li>• Considering the proportions of individual components.</li> </ul>  | <ul style="list-style-type: none"> <li>• Designing a waistcoat in accordance to a specification linked to set of design criteria.</li> <li>• Annotating designs, to explain their decisions.</li> </ul>   |
|                  | <b>Make</b>     | <ul style="list-style-type: none"> <li>• Creating a 3D stuffed toy from a 2D design.</li> <li>• Measuring, marking and cutting fabric accurately and independently .</li> <li>• Creating strong and secure blanket stitches when joining fabric.</li> <li>• Threading needles independently.</li> <li>• Using appliqué to attach pieces of fabric decoration.</li> <li>• Sewing blanket stitch to join fabric.</li> <li>• Applying blanket stitch so the spaces between the stitches are even and regular.</li> </ul>                             | <ul style="list-style-type: none"> <li>• Using a template when cutting fabric to ensure they achieve the correct shape.</li> <li>• Using pins effectively to secure a template to fabric without creases or bulges.</li> <li>• Marking and cutting fabric accurately, in accordance with their design.</li> <li>• Sewing a strong running stitch, making small, neat stitches and following the edge.</li> <li>• Tying strong knots.</li> <li>• Decorating a waistcoat, attaching features (such as appliqué) using thread.</li> <li>• Finishing the waistcoat with a secure fastening (such as buttons).</li> <li>• Learning different decorative stitches.</li> <li>• Sewing accurately with evenly spaced, neat stitches.</li> </ul> |
|                  | <b>Evaluate</b> | <ul style="list-style-type: none"> <li>• Testing and evaluating an end product and giving point for further improvements.</li> </ul>  | <ul style="list-style-type: none"> <li>• Reflecting on their work continually throughout the design, make and evaluate process.</li> </ul>  |
| <b>Knowledge</b> |                 | <ul style="list-style-type: none"> <li>• To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric.</li> <li>• To understand that it is easier to finish simpler designs to a high standard.</li> <li>• To know that soft toys are often made by creating appendages separately and then attaching them to the main body.</li> <li>• To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely.</li> </ul> | <ul style="list-style-type: none"> <li>• To understand that it is important to design clothing with the client/ target customer in mind.</li> <li>• To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric.</li> <li>• To understand the importance of consistently sized stitches.</li> </ul>   |

# Design and Technology – Digital World

## Knowledge & Skills Progression

|           |            | Year 3  | Year 4  |
|-----------|------------|---|---|
|           |            | Example: Electronic charm   | Example: Mindful moments timer  |
| Skills    | Design     | <ul style="list-style-type: none"> <li>• Problem solving by suggesting potential features on a Micro: bit and justifying my ideas.</li> <li>• Developing design ideas for a technology pouch.</li> <li>• Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge.</li> </ul>  | <ul style="list-style-type: none"> <li>• Writing design criteria for a programmed timer (Micro:bit).</li> <li>• Exploring different mindfulness strategies.</li> <li>• Applying the results of my research to further inform my design criteria.</li> <li>• Developing a prototype case for my mindful moment timer.</li> <li>• Using and manipulating shapes and clipart by using computer-aided design (CAD), to produce a logo.</li> <li>• Following a list of design requirements.</li> </ul>   |
|           | Make       | <ul style="list-style-type: none"> <li>• Using a template when cutting and assembling the pouch.</li> <li>• Following a list of design requirements.</li> <li>• Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch.</li> <li>• Applying functional features such as using foam to create soft buttons.</li> <li>• Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.</li> </ul> | <ul style="list-style-type: none"> <li>• Developing a prototype case for my mindful moment timer.</li> <li>• Creating a 3D structure using a net.</li> <li>• Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press.</li> </ul>   |
|           | Evaluate   | <ul style="list-style-type: none"> <li>• Analysing and evaluating an existing product.</li> <li>• Identifying the key features of a pouch.</li> </ul>   | <ul style="list-style-type: none"> <li>• Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages.</li> <li>• Evaluating my Micro:bit program against points on my design criteria and amending them to include any changes I made.</li> <li>• Documenting and evaluating my project.</li> <li>• Understanding what a logo is and why they are important in the world of design and business.</li> <li>• Testing my program for bugs (errors in the code).</li> <li>• Finding and fixing the bugs (debug) in my code.</li> </ul> |
| Knowledge | Technical  | <ul style="list-style-type: none"> <li>• To understand that, in programming, a 'loop' is code that repeats something again and again until stopped.</li> <li>• To know that a Micro:bit is a pocket-sized, codeable computer.</li> </ul>  | <ul style="list-style-type: none"> <li>• To understand what variables are in programming.</li> <li>• To know some of the features of a Micro:bit.</li> <li>• To know that an algorithm is a set of instructions to be followed by the computer.</li> <li>• To know that it is important to check my code for errors (bugs).</li> <li>• To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device.</li> </ul>   |
|           | Additional | <ul style="list-style-type: none"> <li>• To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result.</li> <li>• To know that in Design and technology the term 'smart' means a programmed product.</li> <li>• To know the difference between analogue and digital technologies.</li> <li>• To understand what is meant by 'point of sale display.'</li> <li>• To know that CAD stands for 'Computer-aided design'.</li> </ul>                                    | <ul style="list-style-type: none"> <li>• To understand the terms 'ergonomic' and 'aesthetic'.</li> <li>• To know that a prototype is a 3D model made out of cheap materials, that allows us to test design ideas and make better decisions about size, shape and materials.</li> </ul>  |

# Design and Technology – Digital World

## Knowledge & Skills Progression

|           |            | Year 5   | Year 6   |
|-----------|------------|--|--|
|           |            | Example: Monitoring Devices  | Example: Navigating the world  |
| Skills    | Design     | <ul style="list-style-type: none"> <li>• Researching (books, internet) for a particular (user's) animal's needs.</li> <li>• Developing design criteria based on research.</li> <li>• Generating multiple housing ideas using building bricks.</li> <li>• Understanding what a virtual model is and the pros and cons of traditional and CAD modelling.</li> <li>• Placing and manoeuvring 3D objects, using CAD.</li> <li>• Changing the properties of, or combining one or more 3D objects, using CAD.</li> </ul> | <ul style="list-style-type: none"> <li>• Writing a design brief from information submitted by a client.</li> <li>• Developing design criteria to fulfil the client's request.</li> <li>• Considering and suggesting additional functions for my navigation tool.</li> <li>• Developing a product idea through annotated sketches.</li> <li>• Placing and manoeuvring 3D objects, using CAD.</li> <li>• Changing the properties of, or combining one or more 3D objects, using CAD.</li> </ul>  |
|           | Make       | <ul style="list-style-type: none"> <li>• Understanding the functional and aesthetic properties of plastics.</li> <li>• Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range.</li> </ul>  | <ul style="list-style-type: none"> <li>• Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo).</li> <li>• Explaining material choices and why they were chosen as part of a product concept.</li> <li>• Programming an N,E, S, W cardinal compass.</li> </ul>  |
|           | Evaluate   | <ul style="list-style-type: none"> <li>• Stating an event or fact from the last 100 years of plastic history.</li> <li>• Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices.</li> <li>• Explaining key functions in my program (audible alert, visuals).</li> <li>• Explaining how my product would be useful for an animal carer including programmed features.</li> </ul>   | <ul style="list-style-type: none"> <li>• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.</li> <li>• Developing an awareness of sustainable design.</li> <li>• Identifying key industries that utilise 3D CAD modelling and explaining why.</li> <li>• Describing how the product concept fits the client's request and how it will benefit the customers.</li> <li>• Explaining the key functions in my program, including any additions.</li> <li>• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.</li> <li>• Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch.</li> <li>• Demonstrating a functional program as part of a product concept pitch.</li> </ul> |
| Knowledge | Technical  | <ul style="list-style-type: none"> <li>• To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record.</li> <li>• To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose.</li> <li>• To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met.</li> </ul>                                    | <ul style="list-style-type: none"> <li>• To know that accelerometers can detect movement.</li> <li>• To understand that sensors can be useful in products as they mean the product can function without human input.</li> </ul>  |
|           | Additional | <ul style="list-style-type: none"> <li>• To understand key developments in thermometer history.</li> <li>• 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.</li> <li>• To know the 6Rs of sustainability.</li> <li>• To understand what a virtual model is and the pros and cons of traditional vs CAD modelling.</li> </ul>   | <ul style="list-style-type: none"> <li>• To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request.</li> <li>• To know that 'multifunctional' means an object or product has more than one function.</li> <li>• To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.</li> </ul>  |