

# Design and Technology Overview



## Unit 1:

The national curriculum for DT aims to ensure that all pupils:

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- Critique, evaluate and test their ideas and products and the work of others
- Understand and apply the principles of nutrition and learn how to cook

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Theme</b> Textiles	<b>Theme</b> Structures	<b>Theme:</b> Textiles	<b>Theme</b> Electrical systems	<b>Theme</b> Textiles	<b>Theme</b> Digital world
<b>Title</b> Puppets	<b>Title</b> Baby Bear's chair	<b>Title</b> Cushions	<b>Title</b> Torches	<b>Title</b> Stuffed toys	<b>Title</b> 3D CAD/CAM (sustainable product)
<b>Subject Content:</b> Pupils will research different puppets and choose to design a puppet based around characters from a chosen familiar story. They will select the materials and use simple decoration to make the puppet and evaluate the process and outcome.	<b>Subject Content:</b> Pupils will explore the concept and features of structures and the stability of different shapes to help them understand that the shape of the structure affects its strength. Pupils will make a structure according to the design criteria linked to Goldilocks and the Three Bears. Each child will produce a finished structure and evaluate its strength, stiffness and stability.	<b>Subject Content:</b> Pupils will research different cushions and design and make a small cushion using a cross-stitch to join two pieces of fabric together. They will design and cut the template for the cushion and use cross-stitch and appliqué to decorate a cushion face. They will stuff the cushion with wadding and understand that they have sewn the seam.	<b>Subject Content:</b> Pupils will learn about electrical items and how they work. They will analyse and evaluate existing electrical products and design a product to fit a set of specific user needs. They will use their design to make and evaluate a torch.	<b>Subject Content:</b> Pupils will design a stuffed toy, considering the main component shapes of their toy. They will create an appropriate template for their stuffed toy and join two pieces of fabric using a blanket stitch. Pupils will neatly cut out their fabric and use appliqué or decorative stitching to decorate. They will use blanket stitch to assemble their stuffed toy. Pupils will identify what worked well and areas for improvement through evaluation.	<b>Subject Content:</b> Pupils will write a design brief and criteria based on a client request. Additionally, they will write a program to include multiple functions as part of a navigation device. Then using their sustainable materials research, pupils will develop a sustainable product concept. They will then use the design and concept to develop 3D CAD skills and produce a virtual model. Pupil will conclude by presenting a pitch to 'sell' the product to a specified client. Teachers could extend to create 1 or a few prototypes using our 3D printer.
<b>Essential Knowledge:</b> <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</li> </ul>	<b>Essential Knowledge:</b> <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'</li> </ul>	<b>Essential Knowledge:</b> <ul style="list-style-type: none"> <li>• To know that appliqué is a way of mending or decorating a textile by applying smaller pieces of fabric.</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</li> </ul>	<b>Essential Knowledge:</b> <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</li> </ul>	<b>Essential 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> </ul>	<b>Essential Knowledge:</b> <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> <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</li> </ul>

<p>template (or fabric pattern) is used to cut out the same shape multiple times.</p> <ul style="list-style-type: none"> <li>To know that drawing a design idea is useful to see how an idea will look.</li> </ul>	<p>structure is one which is firmly fixed and unlikely to change or move.</p> <ul style="list-style-type: none"> <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>	<p>turned inside out after sewing so the stitching is hidden.</p>	<p>electrical circuit must be complete for electricity to flow.</p> <ul style="list-style-type: none"> <li>To know that a switch can be used to complete and break an electrical circuit.</li> </ul>	<ul style="list-style-type: none"> <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>	<p>'multifunctional' means an object or product has more than one function.</p> <ul style="list-style-type: none"> <li>To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.</li> </ul>
<p><b>Essential Skills</b></p> <ul style="list-style-type: none"> <li>Using a template to create a design for a puppet.</li> <li>Cutting fabric neatly with scissors.</li> <li>Using joining methods to decorate a puppet.</li> <li>Sequencing steps for construction.</li> <li>Reflecting on a finished product, explaining likes and dislikes.</li> </ul>	<p><b>Essential Skills</b></p> <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> <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> <li>Exploring the features of structures.</li> <li>Comparing the stability of different shapes.</li> <li>Testing the strength of their own structures.</li> <li>Identifying the weakest part of a structure.</li> <li>Evaluating the strength, stiffness and stability of their own structure.</li> </ul>	<p><b>Essential Skills</b></p> <ul style="list-style-type: none"> <li>Designing and making a template from an existing cushion and applying individual design criteria.</li> <li>Following design criteria to create a cushion.</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.</li> <li>Evaluating an end product and thinking of other ways in which to create similar items.</li> </ul>	<p><b>Essential Skills</b></p> <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> <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> <li>Evaluating electrical products.</li> <li>Testing and evaluating the success of a final product.</li> </ul>	<p><b>Essential Skills</b></p> <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> <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> <li>Testing and evaluating an end product and giving points for further improvements.</li> </ul>	<p><b>Essential Skills</b></p> <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>Developing a product idea through annotated sketches.</li> <li>Placing and manoeuvring 3D objects, using CAD.</li> <li>Changing the properties of, or combine one or more 3D objects, using CAD.</li> <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> <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>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.</li> </ul>
<p>Links to prior learning:</p>	<p>Links to prior learning:</p>	<p>Links to prior learning:</p>	<p>Links to prior learning:</p>	<p>Links to prior learning:</p>	<p>Links to prior learning:</p>

EYFS,-bookmarks- simple decorating skills with hessian fabric		EYFS, bookmarks- simple decorating skills with hessian fabric Y1, puppets- joining and decorating skills	,	EYFS, bookmarks- simple decorating skills with hessian fabric Y1, puppets- joining and decorating skills Y3, Cushions- joining fabric with cross- stitch and applique	Y5, CAM- 2D to 3D design
<b>Links to future learning:</b> Y3,-Cushions- joining fabric with cross- stitch and applique Y5, Stuffed toy- 2D design to 3D model. Blanket stitch and decorative applique.	<b>Links to future learning:</b> Y5- Bridges (Amazon)	<b>Links to future learning:</b> Y3, Cushions Y5, Stuffed toy- 2D design to 3D model. Blanket stitch and decorative applique	<b>Links to future learning:</b> Y6, Steady hand game	<b>Links to future learning:</b>	<b>Links to future learning:</b> KS3- Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture

## Design and Technology Overview

### Unit 2:



The national curriculum for DT aims to ensure that all pupils:

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- Critique, evaluate and test their ideas and products and the work of others
- Understand and apply the principles of nutrition and learn how to cook

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Theme</b> Mechanisms	<b>Theme</b> Mechanisms	<b>Theme</b> Mechanical systems	<b>Theme</b> Mechanisms	<b>Theme</b> Structures	<b>Theme</b> Electrical systems
<b>Title</b> Moving pictures	<b>Title</b> Moving monsters	<b>Title</b> Pneumatic toys	<b>Title</b> Slingshot car	<b>Title</b> Bridges (linked to the Amazon)	<b>Title</b> Steady hand game
<b>Subject Content:</b> Pupils will explore different mechanisms and plan their moving story books against a Design Criteria using differentiated templates, deciding on the backgrounds, moving parts, mechanisms and direction of movement required. Pupils make the various elements of their moving storybooks, including	<b>Subject Content:</b> Pupils will explore different levers, linkages and pivots. They will then design a moving monster toy and select the linkages needed to create the movement. Pupils will make and decorate the monster then evaluate the use and purpose of the outcome.	<b>Subject Content:</b> Pupils will explore pneumatic systems and how they work. They will explore a range of pneumatic toys and use these to design their own functional toy. Pupils will select resources to create a pneumatic toy and create the mechanism for function. They will then test and evaluate the toy against the	<b>Subject Content:</b> Pupils will design and make a slingshot car based on the design criteria. They will design a suitable shape to reduce air resistance and create a functioning chassis. Pupils will conduct a trial accurately and draw conclusions and improvements from the results.	<b>Subject Content:</b> Pupils will research different structures and identify stronger and weaker shapes. They will identify beam, arch and truss bridges and describe their differences. explore the supporting shapes to increase the strength of the bridge. Pupils will design a bridge based on the criteria and select,	<b>Subject Content:</b> Pupils will research and analyse a range of existing children's toys. They will then design a steady hand game based on the design brief. Pupils will use their knowledge of structures to construct a stable base for the game. They will then assemble electronics and complete an electronic game. The pupils

bridges and guides to restrict the movement of their sliders where necessary.		design criteria.		cut and smooth down materials based on their design. They will complete their bridge and identify some areas for improvement, reinforcing their bridges as necessary.	could use these products as part of their Fiver Challenge and use it as part of their evaluation.
<p><b>Essential Knowledge:</b></p> <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>	<p><b>Essential Knowledge:</b></p> <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 an 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>	<p><b>Essential Knowledge:</b></p> <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>	<p><b>Essential Knowledge:</b></p> <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>	<p><b>Essential Knowledge:</b></p> <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 their properties.</li> <li>To understand the material (functional and aesthetic) properties of wood.</li> </ul>	<p><b>Essential Knowledge:</b></p> <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>
<p><b>Essential Skills</b></p> <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> <li>Following a design to create moving models that use levers and sliders.</li> <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>	<p><b>Essential Skills</b></p> <ul style="list-style-type: none"> <li>Creating a design criteria for a moving monster as a class.</li> <li>Designing a moving monster for a specific audience in accordance with a design criteria.</li> <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> <li>Evaluating own designs against design criteria.</li> <li>Using peer feedback to modify a final design.</li> </ul>	<p><b>Essential Skills</b></p> <ul style="list-style-type: none"> <li>Designing a toy that 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> <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</li> </ul>	<p><b>Essential Skills</b></p> <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> <li>Measuring, marking, cutting and assembling with increasing accuracy.</li> <li>Making a model based on a chosen design.</li> <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>	<p><b>Essential Skills</b></p> <ul style="list-style-type: none"> <li>Designing a stable structure that is able to support weight. Creating a frame structure with focus on triangulation.</li> <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</li> </ul>	<p><b>Essential Skills</b></p> <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> <li>Constructing a stable base for a game.</li> <li>Accurately cutting, folding and assembling a net.</li> </ul>

		<p>appealing pneumatic toy.</p> <ul style="list-style-type: none"> <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> <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>		<p>techniques to saw safely.</p> <ul style="list-style-type: none"> <li>• Identifying where a structure needs reinforcement and using card corners for support.</li> <li>• Explaining why selecting appropriate materials is an important part of the design process.</li> <li>• Understanding basic wood functional properties.</li> <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>• 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> <li>• Testing their 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>
<p><b>Links to prior learning:</b> EYFS,- attaching different materials using key techniques</p>	<p><b>Links to prior learning:</b> Y1, Moving pictures</p>	<p><b>Links to prior learning:</b> Y1, Moving pictures Y2, Moving monsters</p>	<p><b>Links to prior learning:</b> EYFS,simple moving pictures Y1, Moving pictures- familiar story book creation. Y</p>	<p><b>Links to prior learning:</b> Y2, Baby bears chair</p>	<p><b>Links to prior learning:</b> Y4, Torches- designing and making a functional torch</p>
<p><b>Links to future learning:</b> Y4, slingshot car.</p>	<p><b>Links to future learning:</b> Y4, Slingshot car</p>	<p><b>Links to future learning:</b> Y4, Slingshot car</p>	<p><b>Links to future learning:</b> Y6,Steady hand game</p>	<p><b>Links to future learning:</b> Y6 Steady hand game</p>	<p><b>Links to future learning:</b> KS3 - identify and solve their own design problems and develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations.</p>