



Coleshill Church of England Primary School

Progression of Skills in Design & Technology – Mechanisms

Our curriculum is about **bringing engagement, fun and enthusiasm to learning**. We aspire to provide outstanding educational experiences which will inspire children to develop into lifelong independent learners. **Our high expectations develop character** and pride in our identity as Coleshill Church of England Primary school, preparing every child for their future.

Mechanisms	
National Curriculum	
KS1	KS2
<p><u>Design</u></p> <ul style="list-style-type: none"> design purposeful, functional, appealing products for themselves and other users based on design criteria generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology <p><u>Make</u></p> <ul style="list-style-type: none"> select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics <p><u>Evaluate</u></p> <ul style="list-style-type: none"> explore and evaluate a range of existing products evaluate their ideas and products against design criteria <p><u>Technical knowledge</u></p> <ul style="list-style-type: none"> build structures, exploring how they can be made stronger, stiffer and more stable explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. 	<p><u>Design</u></p> <ul style="list-style-type: none"> use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design <p><u>Make</u></p> <ul style="list-style-type: none"> select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities <p><u>Evaluate</u></p> <ul style="list-style-type: none"> investigate and analyse a range of existing products evaluate their ideas and products against their own design criteria and consider the views of others to improve their work understand how key events and individuals in design and technology have helped shape the world <p><u>Technical knowledge</u></p> <ul style="list-style-type: none"> apply their understanding of how to strengthen, stiffen and reinforce more complex structures understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] apply their understanding of computing to program, monitor and control their products.

	Overview	Skills	
Reception			
Year 1 – Flight	<u>Moving Story Book</u> Y1 - Children explore levers and sliders to make a moving story book	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
		Technological Knowledge	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
Year 2 – Collesh	<u>Ferris Wheel</u> Pupils explore existing mechanisms in order to design, test and make their own big wheel style ride	Design	Designing a moving monster for a specific audience in accordance with a design criteria Selecting a suitable linkage system to produce the desired motions Designing a wheel Selecting appropriate materials based on their properties

Year 3 - Transport		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
		Technological Knowledge	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
	<u>Pneumatic Systems</u> Y3 - Pupils examine pneumatic systems using syringes and balloons then apply their understanding of mechanical systems to create their own pneumatic toys	Evaluate Technological Knowledge	Designing a toy which uses a pneumatic system Developing design criteria from a design brief Generating ideas using thumbnail sketches and exploded diagrams Learning that different types of drawings are used in design to explain ideas clearly
			<u>Year 4 – may not be covered</u> Designing a shape that reduces air resistance Drawing a net to create a structure from Choosing shapes that increase or decrease speed as a result of air resistance Personalising a design
		Make	Creating a pneumatic system to create a desired motion Building secure housing for a pneumatic system Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy Selecting materials due to their functional and aesthetic characteristics Manipulating materials to create different effects by cutting, creasing, folding, weaving
			Measuring, marking, cutting and assembling with increasing accuracy Making a model based on a chosen design
		Evaluate	Using the views of others to improve designs Testing and modifying the outcome, suggesting improvements
			<u>Year 4 – may not be covered</u> Evaluating the speed of a final product based on: the affect of shape on speed and the accuracy of workmanship on performance
		Technological Knowledge	Understanding how pneumatic systems work Learning that mechanisms are a system of parts that work together to create motion Understanding that pneumatic systems can be used as part of a mechanism Learning that pneumatic systems force air over a distance to create movement
			<u>Year 4 – may not be covered</u> Learning that products change and evolve over time Learning that all moving things have kinetic energy Understanding that kinetic energy is the energy that something (object person) has by being in motion

<p>Pop-Up Books</p> <p>Pupils use a range of mechanisms and construction techniques to create a pop up story book for younger children</p>	Design	<p>Designing a popup book which uses a mixture of structures and mechanisms</p> <p>Naming each mechanism, input and output accurately</p> <p>Storyboarding ideas for a book</p>
		<p><u>Year 6 – may not be covered</u></p> <p>After experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement</p> <p>Understanding how linkages change the direction of a force</p> <p>Making things move at the same time</p>
	Make	<p>Following a design brief to make a pop up book, neatly and with focus on accuracy Making mechanisms and/ or structures using sliders, pivots and folds to produce movement</p> <p>Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result</p>
		<p><u>Year 6 – may not be covered</u></p> <p>Measuring, marking and checking the accuracy of the jelutong and dowel pieces required</p> <p>Measuring, marking and cutting components accurately using a ruler and scissors</p> <p>Assembling components accurately to make a stable frame</p> <p>Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles</p> <p>Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set</p>
	Evaluate	<p>Evaluating the work of others and receiving feedback on own work</p> <p>Suggesting points for improvement</p>
		<p>Evaluating the work of others and receiving feedback on own work</p> <p>Applying points of improvements</p> <p>Describing changes they would make/ do if they were to do the project again</p>
	Technological Knowledge	<p>Knowing that an input is the motion used to start a mechanism</p> <p>Knowing that output is the motion that happens as a result of starting the input</p> <p>Knowing that mechanisms control movement</p> <p>Describing mechanisms that can be used to change one kind of motion into another</p>
		<p><u>Year 6 – may not be covered</u></p> <p>Using a bench hook to saw safely and effectively</p> <p>Exploring cams, learning that different shaped cams produce different follower movements</p> <p>Exploring types of motions and direction of a motion</p>

