

Year 5 – Mechanical and Electrical systems – Controllable toy					
Contexts, users, purposes	User & Brief		Design Criteria / Specification		Resources
	A child		Videos and photographs of moving toys, different mechanisms, MDF, card, wooden wheels, plastic or wooden cams, dowels, card boxes, glue, masking tape, glue guns, double sided sticky tape, card, finishing products, junior hacksaw, clamps, hand drill		
	To design and make a controllable toy for a child				
Evaluative exist ing products, individuals & events	Purpose				Vocabulary
	<ul style="list-style-type: none">Describe the purpose of their productIndicate the design features of their products that will appeal to intended usersExplain how particular parts of their products workCarry our research, using surveys, interviews and questionnaires				
	Investigate Products			Contextual Knowledge	
	<ul style="list-style-type: none">How well products have been designedHow well products have been madeWhy materials have been chosenWhat methods of construction have been usedHow well products workHow well products achieve their purposeHow well products meet user needs and wantsWho designed and made the products?Where the products were designed and madeWhen the products were designed and madeWhether products can be recycled or reusedHow much products cost to make?How innovative products areHow sustainable materials areWhat impact products have beyond their intended purpose			<ul style="list-style-type: none">Investigate different types of movements created using cams, pulley and gearsAsk questions: How innovative is the product? What design decisions have been made? What type of movement can be seen? What types of mechanical components are used and where are they positioned? What are the input movement, process and output movement of the system? How well does the product work? Why have the materials and components been chosen? How well has it been designed? How well has it been made?Explore different axles, axle holders and wheels that are fixed and free movingExplore SAM Labs to use to control the toy	
	Individuals and Events				
	Mary Anderson – windscreen wiper Mary Van Brittan Brown – alarm system James Blyth – wind turbine				

Generating, developing, communicating, modelling, creating	Activate Prior Knowledge		Technical Knowledge		
	<ul style="list-style-type: none">• Basic understanding of different types of movement• Experience of cutting and joining different materials• An understanding of how to strengthen and stiffen structures• Understanding of a basic electrical circuit• Experience of using computer software		<ul style="list-style-type: none">• Know that knowledge from computing, science and maths can be used to help design and make products that work• Know that mechanical and electrical systems have an input, process and output• Know how mechanical systems such as cams or pulleys and levers create movement• Know how more complex electrical circuits and components can be used to create functional products		
	Focus Task		Focus Task		
	Know how to use a cam to create movement		Know how to create an electrical circuit: <ul style="list-style-type: none">• Discuss the difference between input, process and output• Use input (switches), process and output (bulbs and buzzers)• Identify and correct faults in the circuit		
	Know how to join different materials in different ways				
	Know how to strengthen and stiffen materials		Know how to use technology (SAM Labs) to create a controllable circuit		
	Know how to handle and use the equipment safely				
	Know how to mark, cut, measure and shape accurately		Know how to use multiple output devices and control them with one switch		
	Know how to create a prototype				
	Design		Evaluate	<ul style="list-style-type: none">• Identify strengths and areas for development in their design• Consider views of others including users, to improve their work• Refer to design specification as they design• Critically evaluate the quality of the design, manufacture and fitness for purpose of their product as they design	
<ul style="list-style-type: none">• Share and clarify ideas through discussion• Create at least 2 designs and• Model ideas using prototypes• Use annotated sketches and exploded drawings to develop and communicate ideas• Generate innovative ideas drawing on research• Make design decisions taking account of constraints such as time, resources and cost					
Planning	<ul style="list-style-type: none">• Select from a range of tools and equipment suitable for the task• Explain their choice of tools and equipment in relation to the techniques they will be using• Select materials and components suitable for the task• Explain their choice of materials and components based on functional and aesthetic qualities• Produce an appropriate list of tools, equipment and materials that they need• Formulate step by step plans as a guide to making				
Making	<ul style="list-style-type: none">• Follow procedures for safety• Accurately measure, mark out, cut and shape materials and components• Accurately assemble, join and combine materials and components• Accurately apply a range of finishing techniques• Use techniques that require a number of steps• Demonstrate resourcefulness when tackling practical problems		Evaluate	<ul style="list-style-type: none">• Identify strengths and areas for development in their products• Consider the views of others, including users, to improve their work• Critically evaluate the quality of the design, manufacture and fitness for purpose of their product as they make• Evaluate their product against their original design specification	