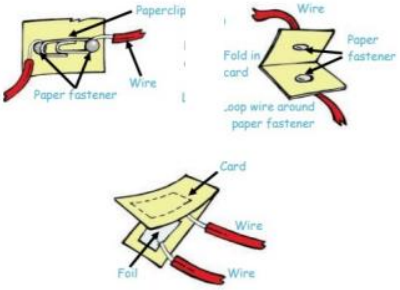
Year 4 NC - pupils should be taught to:	Design, make and evaluate a battery-operated light. How we do this in Year 4	Year 4 Vocabulary / Glossary
Design • use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular 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. **Make** • select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately; **Evaluate** • 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. **Technical Knowledge** • understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors];	Understand how key events and individuals in design and technology have helped shape the world. Extend to developments in Lighting. To be aware of the safety requirements when using electricity. To investigate a selection of "battery powered lights" (e.g. cycle lights, hand held torches, "miners" head lamps) aimed at different users. Recap on circuits and types – series and parallel. To know how to make a simple circuit incorporating a battery, light-bulb, switch and connecting wires in a safe manner. To make a handmade switch using classroom materials e.g. aluminium foil, paper fasteners, paper clips. To identify a purpose and user for a "battery powered light", including: - target market - where the light will mainly be used and what for - Design features of light Discuss, draw and label materials, measurements and decoration of design using an annotated sketch. safe Include an "exploded diagram" of the arrangement of the circuit inside the casing and the kind of switch to be used. Test making stable structures (e.g. lamps), selecting materials, cutting, joining and evaluating materials. Describe the main stages of making their product using technical vocabulary e.g. circuit, battery, battery holder, bulb, wire, insulation, crocodile, connector, aluminium foil switch . Select suitable materials to make their light out of which are similar to the effect they want to achieve. Select appropriate sized batteries and components to hold the battery.	Circuit -path through which electricity passes. Conductor—a material which allows an electrical current to pass through it. Insulator—a material which does not easily allow an electrical current to pass through it. Push-to-break switch—a switch turned off by pressing it. Push-to-make switch—a switch turned on by pressing it. Input device—components that are used to control an electrical circuit (switches). Output device—components that produce an outcome (bulbs, buzzers). **Switches** ◊ Push-to-break switches are off whilst the button is pushed but returns to its 'on' position when it is released.  ◊ Push-to-make switches allows the electricity to flow through the circuit when it is pressed but when it is released the circuits is broken and the switch is off.  **Handmade switches** ⇒ There are different ways of making handmade switches. They involve using a conducting material between two wires that would complete the circuit when pushed together. 

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	Assemble, join and combine materials in order to make the "battery operated light". Evaluate their light (both during and at the end of making process) on functionality and aesthetics.	

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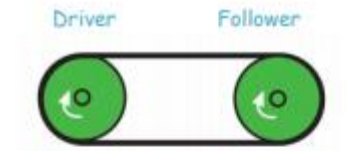
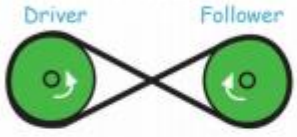
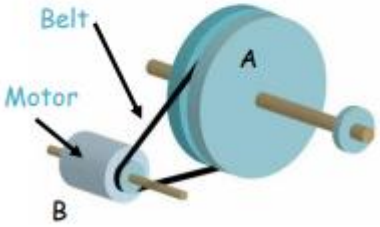
Year 6 NC - pupils should be taught to:	Design, make and control a rotating Fairground ride How we do this in Year 6	Year 6 Vocabulary / Glossary
Design • use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular 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. **Make** • 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. **Evaluate** • investigate and analyse a range of existing products; • evaluate their ideas and products	Understand how key events and individuals in design and technology have helped shape the world by studying the development of fairground rides https://www.sheffield.ac.uk/nfca/researchandarticles/fairgroundrides Investigate fairground rides which have rotating parts, thinking about how they move, what are the components that join them together and the mechanisms that make them work by labelling different pictures of fairground rides. Create a pulley and belt system using electric components (batteries, motor, wires) and compare to earlier made circuit. Explore and investigate electrical motors and how they make fairground rides rotate. Investigate the mechanism (belt and pulley system) which turns the ride by using appropriate materials to create a circuit. Explain how the mechanism works using appropriate technical vocabulary (belt, pulley, axle, rotation, motor). Recap on electrical circuits and explore how light components are including in fairground rides. Explore purpose / effect. Recap on woodwork in year 5 to consider what materials will create an effective stable framework. Develop design criteria with inclusion of light(s) and moving mechanisms to inform design by focusing on: - aesthetics - function - ergonomics - quality - usability - environment - safety Sketch and annotate an exploded design of circuits, labelling using appropriate scientific and technical vocabulary.	function, innovative, design specification, design brief, user, purpose design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional, mock-up, prototype pulley, drive belt, rotation, spindle, driver, follower, motor circuit, circuit diagram, annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output Pulley – a grooved wheel over which a drive belt can run. Drive belt – the belt which connects and transfers movement between two pulleys. Gearing up or down – changing the rotational speed of a product by the use of pulleys or gears. When a small pulley or gear is used to drive a larger one the rotational speed is reduced and the product has been geared down. Mechanical system - a set of related parts or components used to create movement. Driver – the gear or pulley that provides the input movement to the system. Follower - the gear or pulley that provides the output movement to the system. Motor spindle – the rod on the end of the motor onto which a gear or pulley is attached.  The pulleys rotate in the same direction  The pulleys rotate in different directions  The small pulley (B) rotates much more quickly than the large pulley (A)

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.

Technical Knowledge

- 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];

Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.

Make a mock-up of their fairground ride in which a motor successfully drives a rotating part

Make modifications to the model as necessary.

Competently select from and use appropriate tools to accurately measure, mark, cut and assemble materials, and securely connect electrical components to produce reliable, functional products.

Ensure they are working safely and carefully when using a hacksaw and bench hook to cut wood accurately.

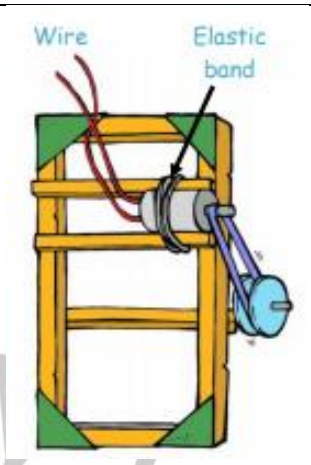
Use a glue gun safely.

Strengthen joins by using card triangles or pin nails.

Use finishing and decorative techniques suitable for the product they are designing and making.

Test the system to demonstrate its effectiveness for the intended user and purpose.

Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.



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