

Y6 Fairground ride	
Links made with other subjects	Science: Electricity Maths: Geometry – Position & direction English: Link this unit to work on texts where children identify an audience for a particular genre of writing or their own work, considering the effect this has on the use and organisation of language Art: Pupils will develop their techniques including their control and their use of materials with creativity, experimentation and an increasing awareness of different kinds of art, craft and design
The BIG Question	Can you make a fairground ride that turns?
The BIG Outcome	To create a model of a fairground ride using a chosen mechanism.
DT objectives (link to NC)	<u>Design</u> • 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 <u>Make</u> • 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 <u>Evaluate</u> • 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 <u>Technical knowledge</u> • 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.
Prior knowledge What prior knowledge is needed for children to be successful in this unit?	This unit builds on the mechanisms units covered in year 2 (wheeled toy) year 3 (moving robot) and year 5 (battery vehicle)
Future learning Consider the conceptual knowledge within a subject that pupils need for future learning not just the recall of	This unit gives prior knowledge to: Design Technology – KS3 Curriculum

DT Scheme of Work

facts but the importance of concepts	
Resources	<u>Parts included in class kit:</u> ▪ 30 cardboard task boxes ▪ 100 54mm diameter wheels with 6mm hole ▪ 100 mixed diameter wheels with 5mm hole ▪ 1 pack of corrugated plastic (10 coloured sheets 500mm x 500mm) ▪ 30 motors ▪ 30 motor mounts ▪ 30 battery holders ▪ 30 toggle switches ▪ 90 crocodile leads ▪ 120 plastic pulleys ▪ 100 cotton reels ▪ 50 lengths of 8mm square wood ▪ 40 lengths of 5mm diameter wooden rod ▪ 500 jumbo coloured lolly sticks ▪ 245g box of rubber bands <u>Tools needed:</u> ▪ Plenty of lightweight passengers, e.g. small soft toys or children can make figures out of cardboard ▪ Rulers ▪ Pencils ▪ Pencil sharpeners ▪ Blu Tack ▪ Calculators ▪ Pairs of compasses ▪ Protractors ▪ Large scissors ▪ Low melt glue guns and glue sticks ▪ Junior hacksaw ▪ Sandpaper ▪ Stop watch
Vocabulary/ Glossary	<u>General</u>: Design, evaluate, refine, explore, improvement, tools equipment <u>Designing</u> model, mock-up, select, modify, improvements, design proposal, <u>Making</u> framework, construct, temporary joins, permanent joins <u>Knowledge and understanding</u> spindle, axle, drive belt, pulley, electric motor, speed, framework, horizontal, vertical, computer control, mechanism <u>Types of movement</u> rotation, electric circuit, switch, gearing up or down
Knowledge	<u>The knowledge that children will learn and remember:</u> to know that there are a variety of products which incorporate a pulley and a drive belt and are driven by a motor or a computer to know how control systems are used in everyday life to use the appropriate vocabulary related to control systems to know that they can model their ideas for their own product using mechanisms, by using construction kits or making a model from a set of instructions to know how to include an electric motor in a simple circuit to know how the direction of rotation and speed of an electric motor can be controlled to know how rotation can be transferred from one part of a model to another by using pulleys and a belt to know how a belt and pulley system can increase or decrease the speed of rotation (by using different size pulleys) to make decisions with regard to the type of ride they will make to model their intended fairground ride

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	to make modifications as they go along to evaluate against their original criteria and suggest ways that their ride could be improved
SEND expectations	Children will have generated one viable idea after discussion with the teacher; have assembled a simple mechanism as part of the design; have used tools with some accuracy and finished their ride in a design that they have prepared with some assistance.
Questioning Questions you can pose to deepen, consolidate and challenge pupil's understanding	1. <i>Who is your the fairground ride for? (audience)</i> 2. <i>What is the purpose of your fairground ride? (persuade, inform, entertain)</i> 3. <i>How will your fairground ride be decorated? Is it based on a real life model? (persuade/ inform/entertain)</i> 4. <i>Which parts of your fairground ride will move? Why have you chosen these?</i> 5. <i>Which mechanisms will you choose to create your moving parts?</i> 6. <i>Does your product do what you intended it to do? (fulfil its purpose)</i>
Suggested activities	Use a video or photographs of rides that have rotating parts. Discuss the children's experience of such rides. – How does the ride turn? – Can you see the mechanism which turns the ride? – What are the different parts called? – How are the components joined together? - Possibility of fairground ride coming to school – subject leader to enquire. The children could examine a collection of toys and other appliances in which there are electric motors eg toy vehicles, battery-operated fan, battery-operated shaver, cassette player. With the children, look at mechanisms in which a belt and pulley is used eg car fan belt, electric sewing machine, record player turntable, vacuum cleaner, roller blind. Safety: Ensure that these appliances are not plugged in or running when being examined. Ask the children to investigate different ways of making a framework to hold the model eg build the model on a baseboard, use card and straws, use a framework with added triangles or diagonals, use a construction kit. Consider carefully how to support the rotating part on a well-supported axle or a spindle. Show the children how a model can be controlled with a computer. Motor speed and direction can be controlled and a sequence of operations can be developed by the children writing a simple program of instructions. The children could use elastic bands and pulley eg cotton reels on spindles to investigate transferring movement from one axle to another. The children could use construction kit components to investigate and to change the speed of rotation, using belts and pulleys. The children could use a pulley on an electric motor with an elastic band to produce rotation of cotton reels on a spindle or a drinks can on an axle. Hold the electric motor in different positions to discover the best arrangement. Discuss which type of ride the children will make eg roundabout type (horizontal rotation) or Ferris wheel type (vertical rotation). Restrict the children's choices to one of these for simplicity and manageability; explain to the children the aspects of the design that are set (eg according to materials available) and those aspects about which they have free choice (eg colour, finish, style). Ask the children to list their

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	design criteria in order of importance. 'To be successful our fairground ride should.....' Discuss how they will finish their model. Ask the children to make a model of the mechanism they will use by employing a construction kit or simple card box to hold the components. (They should be able to play around with and alter this preliminary model quickly and easily at this stage. This 'mock-up' could be taken as equivalent to a design drawing for this project). Ask the children to make the rotating part of their product first and ensure that it can be rotated freely by hand. Then the children can add the electric motor and drive belt. After this the children can finish their ride eg by adding cladding, colour, seats. Ask the children to evaluate their product by referring to their own criteria for success. – Does the model rotate freely without the motor? – Does the motor drive the ride at the right speed? – Is the product an interesting fairground ride? – Does the product have a strong and stable framework? Children's models can be connected to the computer via an interface. Using appropriate software, features eg flashing bulbs and buzzers can be controlled.
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