



Year 5
Autumn 2

Design and Technology – Mechanical System: Fairgrounds

<p>Our JOY</p> <p>Curriculum</p> <p>J- Jesus <u>Instilling values of:</u> <u>Trust, Responsibility, Truth, Compassion,</u> <u>Thankfulness, Respect</u> <u>Responsible use of materials and tools, such as hot glue guns, scissors, saws and electrical components.</u></p> <p>O- Others <u>British Values :Liberty, Tolerance, Mutual Respect, Democracy, Rule of Law</u> <u>Environment</u> <u>To be curious about the past and how fairground rides have evolved.</u></p> <p>Y- Yourself <u>New knowledge and skills gained</u> <u>Well-being</u> <u>Aspirations</u> <u>Be proud of their finished products.</u></p>	<p><u>Enrichment</u> Prior visit to the carousel on the Victorian Southport heritage trail.</p>	<p>Think like a Designer by: Using creativity and imagination. Design and make products that solve problems within a variety of contexts. Be resourceful, innovative and take risks.</p>																						
	<p><u>National Curriculum Coverage</u></p> <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 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 <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] 																							
<p>Cross Curricular Opportunities:</p> <p>Maths – measuring in mm and cm. English – writing a persuasive advert for their fairground ride. Science – Forces Art & Design – creating an aesthetically pleasing fairground ride that would appeal to primary-aged children. Computing – using search engines</p>	<p><u>Prior learning</u> Science (Y4) – knowledge of simple electrical circuits and switches. Maths – understanding of rotation (Y2) and accurately measuring in cm. Design & Technology – mechanical systems (Y1, 3, 4)</p> <p><u>Future Learning</u> DT KS3 - understand how more advanced mechanical systems used in their products enable changes in movement and force. understand how more advanced electrical and electronic systems can be powered and used in their products.</p>	<table border="0"> <tr> <td><u>Key Vocabulary</u></td> <td>Aesthetic</td> </tr> <tr> <td>Mechanism</td> <td>Axel</td> </tr> <tr> <td>Pulley</td> <td>Motor</td> </tr> <tr> <td>Drive belt</td> <td>Motor spindle</td> </tr> <tr> <td>Component</td> <td>Dowel</td> </tr> <tr> <td>Electrical circuit</td> <td>Crocodile leads</td> </tr> <tr> <td>Purpose</td> <td>Battery</td> </tr> <tr> <td>Audience/user</td> <td>Switch</td> </tr> <tr> <td>Rotate</td> <td>Carousel</td> </tr> <tr> <td>Reels</td> <td>Chair swing ride</td> </tr> <tr> <td></td> <td>Ferris wheel</td> </tr> </table>	<u>Key Vocabulary</u>	Aesthetic	Mechanism	Axel	Pulley	Motor	Drive belt	Motor spindle	Component	Dowel	Electrical circuit	Crocodile leads	Purpose	Battery	Audience/user	Switch	Rotate	Carousel	Reels	Chair swing ride		Ferris wheel
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Key Knowledge and Vocabulary	Key Vocabulary	Lesson Sequence (6)
<p>To explore a range of familiar products using rotating parts. What everyday objects use electrical motors to cause rotation? How is rotation used in fairground rides? How do electrical circuits and motors used to make objects rotate?</p>	<p>Prototype, audience, design, research, rotate, motor, components</p>	<p>Revisit: How many different fairground rides have you been on? What were they like? How did they move? Teach: Look at different photos of fairground rides. Discuss: How does the ride turn? Can you see the mechanism that turns the ride? How are the components joined together? Explain that lots of fairground rides and other everyday objects use electric motors to make them work. Show children the picture of the circuit with a motor on. How does the motor work? Children to think, pair, share their ideas. How many other objects can you think of that might use an electric motor to make parts rotate? Children to discuss ideas with a partner then share with the class. Apply: Sketch two of the fairground rides and label how the rotating parts work. Plenary: How do you think you could speed up or slow down the rotation of an object or part of an object using an electrical motor and circuit?</p>
<p>To investigate ways of using electrical motors to create rotating parts. How does an electrical circuit with a motor be used to create rotating parts? How do pulley and belt systems work? How can we use electrical components to create replica fairground rides?</p>	<p>Electrical circuit, motor, switch, battery, reel, rotate, components</p>	<p>Revisit: Key vocabulary quiz. Teach: Show the children the components needed to make an electrical circuit with a motor using the pictures on the slides and real objects if available. How can we use this to make a fairground ride with a rotating part? What would we need to attach to the motor? What different kinds of rotating parts could we have? Children to think, pair, share their ideas. Explore how pulley and belt systems can be used to transfer movement from one axle to another. How could we use this in a design for a fairground ride? What rides might use systems like these? Apply: Provide children with wires, motors, switches, card, elastic bands, reels, and any other appropriate materials and ask them to create a circuit that would be suitable for making a variety of fairground rides. Plenary: Describe the system you created – explain how they make the moving part of the fairground ride move.</p>
<p>To investigate ways of making a framework for a fairground ride. How do we strengthen and reinforce structures? What materials would be useful for a structure?</p>	<p>Doweling, joins, materials, structures, framework</p>	<p>Revisit: What key components do you need to create an electrical circuit? Teach: Show children the pictures of various fairground rides on the slides and ask them to think about how they could create the frameworks for these rides using e.g. card, wood, doweling, etc. Explore different ways of strengthening materials and joins, e.g. using added triangles and diagonals. Apply: Create different structures using card and straws/doweling in small groups. Plenary: How could your design be used for your own fairground ride? How could you combine the electrical circuit with your framework design?</p>
<p>To design a fairground ride with a rotating part. What type of ride will you make? Can you design an electric circuit for your ride? How will you create your product?</p>	<p>Design, rotate, framework, stable, construct, purpose, user, materials, tools</p>	<p>Revisit: What ideas have you had so far about how you could design your own fairground ride? Encourage children to think about the work they have done on using circuits and motors, and on creating stable frameworks. Teach: Explain that over the next few lessons they will be designing, making and evaluating their own fairground rides. What kind of ride do you think you would like to make? Which part will rotate? How will you control the movement? How will you make your framework? Apply: Design their own fairground ride using worksheet to support thinking. Plenary: Share design with a peer. Is the design clear? Have they included all the details they need to include? What do you like about their design? Is there anything you think can be improved upon?</p>
<p>To make a fairground ride following a design. Can you create a fairground ride with a rotating part? How can you ensure you are working safely?</p>	<p>Rotate, framework, stable, construct, purpose, user, materials, tools</p>	<p>Revisit: Ask children to get out their designs from lesson 4 and give them a few minutes to look through them to remind themselves of what they need to do. Teach: Discuss: How will you make sure your finished product will look like your original design? How will you make sure your framework structure is stable? What will you do if something goes wrong? How can you make sure you will work safely with the various tools, materials and electrical components? Apply: Children to follow their designs to create their own fairground rides with rotating parts. Plenary: Encourage children to look carefully at their finished products to ensure there is nothing more they can do to improve their products further. Are there any joins that need to be made more secure? Can you see any part of the electrical circuit that should be hidden? Does your fairground ride look good as well as work well?</p>
<p>To be able to evaluate a finished product. What is successful about your product? How could you improve your product?</p>	<p>Evaluate, quality, fair, product, purpose, audience, sturdy</p>	<p>Revisit: Teach: Set up a mini fairground in the classroom and allow children time to examine their peers' products. Discuss: Which designs do you like and why? Why do you think it is so important to evaluate a finished product? What did you like best/worst about designing and making your fairground ride? What would you do differently if you were to make your fairground ride again? Apply: Children to complete evaluation worksheet in their booklet. Plenary: What do you think is the most important thing you have learnt throughout this unit? Why?</p>



DT – Year 5

Mechanical Systems: Fairground Ride

Key Vocabulary	Definition
Mechanical system/Mechanism	Something that uses related components which act together to make movement.
Electrical circuit	<p>A path of electrical components that allow electricity to pass through it.</p> <div style="text-align: center;"> </div> <p>A drawing of a circuit often looks like this:</p>
Component	A part or element of a larger whole, especially a machine or vehicle.
Motor spindle	The rod on the end of the motor onto which a gear or pulley is attached.
Rotate	To turn on or around a fixed point.
Purpose	Why have you designed your product? How will it be used?
Audience	Who is your product designed for? Who will use it?
Pulley	A grooved wheel over which a drive belt can run.
Drive belt	The belt which connects and transfers movement between two pulleys.

Fairground rides:



Ferris wheel



Carousel/Merry-go-round



Chair swing ride

Mechanism components:



crocodile leads



battery



elastic bands



dowels



motor



wooden pulleys



plastic reels



- Remove jewellery and tie long hair back.
- Never use anything with a plug, wire or cord around water.
- Follow instructions carefully.
- Remember that electricity can be dangerous if not used correctly.
- Stand up when using materials/tools. Make sure your chair is tucked in.
- Return all equipment safely and responsibly.

Year 5 DT Autumn 2 (Mechanical Systems) Assessment

Key Learning

- To explore a range of familiar products using rotating parts.
- To investigate ways of using electrical motors to create rotating parts.
- To investigate ways of making a framework for a fairground ride.
- To design a fairground ride with a rotating part.
- To make a fairground ride following a design.
- To be able to evaluate a finished product.

- I can explain how rotation is used in fairground rides.
- I can use motors and other electrical components to create a rotating part.
- I can make a structurally sound framework for a fairground ride.
- I can choose appropriate materials and tools to make a product.
- I can design and make a prototype of a fairground ride for Southport Pleasureland for primary-aged children.
- I consider purpose and user throughout the design process.
- I can use tools and materials safely and responsibly.
- I can evaluate my finished product.

Emerging

Expected

Exceeding

Additional comments