



Medium Term Unit Planning

Topic Name: DT – cam toys	
Learning outcome: The children will explore various mechanical toys, learning how to rotary system works and looking at the designs of each. They will learn about the design and evaluation process for a mechanical toy and complete this process for their own, creating several prototypes before committing to their final design. They will cut materials with precision and refine the finish with appropriate tools.	
Hook: Experience a range of mechanical toys.	Topic Showcase (e.g. display, museum, performance, presentation): Year 5 rotation where all children get to experience all toys made.
Oracy: In each lesson, the children will be taught a range of new key vocabulary which they will be expected to use accurately throughout the unit.	Key Vocabulary: Rotary, cams, faller, dowelling, split pins, cardboard, design, evaluate, mechanism, assemble, decoration.
Key Texts (whole class reading/end of the day book/Talk for Writing Texts etc.): Under review	
Citizenship/Community Opportunities (Focus – change in attitude/increase knowledge and awareness/make a difference): The children will increase their knowledge of the world around them as they become more aware of the toy designers around the world.	
Experiences/Visits/Visitors: Children to experience a range of toys.	



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Main subjects covered:

DT

DT threshold concepts:

Master practical skills

This concept involves developing the skills needed to make high quality products.

Design, make, evaluate and improve

This concept involves developing the process of design thinking and seeing design as a process.

Take inspiration from design throughout history

This concept involves appreciating the design process that has influenced the products we use in everyday life.

Notes:

This unit of work will offer the children opportunities to cut materials with precision and refine the finish with appropriate tools to create a professional looking mechanical toy.

Lesson title and learning Intention	Threshold concepts (success criteria)	Milestones (success criteria)	Lesson structure/differentiation
1. To understand the function of cams in a moving toy. To think of ideas for our moving toy project.	Master practical skills This concept involves developing the skills needed to make high quality products. Design, make, evaluate and improve	Convert rotary motion to linear using cams. Use innovative combinations of electronics (or computing) and	Show the children some real-life mechanical toys with differing designs. Explain how the mechanism works. Change cams in a mechanism and identify how this affects the



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	<p>This concept involves developing the process of design thinking and seeing design as a process.</p> <p>Take inspiration from design throughout history This concept involves appreciating the design process that has influenced the products we use in everyday life</p>	<p>mechanics in product designs.</p> <p>Design with the user in mind, motivated by the service a product will offer (rather than simply for profit).</p> <p>Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices.</p> <p>Create innovative designs that improve upon existing products.</p> <p>Evaluate the design of products so as to suggest improvements to the user experience.</p>	<p>movement. Children to sketch cam mechanism and write definitions of cam and follower. Children to jot down suitable ideas for moving toys.</p>
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<p>2. To understand rotary and linear motion.</p> <p>3. To evaluate a toy which moves using a cam.</p>	<p>Master practical skills This concept involves developing the skills needed to make high quality products.</p> <p>Design, make, evaluate and improve This concept involves developing the process of design thinking and seeing design as a process.</p> <p>Take inspiration from design throughout history This concept involves appreciating the design process that has influenced the products we use in everyday life</p>	<p>Convert rotary motion to linear using cams.</p> <p>Use innovative combinations of electronics (or computing) and mechanics in product designs.</p> <p>Design with the user in mind, motivated by the service a product will offer (rather than simply for profit).</p> <p>Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices.</p>	<p>Recap key terms from previous lesson (cam and follower). Introduce two new terms rotary and linear. Children to write definitions. Model how to assemble a moving toy. Children to evaluate materials, skills consider what worked well and what could be improved on the model example before starting to plan their own toy.</p>
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		<p>Create innovative designs that improve upon existing products.</p> <p>Evaluate the design of products so as to suggest improvements to the user experience.</p>	
<p>4. To plan and design the moving toy.</p>	<p>Master practical skills This concept involves developing the skills needed to make high quality products.</p> <p>Design, make, evaluate and improve This concept involves developing the process of design thinking and seeing design as a process.</p>	<p>Convert rotary motion to linear using cams.</p> <p>Use innovative combinations of electronics (or computing) and mechanics in product designs.</p> <p>Design with the user in mind, motivated by the service a product will offer (rather than simply for profit).</p>	<p>Recap the successes with yesterday's model toy. Discuss criteria for successful moving toy and children agree on a class criterion. Children to complete design ideas sheet drawing two possible models and then give reasons for their final choice. Children present their ideas to design team (rest of the class) for evaluation against agreed criteria. Children to complete planning sheet</p>



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			materials and steps to be taken.
<p>5. To assemble the basic structure of our moving toy.</p> <p>6. To safely saw dowelling to the appropriate length.</p> <p>7. To begin decoration.</p>	<p>Master practical skills This concept involves developing the skills needed to make high quality products.</p> <p>Design, make, evaluate and improve This concept involves developing the process of design thinking and seeing design as a process.</p>	<p>Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape).</p> <p>Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).</p> <p>Develop a range of practical skills to create products (such as</p>	<p>Safety talk about tools and equipment with procedure demonstration. Children work with a buddy to saw the lengths of dowelling. Teacher to demonstrate assembling the basic structure box and cams. Children assemble their box once design has been approved. Discuss how we should hold the mechanism in place. Demonstrate decoration materials if necessary. Children assemble boxes and saw dowelling. Once checked they can begin decoration.</p>



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		<p>cutting, drilling and screwing, nailing, gluing, filing and sanding).</p> <p>Make products through stages of prototypes, making continual refinements.</p> <p>Use prototypes, cross-sectional diagrams and computer aided designs to represent designs.</p>	
<p>8. To decorate the moving toy according to our design.</p>	<p>Master practical skills This concept involves developing the skills needed to make high quality products.</p> <p>Design, make, evaluate and improve This concept involves developing the process of</p>	<p>Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape).</p>	<p>Begin with 10-minute evaluation children look at what has been achieved so far (with partner) and decide on next step for this lesson. Continue decorating moving toy.</p>



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	<p>design thinking and seeing design as a process.</p>	<p>Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).</p> <p>Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filing and sanding).</p>	
<p>9. To finish our moving toy and evaluate according to the agreed design criteria.</p>	<p>Master practical skills This concept involves developing the skills needed to make high quality products.</p> <p>Design, make, evaluate and improve</p>	<p>Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape).</p>	<p>Children finish decorating moving toys and move onto evaluation stage when toy is finished. With partner, the children evaluate their toy and discuss what they think works about their partners</p>



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	<p>This concept involves developing the process of design thinking and seeing design as a process.</p>	<p>Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).</p> <p>Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filing and sanding).</p> <p>Ensure products have a high-quality finish, using art skills where appropriate.</p>	<p>toy. Children to complete evaluation sheets about what they would do differently next time. End with celebration show toys, children talk about their design choices and what they think is most effective about their toy.</p>
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