



Year Group: 3	Term: Autumn #2 2021	Teacher: Jessica Hindley	Subject lead: Catherine O'Neill Edwards	Overview: Mechanical Systems – Lever And Linkages Design, make and evaluate a Christmas card using levers and linkages	Key End Points: By the end of this unit children will be able to: - use and explain lever linkage systems	
Links to other learning: RE: Christmas Spoken Language: instructions Science: materials	Relevant Prior Learning: Y1: Mechanisms; sliders and levers and simple structures Y2: Mechanisms; wheels and axles	Relevant Future Learning: Y4: Mechanisms: pneumatics & hydraulics Y5: Mechanisms; CAMS Y6: Mechanisms; gears & pulleys	High Quality Text: The Colour Monster; A Pop Up Book About Feelings <i>Anna Llenas</i>	Risk Assessment: Split pins can be sharp, children to make holes to push split pin through rather than creating the hole with the split pin. Use of blu-tack and sharp pencil to make holes in card/paper. Take care with recycled materials and allergies	Teacher CPD: Please read the DATA project on a page sheets attached at the end of this plan prior to teaching. https://www.youtube.com/watch?v=1kC4uX2BoDw (13m 21s) how to make 3 different lever and linkage PowerPoint – understanding levers and linkages Know what a thumbnail sketch is	
<u>Learning Intention</u>	<u>Lesson Outline (Key Questions in colour)</u>			<u>Resources</u>	<u>Vocabulary</u>	<u>Lowest 20% Adaptations</u>
1	<p>This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is investigating (levers and linkages) Today we will be investigating a certain type of mechanism. What is a mechanism? Allow children to discuss. <i>Something that does a job using moving parts.</i> The mechanism we will be learning about today are Levers and Linkages. Levers and linkages use stiff rods and pivots to move. We are going to explore some to see how they work. Investigative and Evaluative Activities (IEAs) • Children investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms. You could also have some pre-made for the children to explore. • Use questions to develop children's understanding e.g. Who might it be for? What is its purpose? What do you think will move? How will you make it move? What part moved and how did it move? How do you think the mechanism works? What materials have been used? How effective do you think it is and why? What else could move? https://www.youtube.com/watch?v=1kC4uX2BoDw Watch this 13 minute video which shows three different types of linkages. Have pre-prepared long strips for levers (black on video), shorter strips for output (gold/brown/yellow on video) and similar sized paper strips for bridge/guide (pink/red on video), white card backboard (a5) Encourage children to have a go at making the mechanism as the video progresses (video can be played twice or paused as necessary) –. Revisit key vocabulary throughout lesson. Children record sketches of their learning. (teach children how to draw thumbnail sketches) What should be labelled on the diagram? What is a fixed pivot? What is a loose pivot? Encourage correct vocab e.g. fixed or loose pivot not split pin, lever not card. Children record thumbnail sketches in their books and label (using a ruler to draw lines)</p>			Range of books about levers and range of pop up books Split pins Blu-tack Sharp pencil Hole punch Card paper strips Card for back board	Mechanism Linkage Pivot lever stiff rod Output input Loose pivot Fixed pivot Backboard Guide/bridge Linear Arc Parallel motion Oscillating Reverse motion Mechanism Linkage Slot System rotary	
2	<p>This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is using levers and linkages Focused Tasks (FTs) • Demonstrate a range of lever and linkage mechanisms to the children using prepared teaching aids. Use the power point 'Understanding levers and linkages'</p>			Split pins Blu-tack Sharp pencil Hole punch Card paper strips Card for back board	Pivot Output Loose pivot Lever input Fixed pivot Backboard Guide/bridge Linear Arc Parallel motion Oscillating	

	<ul style="list-style-type: none"> • Know and use technical vocabulary 	<ul style="list-style-type: none"> • Use questions to develop children's understanding e.g. Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots? Which are the loose pivots? • Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques. • Children should develop their knowledge and skills by replicating one or more of the teaching aids, put in books and label. Encourage children to discuss their work with a partner and encourage use of correct vocabulary. 	Levers 7 linkages design sheet	Reverse motion Linkage System Mechanism Slot rotary	
3	<ul style="list-style-type: none"> • Generate their own design criteria • Use annotated sketches and prototypes to develop, model and communicate ideas 	<p>This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is designing</p> <p>What is a design brief? Plan for a project that focuses on a product, user and purpose. Using what we have learned so far in our two lessons, we are going to apply this learning and we are going to 'Design, make and evaluate a Christmas card using levers and linkages'. What is the product? What is the purpose? Purpose is to give pleasure and season greetings as well as to demonstrate we can use a lever and linkage system Who will be the user? Children select who they will make their card for.</p> <p>What is design criteria? Precise goals that a project must achieve in order to be successful.</p> <p>Ask the children to generate a range of ideas, encouraging creative responses, complete Levers and linkage design sheet Agree on design criteria that can be used to guide the development and evaluation of the children's products. What three things must it have? E.g. it must have a fixed and loose pivot, it must be strong enough to work, it must be Christmas themed.</p> <p>Complete Y3 levers and linkages design sheet</p>	Y3 levers and linkages design sheet	Design Label criteria Design brief Product Purpose User	draw ideas
4 & 5	<ul style="list-style-type: none"> • Order the main stages of making. • Select and use appropriate tools with some accuracy to cut, shape and join paper and card. 	<p>Children choose their final design – that they will make into a final product. Revisit design brief and design criteria... ensure these are fulfilled. Children completed a detailed labelled diagram of their final design. Children then order the stages of making... how will they make their product? Discuss how they will make it, what they will use and why e.g. why will they use a hole punch instead of blue tack and a sharp pencil. Record this in their books.</p> <p>Children make their design, ensure they take their time and work carefully and precisely, explain they will have enough time and do not need to rush.</p>	Range of card, paper, split pins, hole punches, computers to print Christmas pictures off if needed Glue, reclaimed materials	Design Tools Accuracy Making Manufacture Accuracy Join Shape connect	plan
6	<ul style="list-style-type: none"> • Evaluate their own products and ideas against criteria and user needs, as they design and make. 	<p>This is a DT lesson. In DT we design and make to solve problems. The skill we will be using this lesson is evaluating</p> <p>What is an evaluation? Why do we do an evaluation? Why is an important part of DT?</p> <p>Display evaluation sheet and encourage group or paired discussion. Invite children to ask other children to make comments on their design and products.</p> <p>Children complete their evaluation. Display Y3 evaluation sheet on board as prompt questions for children to use to record in their books</p>	Y3 evaluation sheet	Evaluate Review Assess Improve Change Reflect Critique feedback	