Year 5 Medium Term Planning for the Learning Challenge Curriculum

Term: Spring DT Project: CAM Toy

Previous Learning	New Knowledge /Consolidation	End of Project Outcome	Environmental Links	Key Inventors/People	Project Vocabulary
Creating movement within a 2D format using sliders to create a moving picture (simple lever mechanism). Moving/lifting objects using pulleys.	Measuring and shaping wooden dowels (moving from card to wood) with growing accuracy in order to connect pre-cut CAMs. Moving/lifting objects using CAMs.	Creating a basic cam toy (building of shaping and joining card to create movement – lift rather than slide) & lifting objects in different ways (pulley vs. CAM).	N/A	Google Challenge What is the oldest mechanical toy? Use Google to investigate the oldest mechanical toy – mind map on PowerPoint. *(One of the first mechanical toys is the flying pigeon by Archytas of Tarentum created 400 years BC. In 16th Century Leonardo da Vinci created his mechanical lion as a present for king Louis XII).*	Hazard Cross Section Develop Variation Specification Combining Support Manoeuvrability Cam, Handle, Follower, Slider & Cam Shaft Analyse Finish Fit for purpose

Section	Lesson	Key Skills	Learning Objective & Activity
Explore	**1**	• Begin to make clear points considering function, cost, and sustainability. • Learn about key individuals or events in product innovation. • Understand how cams & gears function (mechanical components). • Consider sustainability of materials and the product life cycle. • Begin to use logical reasoning to consider why products have evolved over time.	**To investigate how different components, alter the movement of a CAM toy.** Introduce how a CAM toy works using key parts (follower, CAM & crank) – BBC Bitesize slides used to support discussion. Explore real world examples, focusing on where the elements attach. Allow the children to explore (wooden & card) – discuss the advantages of using different material e.g. card= light, easy to manipulate and shape; wood = strong. Watch Art and Design / DT KS2: How to design a moving shop window display: https://www.bbc.co.uk/teach/class-clips-video/design-challenge-make-moving-shop-window-display/z7ytscw. Explore how different shapes result in different movement (circle, pair, snail, heart) Challenge: What is the oldest mechanical toy? Use Google to investigate the oldest mechanical toy – mind map on PowerPoint. *(One of the first mechanical toys is the flying pigeon by Archytas of Tarentum created 400 years BC. In 16th Century Leonardo da Vinci created his mechanical lion as a present for king Louis XII).*

			What is the purpose of a CAM toy? Class discussion
Plan	**2**	• Generate multiple ideas based on research. • Use CAD or 3D modelling for detailed designs. • Develop design criteria considering feedback. • Begin to investigate some benefits of using sustainable materials. • Understand how cams & gears function (mechanical components).	Based on the moving shop window display & BBC Bitesize slides, create a design criterion as a class – What does our CAM toy need? **Make design choices based on the desire other others in the class. Make design choices to create a CAM toy that moves in a pre-planned way.** What does your partner want? Discuss what type of movement and design that both members of the team are happy with. Use Google images to locate a character (with white background) and save to Shared. PAIRED TASK - Create a plan on PPT (Use computer-aided designs as part of the planning process) selecting: • The cam shape (explain how the character will move based on explore). • Add an image of the character to be moved. • Consider and add a possible material to be used as a base (e.g. teabag box, pringles tub, cracker box, cereal bar box.
Make	**3 & 4 (double lesson)**	• Use various tools and materials to create functional products. • Reinforce and strengthen structures. • Apply finishing techniques for improved aesthetics. • Create a cam mechanism with support.	**<u>To measure, cut and position wooden dowels to create movement.</u>** Measure the base and select appropriate wooden dowels to fit the width and height of the box. Cut base material (box), measure and mark out points for the cam shaft. Insert Cam & follower. Use pre-cut CAMs and connect to the dowels, using trial and error testing to position (evaluate position and shape of components, with reference to planning, and alter if necessary). Cut out and attach their character. Construct a handle by combining the strengthening - (peg, wire, tape, dowels & pipe cleaners). How could we strengthen and finish the connections? Combine materials (e.g. tape, pipe cleaners, bluetac, rubber washers) to strengthen the connections and add finishing techniques to hide joins. Class discussion: What problems did we have and how were they solved practically during the make? (Mind map).

Evaluate	**5**	• Test and refine products to assess & improve effectiveness. • Consider functionality, durability, and aesthetics. • Collect feedback for improvement. • Begin to use their own design criteria for product assessment.	**<u>To reflect on the planning and add comments about what was changed and what could be improved.</u>** **<u>To reflect on the planning and add comments about what was changed and what could be improved.</u>** Test CAM toy and revisit previous planning in pairs (PowerPoint). Upload a photo of the completed cam (Seesaw) & add comments to evaluate if the planning was followed and if the CAM toy was a success (based on the design criteria). Planning open on PC 1 and evaluation open on PC 2. What would you change about the project? How could we improve the way it looks? Create a class mind map. Add a paragraph outlining if their toy was fit for purpose & why and how they would improve the appearance/finish (based on the points documented in the mind map). Revisit key question: What problems did we have and how were they solved practically during the make? (Mind map).

Substantive Knowledge	Disciplinary Knowledge