Year 4 Medium Term Planning for the Learning Challenge Curriculum

Term: Spring DT Project: Paddle Boats (twirling mechanism)

Previous Learning	New Knowledge /Consolidation	End of Project Outcome	Environmental Links	Key Inventors/People	Project Vocabulary
Pupils have previously created a moving vehicle that was not self-propelled using an axle.	Use of elastic to create a twirling mechanism. Use of hot glue as an adhesive.	To create a paddle boat that is self-propelled using a twirling mechanism. **Alternative project – Pull back car (use of kinetic energy to create movement)**	Consider which parts of our boat could be recycled and which parts would need to go in general waste? Mind map on PowerPoint.	How have boats/ships changed over time: https://www.youtube.com/watch?v=kupNhIXwGSc	Investigate & Compare CAD (Computer Aided Design) Select & Decide Criteria Assemble & Components Properties Scale Finish Reinforce Functional Mechanism Review & Evaluate Reusable & Recycle

Section	Lesson	Key Skills	Learning Objective & Activity
Explore	**1**	• Evaluate existing products based on design, materials, and function. • Understand how mechanisms can be used to store & release energy.	**To investigate the properties of materials and how this effects how they float.** Explore toy boats made from different materials (foam, plastic, wood). Will they float? Why? Objects to be passed around & tested as a class using a tub of water. Record reasons in a table (PowerPoint slide).
Plan	**1**	• Use sketches and CAD for clarity. • Plan the making process and required materials. • Develop a simple design criterion as a class. • Begin to appreciate the global impact of using sustainable & recyclable materials.	**Create a design criteria and plan, considering available & suitable materials.** Examine a completed "paddle boat" (use photographs from last year) and discuss & list what our paddle boat needs to have to be a success (design criteria). How could we improve the design? Use Seesaw template to select materials to create: • Twirling Mechanism • Captain's Cabin

			• Boat body Discuss & list available materials and select appropriate materials from the list. Label key features and the materials used. Describe how the “twirling mechanism will work”. Discuss & list what makes a successful paddle boat based on completed image.
Make	**2 & 3**	• Select and combine materials to meet design needs. • Measure, mark, cut, and shape materials accurately. • Create a simple wind-up mechanism from plastic.	**To shape and join plastic to create a self-propelled boat that floats.** Watch how to make a Paddle Boat – Let’s Go Live with Maddie and Greg. **https://www.youtube.com/watch?v=PGWpJ5DFevc** How to make a Paddle Boat & Density Column | Mini Makers | #27 LET'S GO LIVE with Maddie & Greg - YouTube Distribute how to guides downloaded from The Centre for Life https://letsgolivescience.com/activity/how-to-make-a-paddle-boat/ Discuss how we could adapt the project – what could we change (altering the body of the boat and “rods” used for the mechanism. Use a variety of tools & adhesives (scissors, glue gun, craft knife) to join materials to create a boat with cabin and “twirling mechanism”. Consider how to reinforce the joins (while maintaining water resistance) and finishing techniques to produce a tidy model.
Evaluate	**4**	• Test & refine products to see if they work as intended. • Identify strengths and weaknesses in a product. • Explain what went well and what could be improved. • Use design criteria for product evaluation. • Understand how mechanisms can be used to store & release energy. • Appreciate how products have changed over time & some reasons for this.	**To consider if the boat meets the design criteria, how it can be improved and if it can be recycled.** Use water tray (EYFS) or sink to test if the boats float and are self-propelled Consider how the mechanism works and what it is called (Let’s Go Live Handout Notes). Revisit the design criteria and mark of which sections have been met using ticks (Seesaw template). List improvements that could be made (Seesaw template). Now we have finished, which parts of our boat could be recycled and which parts would need to go in general waste? Mind map on PowerPoint. How else could we create a self-propelled vehicle? Explore use of the wind up mechanism to create a moving car (example model to investigate to be passed round) and balloons to power (a bottle car and CD hovercraft). Images shared via PPT. Next steps – Introduce the reapplication of the mechanism to create twirling butterflies in Y6 (see photos from Completed Work). How have boats/ships changed over time: https://www.youtube.com/watch?v=kupNhIXwGSc Explore why an orange floats with the skin and sinks when peeled due to air pockets. Discuss how dense material can float providing it is the correct shape and contains air.

Substantive Knowledge	Disciplinary Knowledge