Max’s Mechanical Marvels: Designing Levers and Pulleys

Learning objective: To design, build, and evaluate a functional mechanism using levers or pulleys to move a load.

Use this writing scaffold to plan your mechanical invention. Think like Max the monkey—consider how your design uses force and motion to solve a practical problem. Use the word bank to help explain your technical choices.

Max has challenged us to create a machine that can lift a heavy load with minimal effort, so I have decided to design a device that...

Word bank: fulcrum · load · effort · mechanism · pulley system · mechanical advantage · pivot point · consequently · furthermore · in contrast · structural integrity

1. The Problem: What specific challenge is your machine designed to solve and why is a lever or pulley the most effective solution? (2 marks)

2. Design Specifications: Describe your materials and explain why they are suitable for the structural integrity of your mechanism. (3 marks)

3. Mechanism Analysis: Explain why you chose the specific position for your fulcrum (in a lever) or your wheel placement (in a pulley) to gain mechanical advantage. (3 marks)

4. Comparative Reasoning: Compare and contrast how your machine would function if you changed the position of the load. Justify your design choices. (4 marks)

5. Evaluation: What might happen to the effectiveness of your machine if the load became significantly heavier? How would you adapt your design? (3 marks)

6. Future Improvements: If you were to build a second prototype, which element of the construction would you refine and why? (2 marks)

Extension challenge: Imagine you are an engineer presenting this design to Max. Write a persuasive paragraph explaining how your machine makes life easier for the animals in the forest, ensuring you use technical vocabulary to impress him.