

Design Technology: Mastering Levers and Pulleys with Max

Learning objective: To explain how simple machines like levers and pulleys can be used to lift heavy loads with less effort.

Use this writing frame to describe your invention. Max the monkey needs your help to design a machine that will help him lift heavy piles of books into the treehouse! Use the word bank to help you construct your sentences.

To successfully lift heavy objects into the treehouse, I have designed a mechanism that utilises the principles of simple machines.

Word bank: fulcrum · load · effort · mechanical advantage · pulley system · consequently · furthermore · in contrast · specifically · decreases the force

1. Identify which simple machine you have chosen (a lever or a pulley system) and describe its main components. Start by saying: My chosen design uses a... (2 marks)

2. Explain how your machine works. Where is the fulcrum placed, or how is the rope threaded through the wheels? Start by saying: In my design, the position of the... (3 marks)

3. How does your machine make lifting easier for Max? Use the word 'effort' in your explanation. Start by saying: This machine reduces the amount of effort required because... (3 marks)

4. If you were to change one part of your design to make it even more efficient, what would you do? Start by saying: To improve the mechanical advantage further, I would... (2 marks)

5. Summarise why this design is the best solution for the task. Start by saying: Overall, this mechanism is effective because... (2 marks)

Extension challenge: Imagine Max wants to lift a load weighing 5kg. If he uses a pulley system that requires him to pull with only 2.5kg of force, calculate the total savings in effort and explain why this is useful.