

Max's Mechanical Missions: Levers and Pulleys

Learning objective: To understand how levers and pulleys function as simple machines to move heavy objects with less effort.

Read each question carefully and use your knowledge of mechanical systems to provide your answers. Max is relying on your help to solve these engineering puzzles!

Max the monkey is building a pulley system to help him lift his collection of heavy maths textbooks into his treehouse, and a lever system to move large logs for his campfire. He needs to make sure he uses the right components to make the work as easy as possible.

Word bank: Fulcrum · Load · Effort · Pulley · Pivot · Resistance · Mechanical advantage

1. Max is using a seesaw as a lever to move a heavy log. Define the role of the 'fulcrum' in this system and explain what happens if it is moved closer to the log. (2 marks)

2. When using a single fixed pulley to lift a bucket of supplies, does the pulley reduce the weight of the load, or does it change the direction of the force? Explain your answer. (2 marks)

3. Look at the three parts of a lever: Effort, Load, and Fulcrum. If Max wants to lift a heavy rock with a long pole, where should he place the fulcrum in relation to the rock to make it easiest to lift? (2 marks)

4. Max buys a new pulley system for £12.50 and a sturdy wooden lever for £4.75. If he pays with a £20 note, how much change should he receive? Show your calculation. (2 marks)

5. Give one real-world example of a lever you might find in your own classroom and identify where the fulcrum is located on that object. (2 marks)

Draw: Draw a diagram of a simple pulley system being used to lift a basket. Label the 'Load', the 'Effort' (where the rope is pulled), and the 'Pulley' wheel.



Extension challenge: Research how a 'block and tackle' system uses multiple pulleys to lift even heavier loads. Write two sentences explaining why adding more wheels makes the work feel lighter.