Max’s Mechanical Marvels: 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. Use your knowledge of forces and mechanisms to help Max the monkey solve his workshop puzzles.

Max the monkey is building a new treehouse. He needs to lift heavy wooden planks to the top of his tree. He is experimenting with different simple machines to make the work easier. He has been using a long piece of wood over a sturdy branch to lift things, and he is also setting up a system with a wheel and rope to hoist his supplies.

Word bank: pivot · fulcrum · load · effort · pulley · force · mechanism · wheel · rope

1. Max is using a lever to lift a heavy stone. What is the special name for the point that the lever turns on, and what happens to the effort needed if you move this point closer to the load? (2 marks)

2. Explain why using a pulley system with a wheel and rope makes it easier for Max to lift a heavy bucket of tools compared to lifting it straight up with his hands. (2 marks)

3. If Max wants to lift a very heavy crate, should he place the fulcrum closer to the load or closer to where he is pushing down? Explain your reasoning. (2 marks)

4. Identify one example of a lever you might find in a classroom (e.g., a pair of scissors) and label where the load, effort, and fulcrum are located. (2 marks)

5. Max has £15 to spend on new equipment. A simple pulley kit costs £4.50. If he buys two kits, how much change will he have left? (2 marks)

Draw: Draw a diagram of a lever. Label the 'fulcrum', the 'load' (a heavy rock), and the 'effort' (where Max is pushing down).

Extension challenge: Research how a crane uses a pulley system. Write a short paragraph explaining how a construction worker uses these machines to lift materials to the top of a tall building.