

Design Technology: Levers and Pulleys Assessment

Learning objective: To demonstrate understanding of how levers and pulleys function as simple machines to move loads with greater ease.

Read each question carefully. Use your knowledge of mechanical systems to explain how levers and pulleys work. Write your answers clearly in the spaces provided.

Max the monkey is helping his friends organise their workshop. He needs to lift heavy boxes of books and move them onto high shelves. To help him, Kit the fox has suggested using simple machines. Max is experimenting with a wooden board over a stone to create a lever, and he is looking at a system of wheels and ropes to lift the boxes vertically.

Word bank: fulcrum · load · effort · pivot · mechanical advantage · pulley · force · rope

1. Identify the three parts of a lever. Explain what the 'fulcrum' is in your own words. (3 marks)

2. If Max wants to lift a heavy box using the least amount of effort, should he move the fulcrum closer to the load or further away from the load? Explain why. (3 marks)

3. Describe how a pulley system helps a person lift a heavy object compared to lifting it directly with their hands. (3 marks)

4. Give one real-life example of a lever that you might find in your kitchen or school playground. (2 marks)

5. Max is building a pulley system to lift a box costing £12.50. If he uses a rope that costs £1.25 per metre and he needs 4 metres, how much does the rope cost in total? (2 marks)

6. Why is it important to consider the strength of the materials used when designing a pulley or a lever? Think about the load being lifted. (4 marks)

7. Extended Writing: Imagine you are an engineer like Kit. Design a machine to help Ellie the elephant lift her heavy art supplies to a high shelf. Describe which machine you would choose (a lever or a pulley), explain how it would work, and list the materials you would need to build it. (8 marks)

Draw: In the box below, draw a simple diagram of a lever. Label the 'load', the 'effort', and the 'fulcrum'.



Extension challenge: Total: /25