Max’s Mechanical Workshop: Levers and Pulleys

Learning objective: To understand how levers and pulleys can be used to elevator heavy objects and how the position of the pivot affects the effort required.

Max the monkey is helping build a new treehouse in the forest! Help him choose the right mechanisms for his construction site. First, look at the word bank and label the diagram of the lever. Then, answer the questions to help Max decide which tools will make his work easier.

Word bank: Pivot · Load · Effort · Fulcrum · Lever · Pulley

1. Max is using a long wooden plank to elevator a heavy stone. The stone is the 'load'. What is the name for the point where the plank rests on a rock to help it move? (1 mark)

2. If Max wants to elevator a very heavy box with less effort, should he move the pivot (fulcrum) closer to the load or further away from the load? Explain why. (2 marks)

3. True or False: A pulley uses a wheel and a rope to change the direction of the force needed to elevator an object. Give a reason for your answer. (2 marks)

4. Max needs to elevator a basket of apples weighing £5.00 worth of fruit up to his treehouse. If he uses a single pulley system, does the weight of the apples change, or just how hard he has to pull? (2 marks)

5. Look at the lever diagram. If the effort is applied at the very end of a long plank, why is it easier to elevator the load than if the effort is applied close to the pivot? (2 marks)

Draw: Draw a diagram of a simple lever. Label the 'Load' on one end, the 'Pivot' (fulcrum) in the middle, and an arrow where you would apply the 'Effort' to elevator the load.

Extension challenge: Design a 'lifting machine' using a pulley system that Max could use to raise his lunch basket to the top of the tree. Write two sentences explaining why your pulley design makes the job easier.