

Max's Mechanical Masterpieces: Levers and Pulleys

Learning objective: To understand and apply the principles of levers and pulleys to design a simple machine that assists with lifting heavy objects.

Max the monkey is helping a local farmer lift a heavy crate of apples. Use your knowledge of mechanical advantage to design a system that makes the job easier. Follow the drawing steps below and ensure you label your components correctly.

Draw: In the central box, draw two separate mechanical systems. On the left, draw a class-one lever being used to lift a crate (the load). Use a clear, sharp pencil style. On the right, draw a simple pulley system attached to a wooden frame, showing a rope threaded over a wheel to lift a bucket of water. Ensure all components like the fulcrum and the pulley wheel are drawn in clear, technical detail.



Label words: Fulcrum · Load · Effort · Pulley wheel · Pivot point · Rope · Beam

Steps:

1. Explain why the position of the fulcrum on a lever changes how much force is needed to lift the load.
2. Label the point where the force is applied on your lever drawing as the 'Effort'.
3. Justify your choice of pulley placement in your drawing. Why did you choose this position?
4. Compare and contrast a pulley system with a lever. Which is more effective for lifting an object vertically?

5. What might happen to the ease of lifting if the pulley wheel were made of a material that caused high friction?
6. Label the 'Load' on your pulley design.