

Grade 3 Design Technology: Mechanisms Assessment

Learning objective: To demonstrate understanding of levers, linkages, and pneumatics in mechanical systems.

Read each question carefully. Use the word bank to help you with technical terms. Answer all questions clearly.

Max the monkey is designing a new playground toy. He wants to create a jumping frog character that moves using a lever. He is also experimenting with a pneumatic system using balloons and tubes to make a butterfly flap its wings. Zara the zebra is helping him ensure the patterns on his designs are bright and clear.

Word bank: Lever · Pivot · Linkage · Pneumatic · Air pressure · Force · Mechanism

1. What is the name of the fixed point that a lever turns around to create movement? (1 mark)

2. Explain the difference between a lever and a linkage. How do they both help a mechanism move? (3 marks)

3. Max is using balloons for a pneumatic system. How does pushing air through a tube create movement in the butterfly wings? Use the term 'air pressure' in your answer. (3 marks)

4. If Max wants to make his jumping frog jump higher, should he move the pivot closer to or further away from the input force? Explain why. (3 marks)

5. A toy costs £4.50 to build. If Max builds 5 of these toys, what is the total cost? Show your working out. (2 marks)

6. List three materials you might use to create a sturdy lever mechanism in the classroom and explain why they are suitable. (3 marks)

7. Design a simple mechanical greeting card that uses a lever to move a character's arm. Describe the components needed, how you would join them, and how the user interacts with it to create motion. (5 marks) (5 marks)

Draw: Draw a diagram of a simple lever system. Label the 'Pivot', the 'Input Force', and the 'Output Movement' clearly.



Extension challenge: Total: /25. Imagine you are building a larger machine for the playground. What problem would you solve for the other animals, and which mechanism (lever, linkage, or pneumatic) would be the most effective to use? Write a short paragraph explaining your choice.