

Max's Structural Engineering Challenge

Learning objective: To understand how to strengthen structures by identifying materials and shapes that provide stability, such as triangles and reinforcement.

Max the monkey is building a new treehouse for his friends. Help him by sorting the structural techniques into the correct boxes. Read each statement about building and decide if it describes a way to make a structure stronger or if it describes a weakness. Then, explain why your choice helps the structure stay standing.

Word bank: Triangular bracing · Heavy roof · Wide base · Weak joints · Cardboard tubes · Rigid materials · Adding supports

1. Why is it better to use triangles in a frame rather than squares? Explain the effect of the shape on the strength of the structure. (2 marks)

2. Max wants to use a very heavy clay roof on his treehouse. Why might this cause the structure to collapse? Suggest a lighter material he could use instead. (2 marks)

3. If a structure keeps wobbling from side to side, which technique from the word bank would you recommend to fix it? (1 mark)

4. Explain why a building with a narrow, thin base is less stable than a building with a wide, heavy base. (2 marks)

5. True or False: Using masking tape to connect two pieces of cardboard is a permanent way to create a strong joint. Explain your reasoning. (2 marks)

Draw: Draw a design for Max the monkey's treehouse. Ensure you include at least two triangular supports and label the materials you have chosen to make it strong and stable.



Extension challenge: Imagine Max has a budget of £10.00 to build his treehouse. If wood costs £2.50 per plank and he needs 5 planks, can he afford it? If not, suggest how he could change his design to save money while keeping the structure safe.