

Max's Structural Engineering Challenge

Learning objective: To understand how to strengthen structures by reinforcing shapes and using stable joints.

Max the monkey has been tasked with building a stable platform for his treehouse. Look at the structural techniques below. Decide if the statement is True or False. If it is false, rewrite the sentence so that it is factually correct. Use the word bank to help you explain your reasoning.

Word bank: triangulation · reinforcement · stability · compression · tension · joint · rigid

1. 1. Triangulation is a technique used to make a structure less stable because triangles are weak shapes. True or False? Explain your answer. (2 marks)

2. 2. Adding extra struts to a frame is a form of reinforcement that prevents the structure from collapsing under weight. True or False? Explain your answer. (2 marks)

3. 3. A joint is the point where two or more materials meet; a loose joint makes a structure more rigid. True or False? Explain your answer. (2 marks)

4. 4. If you are building a bridge, you should ignore the effects of tension and compression. True or False? Explain your answer. (2 marks)

5. 5. Max wants to build a tower that is 2 metres tall. Does he need a wide base or a narrow base to ensure the structure does not topple over? Explain why. (2 marks)

Draw: Draw a diagram of a simple square frame. Show how you would add a diagonal brace to turn the square into two triangles, making it more rigid.



Extension challenge: Imagine you are building a model bridge using £5.00 worth of wooden dowels. If each dowel costs 50p, how many dowels can you buy? How would you arrange them to ensure the bridge can support the weight of a heavy book?