

Max's Mighty Structures Challenge

Learning objective: To identify and apply knowledge of structural reinforcement, materials, and stability in design technology.

Max the monkey is building a tall treehouse! Help him choose the best designs by answering these 10 questions. Read each question carefully and select the best answer.

Answer Key: 1.C, 2.True, 3.Triangulation, 4.B, 5.False, 6.Compression, 7.A, 8.True, 9.Reinforcement, 10.B.

Explanation: Triangles are the strongest shape because they do not easily change shape under force, unlike squares or rectangles.

Word bank: Triangulation · Compression · Tension · Reinforcement · Stability · Structure · Joints

1. Which of these shapes is most commonly used in structures to provide strength and stability? A) Circle B) Square C) Triangle* D) Pentagon (1 mark)

2. True or False: Adding a diagonal brace to a square frame helps to prevent it from collapsing. (1 mark)

3. What is the name of the technique where triangles are used to strengthen a structure? (One word) (1 mark)

4. When you push down on a pillar, what type of force is being applied? A) Tension B) Compression* C) Torsion D) Shear (1 mark)

5. True or False: Using thicker materials always makes a structure lighter. (1 mark)

6. What is the force called when you pull on a material, such as a rope in a suspension bridge? (One word) (1 mark)

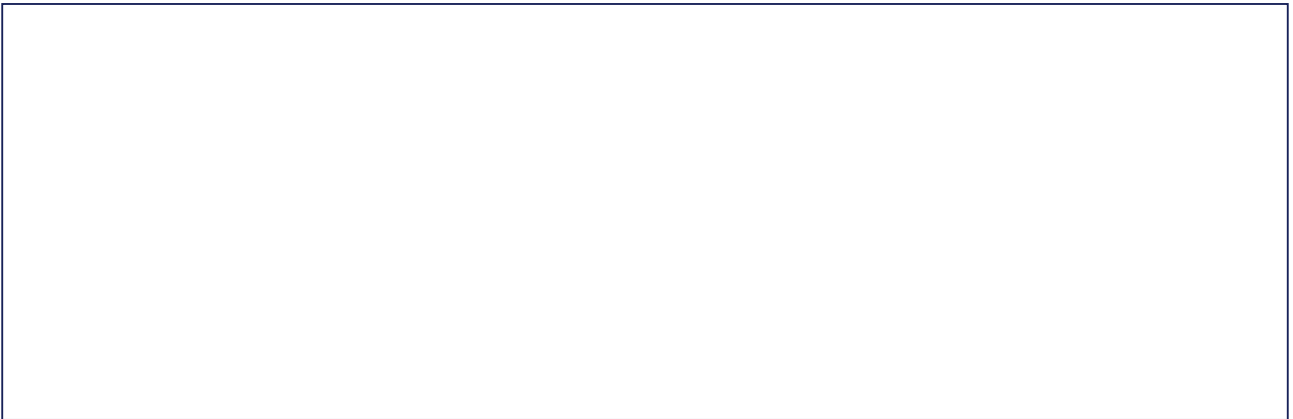
7. Which material is often used for its high strength-to-weight ratio in modern building frames? A) Steel* B) Cardboard C) Glass D) Soft clay (1 mark)

8. True or False: A structure with a wide base is generally more stable than one with a narrow base. (1 mark)

9. 9. If Max adds extra wooden struts to the corners of his treehouse, he is providing extra _____. (1 mark)

10. 10. Which of these is a common type of joint used in woodwork to connect two pieces of timber? A) Folding B) Butt joint* C) Melting D) Tying (1 mark)

Draw: Draw a sketch of a bridge design that uses triangles to support a heavy load. Label one part of your drawing where you would find 'tension' and one part where you would find 'compression'.



Extension challenge: Max wants to build a bridge for £50. If the wood costs £25, metal bolts cost £12, and the paint costs £8, how much money will he have left over for his next project?