

Max's Magnificent Structures Challenge

Learning objective: To understand the properties of materials and the principles of structural stability, strength, and rigidity.

Help Max the monkey solve these engineering puzzles! Read each question carefully and select the best answer or provide a short response. Good luck, budding architects!

Answer Key: 1.C, 2.B, 3.False, 4.True, 5.Triangles, 6.Compression, 7.True, 8.Foundation, 9.To prevent it from collapsing under its own weight or external forces, 10.B.

Word bank: Compression · Tension · Rigid · Stable · Bracing · Strut · Foundation · Load

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

2. 2. Max wants to build a bridge. What is a 'load'? A) The length of the bridge B) The weight or force applied to a structure* C) The colour of the materials D) The time taken to build (1 mark)

3. 3. True or False: Adding a diagonal strut to a square frame makes it less stable. (1 mark)

4. 4. True or False: Compression is a force that squashes or squeezes a material. (1 mark)

5. 5. What do we call the base of a building that helps it stay upright and prevents it from sinking? (1 mark)

6. 6. When you pull on a piece of string, you are applying which type of force: Tension or Compression? (1 mark)

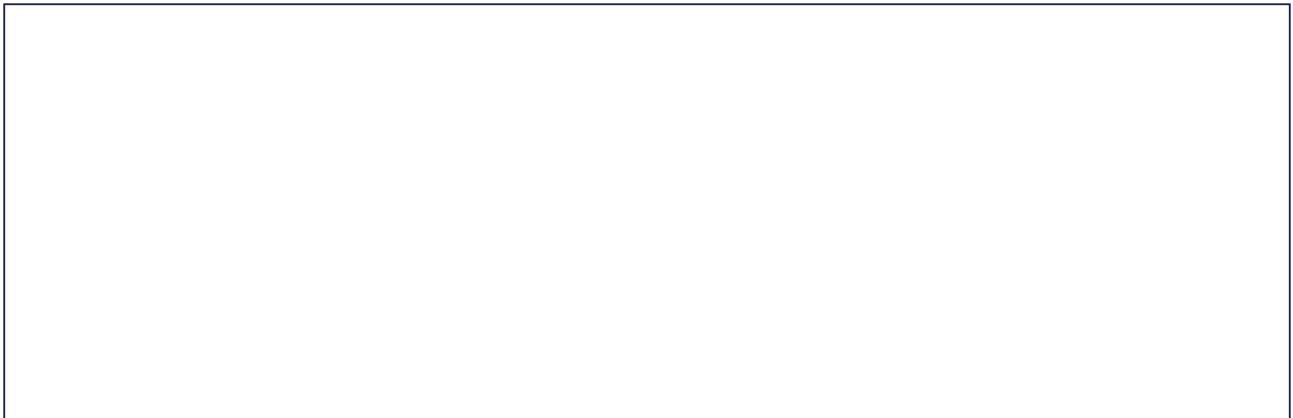
7. 7. True or False: A structure is 'rigid' if it does not easily change its shape when a force is applied. (1 mark)

8. 8. If you were building a tall tower, why would you make the base wider than the top? (1 mark)

9. 9. Explain why engineers use cross-bracing in tall skyscrapers during construction. (1 mark)

10. 10. Max is buying materials for a model. If wood costs £2.50 and he buys 4 pieces, how much does he spend? A) £8.00 B) £10.00* C) £12.50 D) £7.50 (1 mark)

Draw: Draw a bridge design that uses at least three triangles to strengthen the main span. Label where the 'load' would sit.



Extension challenge: Greater Depth Challenge: 1. Compare and contrast a shell structure (like an egg) with a frame structure (like a house). 2. Justify why a tripod is more stable than a monopod for a camera. 3. What might happen if a bridge were built without considering the force of 'tension'? 4. If you had a budget of £20, design a list of materials you would buy to build the strongest tower possible. 5. Explain why skyscrapers in windy cities require special structural considerations. 6. Can you identify an example of a structure in nature and explain how its shape helps it survive?