

Build a bridge

Location

First floor, Curiosity zone exhibition

In a nutshell

Can you build a bridge to cross the Avon Gorge?



What to do

Choose a pair of towers, use these and the chains to build your bridge across the gorge. Test you bridge using the masses. How much weight can it support?

Time Required

KS1 & KS2 3-4 minutes per student.
KS3 & KS4 3-4 minutes per student.

What's happening?

Suspension bridges use cables to transfer the load from the bridge deck to large towers at each end. The towers also need their own support cables to keep them upright so they don't buckle under the strain of the load. The cables are under a stretching force (tension). Some of this is transferred to the towers as a squashing force (compression). A large amount of the force continues past the towers and into the anchors in the ground. Suspension bridges are just one solution to crossing a gap. There are a few other key design features that bridges can use depending on the size of the gap they must cross and the load they must carry. Simple beam bridges are an easy way cross small gaps. For larger gaps you can join together a series of beams with vertical supports at each joint. In 1830, Isambard Kingdom Brunel won a competition to build a bridge over the Avon Gorge. The final suspension bridge wasn't completed until 1864, four years after Brunel's death.

Curriculum links

| | |
|------------|--|
| KS3 | <p>Science - Forces</p> <ul style="list-style-type: none"> - forces as pushes or pulls, arising from the interaction between two objects - using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces <p>Science - Balanced forces</p> <ul style="list-style-type: none"> - opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface <p>English - Reading</p> <ul style="list-style-type: none"> - learning new vocabulary, relating it explicitly to known vocabulary and understanding it with the help of context and dictionaries <p>Design & Technology</p> <ul style="list-style-type: none"> - understand how more advanced mechanical systems used in their products enable changes in movement and force |
| KS4 | <p>Science - Forces and their interactions</p> <ul style="list-style-type: none"> - recall examples of ways in which objects interact: by gravity, electrostatics, magnetism and by contact (including normal contact force and friction), and describe how such examples involve interactions between pairs of objects which produce a force on each object; represent such forces as vectors - describe examples of the forces acting on an isolated solid object or system; describe, using free body diagrams, examples where several forces lead to a resultant force on an object and the special case of balanced forces when the resultant force is zero (qualitative only) - explain, with examples, that stretch, bend or compress an object, more than one force has to be applied <p>Science - Forces, accelerations and Newton's laws of motion</p> <ul style="list-style-type: none"> - recall Newton's Third Law and apply it to examples of equilibrium situations <p>English - Spoken</p> <ul style="list-style-type: none"> - listening to and building on the contributions of others, asking questions to clarify and inform, and challenging courteously when necessary |

Relates to:

| Workshops & Theme Days | Shows | Trails | Other exhibits |
|--|--|--------|---|
| <ul style="list-style-type: none"> • Engineering solutions (KS3 & KS4) • Bloodhound Rocket Car day (KS3 & KS4) | <ul style="list-style-type: none"> • Launch it! (KS3) | | <ul style="list-style-type: none"> • Pulley table • Launch it • Air stream • Under pressure |

