

Design and Technology Knowledge Organiser

Southwold Primary School



Topic: How can we use readily available materials to construct, strengthen and test our own bridges?

Year: UKS2

Strand: Structures

What should I already know?

- How a greenhouse helps plants to grow and different types of greenhouses.
- Factors that make a structure more stable.
- How to identify suitable materials for a mini greenhouse.
- How to successfully communicate my ideas in response to a design brief.
- Ways of successfully joining materials.
- Build on and develop ways to strengthen, secure and stabilise my design from those learnt in KS1.

What will I know by the end of this unit?

- That pillars and beams are used to span gaps.
Use technical vocabulary to explain how beam bridges are constructed.
- How the effect of gravity is managed on a bridge.
- Understand the impact better bridge design has had on daily life.
- Understand how suspension bridges are able to span long distances.
- Different criteria and techniques used to make a bridge successfully.
- Different materials used to make bridges and their qualities.
- How arches of different shapes and sizes are effective in spreading the load on bridges.

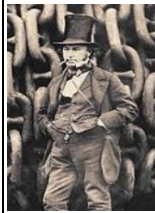
Useful Websites:

[bridge - Kids](#) | [Britannica Kids](#) | [Homework Help](#)

[Six unusual bridges from around the world - BBC Bitesize](#)

[Thomas Telford - Kids](#) | [Britannica Kids](#) | [Homework Help](#)

Famous Bridge Engineer



Isambard Kingdom Brunel was a Victorian **engineer**. He designed major bridges, railway lines, tunnels and ships. Many of the things Brunel designed are still in use today and he is considered to be one of the most important engineers in history.

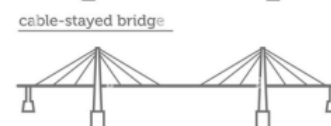
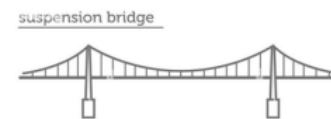
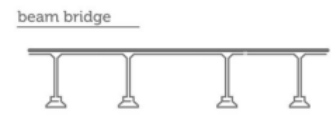
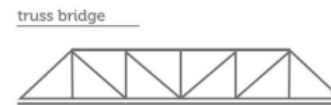
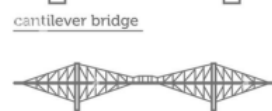
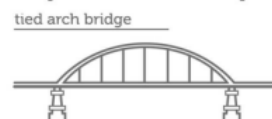
One of Brunel's most famous structures is the Clifton Suspension Bridge, which spans the River Avon in Bristol. The weight of a suspension bridge is carried by cables that are suspended from towers.

The Clifton Suspension Bridge is 412 metres long (214 metres of which are over the water) and 76 metres above the water. It took 33 years to complete!



Bridge Structure

TYPES OF BRIDGES



Vocabulary

beam	Length of sturdy material that has been cut and shaped to span a gap or support a bridge.
deck	The flat surface of a bridge.
parapets	The side sections of a bridge.
truss	Several beams connected in different ways.
Compression force	Gravity acting on a bridge
abutment	Substructure at the ends of a bridge span supporting its superstructure.
Suspension bridge	A bridge where the deck hangs from cables attached to pillars and anchorage points on either side.

What will I be able to do by the end of this unit?

Design:

- Use technical vocabulary to explain how truss bridges spread the load of objects travelling across them.
- Apply my knowledge of how to stiffen and strengthen structures.
- Develop criteria and design a prototype bridge for a purpose.
- Explain how tension and compression forces are distributed by suspension bridges.

Make:

- Build and test models to find a strong bridge design.
- Build a model suspension bridge that will support a given weight.
- Use tools accurately and safely with precision for instance, when measuring and cutting.

Evaluate:

- Investigate and explore the effectiveness of different beam/pillar designs.
- Explore ways in which trusses can be used to strengthen bridges.