



What I should already know

Through research and development of designs, I can make a functional, appealing product that is fit for purpose.

Sketches of models can be annotated and cross-sectional.

A wide range of tools and materials can be used to perform practical tasks.

Investigate and analyse a range of existing products, evaluate their design and consider how they can improve their work.

By the end of this unit:

Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided designs.

Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.

Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.

Understand how key events and individuals in design and technology have helped shape the world.

Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

TASK: Design a bridge and build a prototype model to scale.

Design Criteria

The bridge must span a gap of 50cm.

It must allow traffic to pass in both directions.

It must have a clearance of at least 20cm.

It must be strong.

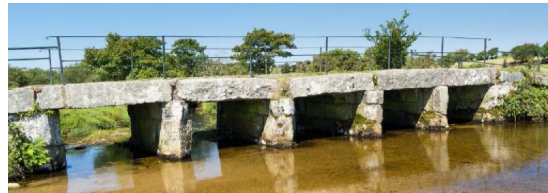
It must be attractive.

(The prototype model for this bridge will be 100:1 scale)

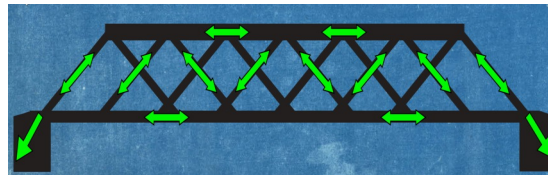
**YEAR 6: Design Technology
Architects– Building Bridges**



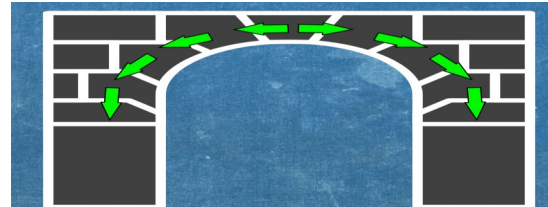
Mersey Gateway Bridge, designed by Knights Architects and opened in October 2017.



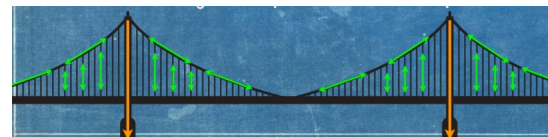
Simple bridge design with beams and pillars



Trusses on a bridge to strengthen the structure



Arch used to spread out the compression of forces on the bricks to the pillars either side



Suspension bridge uses tension forces in the cables which transfer the weight to the pillars

<u>Vocabulary</u>	
Abutments	The pillars at either end of a bridge which supports the main structure
Annotated sketch	A drawing that has various call-offs noted with arrows leading to the details being annotated
Architect	A person who designs buildings or bridges and supervises their construction
Arch bridge	A bridge with an arch which is designed to spread out the compression forces acting on the stone blocks and transfer them to the pillars or abutments at either end of the arch.
Beam bridge	The simplest structural form of a bridge. (The beam is the log, wooden plank or stone slab laid horizontally across the road or stream.)
Construct	To build or make something
Cross-sectional diagram	A diagram that shows the inside and outside of the picture
Exploded diagram	A view drawing of a diagram that shows how the objects are placed together.
Fit for purpose	Well equipped or well suited for its designated role or purpose
Functional qualities	The aesthetic qualities of an object that serve a purpose
Pillars	The vertical structures used for supporting the beams on a bridge
Prototype	A model of a product that is built to a smaller scale
Strengthen	To make it stronger
Suspension bridge	A structure where the bridge hangs from cables attached to pillars and anchorage points on either side of the bridge.
Trusses	A truss is made up of several beams connected together in different ways, designed to make a bridge stronger