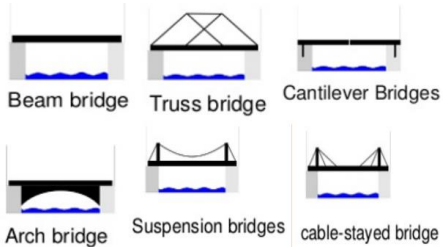
Grow Flourish Think

BIRKENHEAD HIGH SCHOOL ACADEMY
Junior School Vision Statement
GDST

BE: RESPECTFUL
BE: FORGIVING
BE: KIND

Year 5 - Summer	DT Knowledge Organiser
Unit of work:	DT – Building Bridges
Links to other year groups:	

Key Vocabulary & Skills:

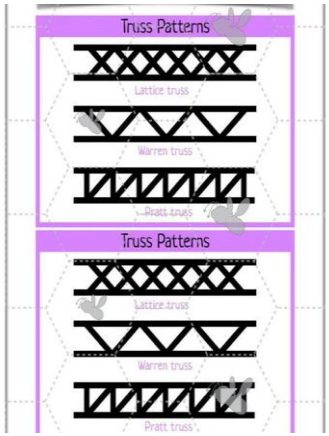


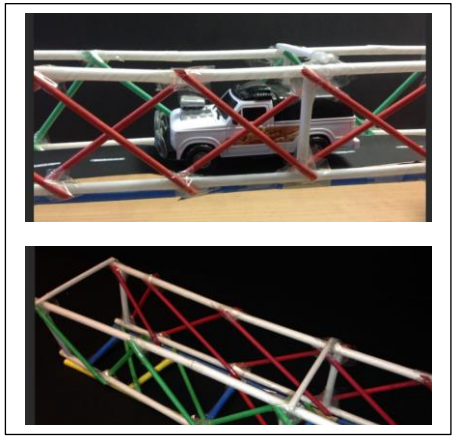
- Beam bridges - the simplest structural forms for bridge spans supported by a pier at each end.
- Truss bridge - is a bridge with its load-bearing structures composed of a series of wooden or metal triangles: trusses.
- A cantilever bridge – a bridge built using cantilevers, structures that project horizontally into space, supported on only one end.
- An arch bridge is a bridge with abutments at each end shaped as a curved arch.
- A suspension bridge is a type of bridge in which the deck is hung below suspension cables on vertical suspenders.
- A cable-stayed bridge has one or more towers from which cables support the bridge deck

Real World Examples:

Constructional Diagrams & Key Info:

Evaluation: How well does your structure work? How did you make your frame structure strong and rigid? Which materials did you use and why? How does your bridge look? Did your bridge stay standing?





Important People:

Thomas Telford - (1757 – 1834) will be remembered in history as one of the most accomplished Scottish civil engineers, road and canal builders of the 19th century. His reputation for fast and reliable work gave the birth of nickname "The Colossus of Roads". He is best known today as the designer and builder of The Menai Suspension Bridge (417 m), one of the first long-span suspension bridges that were ever made.

Isambard Kingdom Brunel – This English mechanical and civil engineer remains remembered today as one of the most formidable figures of the engineering world during the Industrial Revolution. He is credited as being one of the most responsible for changing the look of the modern England with his innovative designs. He was a very successful bridge builder, with Clifton Suspension Bridge in Bristol being his most famous design.

Emily Roeblin an early champion for breaking the glass ceiling for women in STEM fields. She is best known for her contribution to the construction of the Brooklyn Bridge, completed in 1883. When her husband, who was the Chief Engineer of the project, became ill, Roebling assumed responsibility of being his liaison with the engineering team to keep the project moving forward. She became so proficient at managing technical issues, materials, stress analysis, construction and calculations, that she became the lead for the remainder of the project.

Sequence of Lessons

Lesson 1	To explore ways in which pillars and beams are used to span gaps.	Children will learn about how simple bridges are constructed using beams, pillars or piers, then make and test beam bridge designs.	• Can children use technical vocabulary to explain how beam bridges are constructed? • Do children understand the impact better bridge design has had on daily life? • Can children investigate and explore the effectiveness of different beam/pillar designs?
Lesson 2	To explore ways in which trusses can be used to strengthen bridges.	Children will learn how trusses are used in bridge design to spread out compression forces. They may then either build and test model truss bridges, or use software to explore how truss bridges may be constructed.	• Can children use technical vocabulary to explain how truss bridges spread the load of objects travelling across them? • Can children apply their knowledge of how to stiffen and strengthen structures? • Can children evaluate their models against established design criteria?
Lesson 3	To explore ways in which arches are used to strengthen bridges.	Children will learn how arches are used to spread and redirect compression forces acting on bridges. They will then build and test model arch bridges.	• Can children use technical vocabulary to explain how arch bridges are constructed? • Can children use technical vocabulary to explain how arch bridges work? • Can children build and test models to find a strong bridge design?
Lesson 4	To understand how suspension bridges are able to span long distances.	Children will learn about how suspension bridges use tension to support bridge decks spanning large distances. They may then either build and test model suspension bridges, or research and write about iconic suspension bridges.	• Can children explain how tension and compression forces are distributed by suspension bridges? • Can children build a model suspension bridge that will support a given weight? • Can children evaluate the designs of others and consider their views?
Lesson 5	To develop criteria and design a prototype bridge for a purpose.	Having been presented with a design brief, children must develop criteria for a bridge design that will meet the terms of the brief. They will then either design a bridge according to their criteria, or generate more criteria for a range of given design briefs.	• Can children write design criteria according to a given brief? • Can children design a prototype model according to design criteria? • Can children work collaboratively to produce a prototype according to an agreed design?
Lesson 6	To analyse and evaluate products according to design criteria.	Following on from the previous lesson, children will consider ways in which they might test their bridge design once constructed. They will then build and test their designs.	• Can children devise tests to analyse a product according to design criteria? • Can children evaluate their product according to design criteria? • Can children consider the views of others and think of ways to improve their work?

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