Alder Coppice Primary School — Knowledge Organiser

Design & Technology	Year: 5	Unit 1: Structures - Bridges	Links to: Previous Structures Units

Subject Vocabulary:

Design - a picture to show what something will look like

Plan – a picture or words to show how something will be made

Function - what the object is for

Product - the object made

Join- where materials meet

Materials - things to be used to

Tools – something to help get the job done

Evaluate - does the product work

Test - find out if the product works

Test criteria – ways to test products linked to their design purpose and how effective they are.

What I should know by the end of the Unit:

To know the different types of bridges

To know that trusses and arches strengthen bridges

To know that pillars, beams and suspension are used to span large distance gaps

To know key facts about two famous bridge inventors

What I Should Already Know:

To know what a structure is and understand the difference between free standing and shell structures

To know how to make a structure stronger

To know you can make structures from different materials

To know the names and properties of different materials

To know how to join and shape materials safely selecting the appropriate tools

Skills & Enquiry:

<u>To communicate</u> - ideas, observations, comparisons, preferences

Skills -To manipulate materials and use tools

<u>Thinking</u> -

To generate ideas for design

To generate ideas through drawing/annotated sketches

To select material for purpose

To select appropriate tools/ techniques

<u>Investigate</u> –

To investigate the effectiveness of existing structures and their designs

To investigate different structures to identify the purpose of them

Unit Specific Vocabulary:

Structure - a framework made to contain or support

Freestanding structure - not attached or supported by another structure

Shell structure - structures with an outer surface that may be curved or flat and have a hollow inner area

Strong - able to withstand force/ less likely to break

Stable - not likely to fall over or cave in

Rigid - solid

Support - something that will help the structure stay up

Construct - to make

Materials – wood, paper, metal, card, plastic, wool

Base - the bottom of the structure

Layering - (can add strength) - adding more materials to make stronger

Folding - to bend something over on itself

Flexible - is able to bend

Durable – able to with stand pressure or wear

Marking out – transfer design or pattern to work piece

Corrugating – contract or cause to contract into wrinkles or folds

Prototype – a first version or a product to develop

Truss - a framework, typically consisting of rafters, posts, and struts, supporting a roof, bridge, or other structure

Triangulation - constructing using triangle shapes - can help to make a structure stronger

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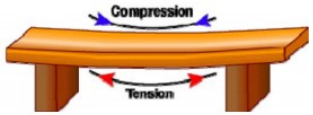
Designing

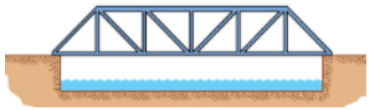
What are the different key bridge designs?

There are 4 main types of bridge construction:

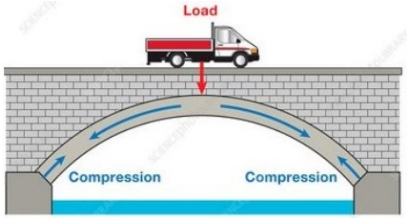
Beam bridge – The simplest of bridge design where the downward compression force is created by the load on the bridge



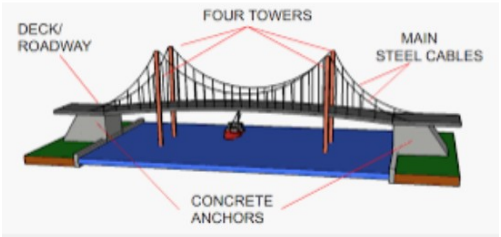
Cantilever/Truss bridge - Built using cantilevers, structures that project horizontally into space, supported on only one end. For small footbridges, the cantilevers may be simple beams; however, large cantilever bridges designed to handle road or rail traffic use trusses built from structural steel, or box girders built from restressed concrete.



Arch bridge - a curved design, which does not push load forces straight down, but instead they are spread along the curve of the arch to the supports on each end. These supports (called abutments) carry the load of entire bridge and are responsible for holding the arch in the precise position unmoving position.



Hanging/Suspension bridge - suspend the roadway by cables, ropes or chains from two tall towers. These towers support the majority of the weight as compression pushes down on the suspension bridge's deck and then travels up the cables, ropes or chains to transfer compression to the towers.



Famous Bridges in the UK and their architects

Clifton Suspension bridge -

Isambard Kingdom Brunel

Ironbridge -

Abraham Darby

Tower Bridge (London) –

Horace Jones

Menai Bridge (Wales) -

Thomas Telford