STEPHEN LAWRENCE DAY

GET HANDS-ON BUILDING YOUR OWN BRIDGE

22 APRIL

GET HANDS-ON BUILDING YOUR OWN BRIDGE

Stephen Lawrence Day is about being inclusive, and bridges are a way of connecting people and communities.

We have set a challenge to build your own bridge, as a great way to think about some of the challenges involved in architecture and engineering.

The challenge

We are challenging you to build a bridge that is 30cm wide – this is called the bridge's 'span' – and a minimum of 15cm high in the centre, that is able to hold 500g – e.g. a bag of sugar or rice – for 10 seconds without collapsing.

What you will need

Get together some things that you can use to build it before you start. There are no rules for this - you can do this just with things you have around your home. Some examples of things you might use are:

- Straws
- Blutack
- Rubber bands
- String
- Paper
- Egg cartons
- Scissors
- Sellotape
- Card

Things to think about before you start

- Think about the types of bridge you have seen. The different types of bridge (beam, arch, truss etc) are called its 'form'. You can see more about these below. Which form of bridge are you going to build?

- Your bridge will need to be strong enough to 500g. How will you make your bridge strong enough? In the past bridges were often made of stone or timber, but modern bridges are commonly made of materials like concrete and steel, which are heavy but very strong.

    - Extension: Find out more about what bridges are made of.

GET HANDS-ON BUILDING YOUR OWN BRIDGE

- Did you know that some shapes are better at absorbing loads than others? For example triangles are particularly strong because they create a very rigid structure that spreads the load from a single point to a wider area.

    - Extension: Get some ideas about different shapes you might use.

- In real life, bridges often have to withstand high winds, what will help your bridge to withstand the wind?

Information to help you

There are four main types of bridges:

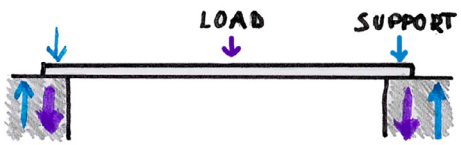
1. Beam bridges are made of horizontal beams supported by piers at each end.
2. Truss bridges are a combination of triangles.
3. Arch bridges are made up of arches supporting the bridge and are naturally strong.
4. Suspension bridges are long bridges, such as the Golden Gate Bridge.

Two key types of forces involved in building any structure are tension and compression. A tension force is one that pulls materials apart (like two teams pulling a rope during a game of tug-of-war). A compression force is one that squeezes material together (like pushing down a spring and making it shorter). Each type of bridge deals with the important forces of tension and compression.

Turn for picture

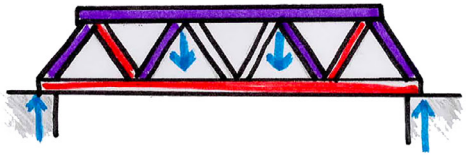
THE FOUR MAIN TYPES OF BRIDGES:

1. BEAM BRIDGE



When a single beam spans any distance, the very top of the bean gets the most compression, and the very bottom of the beam experiences the most tension. The beam needs to be strong to resist these forces. You also need to apply weight at both ends to counteract the bending at the centre.

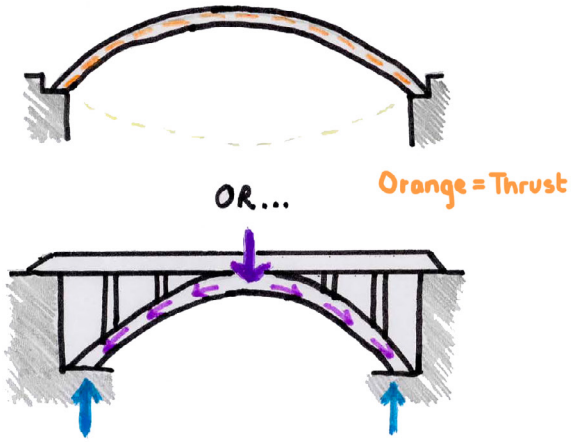
2. TRUSS BRIDGE



- Compression
- Tension
- Forces

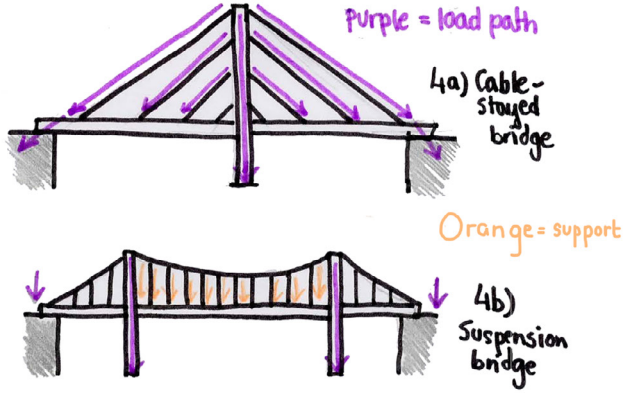
The design of a truss creates a rigid structure that transfers the load from a single point to a wider area, making the structure strong.

3. ARCH BRIDGE



The semi-circular structure distributes compression through its entire form and diverts weight onto its two abutments, the part of the bridge that directly take on pressure. It needs firm foundations, to allow all the parts to push back against each other.

4. SUSPENSION BRIDGE



The 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. The towers then dissipate the compression directly into the earth.

Read more about how bridges work: https://science.howstuffworks.com/engineering/civil/bridge.htm

GET HANDS-ON BUILDING YOUR OWN BRIDGE

We would love it if you would post what you're doing on social media to let us and others know how you are celebrating Stephen Lawrence Day.

Build the impact of the day and help others to see what you're doing by using the hashtags

#LiveOurBestLife

#BecauseofStephen

#SLDay

#StephenLawrenceDay

#ChallengeAccepted

And don't forget to tag us in so we can share your good work

Twitter /s_lawrencetrust

Instagram /s_lawrencetrust

Facebook /stephenlawrencecharitabletrust