This bridge building STEM activity will get you thinking about the foundations of bridge building and what exactly creates a strong structure.

This build requires you to work well as a team and challenges you to carefully consider the most effective use of materials available to you.

It’s up to you and your team to create the strongest bridge you can. Are you ready to build?
**VOCABULARY**

**Strut** - A rod or bar designed to increase strength. Lollipop sticks make excellent struts.

**Load** - The weight or forces that are put on a bridge. On large bridges, this may be the number of cars, for this challenge, we will use any weights available, such as pens or books.

**Truss Bridge** - A bridge made primarily of triangles to give them strength.

**Beam Bridge** - Horizontal beams supported at each end by piers.

**Arch Bridge** - These are arch-shaped and have abutments at each end.

**Cantilever Bridge** - Built using cantilevers - horizontal beams that are supported on only one end.

**Suspension Bridge** - Bridges suspended from cables.

**Cable-stayed Bridge** - Similar to suspension bridges, they are held by cables. The difference being that less cable is required and the towers holding the cables are proportionately shorter.

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**EACH TEAM WILL NEED**

![Lollipop Stick](image)

- **Lollipop Stick**
  - 30

![Elastic Band](image)

- **Elastic Band**
  - 20

![Bulldog Clip](image)

- **Bulldog Clip**
  - 16

![Clothes Peg](image)

- **Clothes Peg**
  - 10

![White Tac](image)

- **White Tac**
  - (Not Included)

![CD](image)

- **CD**
  - 2

![Book](image)

- **Book**
  - 2

(Not Included)
WARM-UP ACTIVITIES

A  
10m

Draw a picture of some bridges that you have seen or been across, either on foot or in a car. Consider why they may be particularly strong?

B  
20m

Using paper and cardboard, create prototype models of the bridge designs that you and your team mates drew in warm up activity A.

MAIN CHALLENGE

The challenge is to work together as a team to build a strong bridge across the gap in front of you using the materials provided.

Great engineers always create designs of what their final masterpiece will look like. Sketch out different options and experiment with different approaches.

The bridges must span at least 45cm and hold each weight for at least 10 seconds.

Don’t forget to think about the design principles you can find in the six main bridge types and remember, if you can make the bridge symmetrical, you’re less likely to have weak points.

Once completed and tested, there will be a class discussion about your findings.
BUILDING YOUR BRIDGE

There are many ways to build a bridge using the materials provided. Use your creativity to form innovative, load bearing structures!

TECHNIQUES TO TRY

STRAIGHT JOINT

Join two lollipop sticks together in a line using a bulldog clip. Be sure there is an overlap between both lollipop sticks to ensure a strong joint.

ANGLED JOINT

Angled sections can be joined together as shown below.

TRUSS

By combining these techniques, you’re able to create a truss. Trusses are excellent at distributing the load applied to your bridge. Several trusses can be joined together using the provided materials to create strong, stable structures. Use these techniques to get building!

ADVANCED TECHNIQUE

Perpendicular faces can be created by fixing two lollipop sticks to a clothes peg using a rubber band, as shown here. This can be particularly useful when constructing the sides of the bridge.
EXAMPLE BRIDGE

We created a bridge using only these techniques. CDs were placed along the stringers of the bridge to provide a stable load-bearing platform. Think about where you want the load to be applied on your bridge. Be as creative as you can!