

Materials and Sustainable Design – Bridge Build

Overview

This activity develops pupils' understanding of material types and sustainable design practices used in engineering projects, by focusing on bridges. Engineers are developing bridges that leverage advanced technologies and construction techniques that limit their impact on the environment and in some cases, protect fragile ecosystems from human impact. Many of these structures are not only good for the planet, they're also architecturally amazing.

Aim

Teams use their creativity and knowledge of bridge designs from the presentation to construct their own bridges.

Resources

- 1 pack of **paper straws**
- 1 pack of **lollipop sticks**
- **Newspaper or waste paper** from your recycling
- **Craft glue or PVA** (or a hot glue gun if you use them in school)
- 1 roll of **masking tape**
- A ball of **string**
- A selection of **elastic bands**
- **Blu-Tac**
- **Scissors**
- **Pencil and paper** (for planning)
- **Weight of around 100g** (individual weights or a small stapler)

Rules

- Minimum of 30cm long and 10cm wide
- Strong enough to hold a weight of up to 100g
- Free-standing (cannot be supported by other materials)

Instructions

1. Move two tables 30cm apart.
2. Using the materials provided teams build 4 individual bridges – one from newspaper, one from paper straws, one from lollipop sticks and one from a mixture of all the materials. The bridge must be a minimum of 30cm long and 10cm wide.
3. Test the bridge using the weight. If you can, try adding weight gradually to get an exact measurement.
4. Complete the table, either using the template or create your own.
5. Share your results with us on Facebook, Twitter (X) and Instagram [@KSBScotland](#)

After teams have constructed them, use the table below to evaluate the bridges. Think about these criteria:

Durability – How strong is it? How long will it last? How easy is it to fix?

Sustainability – How did you source the materials? Can the materials be reused or recycled?

Efficiency – How much did it cost? How long did it take to build?

| Material | Durability | Sustainability | Efficiency (cost and time) |
|-----------------|------------|----------------|-------------------------------|
| Newspaper | | | |
| Paper straws | | | |
| Lollipop sticks | | | |
| All the above | | | |

Further research

[Jacobs Engineering- Transportation](#)

[Sustainable and Green Bridge Designs 101, Bridge Masters](#)

[The Forth Bridge, UNESCO](#)

[14 Famous Bridges in Scotland](#)

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