Canal & River Trust | Explorers

Building Bridges

The following practical activities and challenges should be completed in groups, and can be undertaken over a series of lessons.

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Build a bridge: Beam

Equipment

Per group - a selection of books, 10 strips of card, selection of small weights such as pennies or multilink (alternatively, replace the books with plastic cups).

Step 1

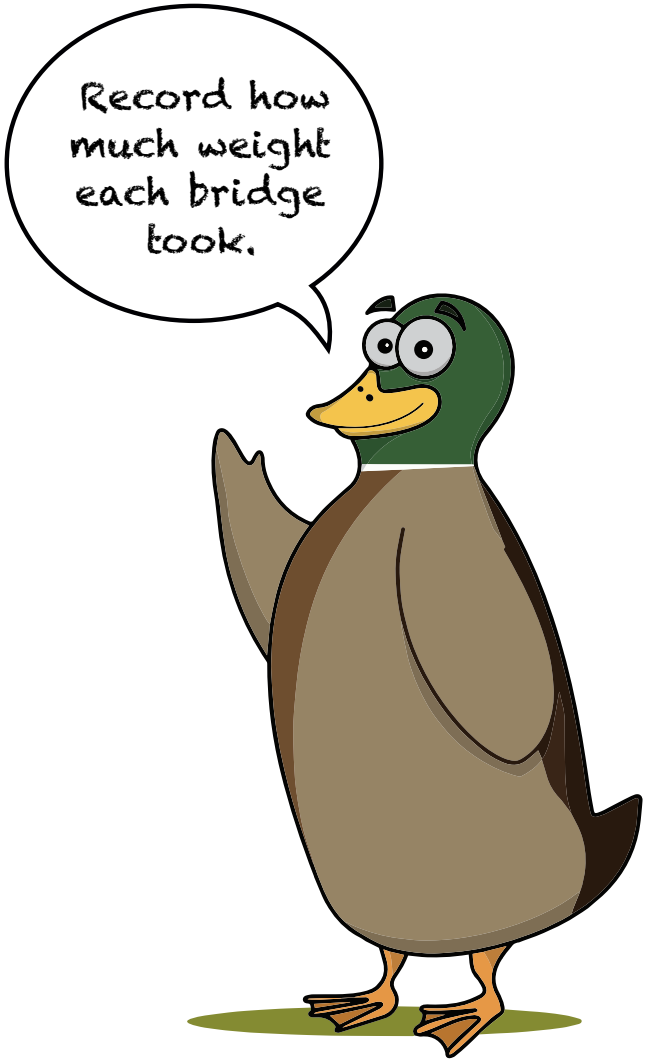
Place the books in two piles of equal height and ensure that there is a gap of 10cms between the two piles.
Lay one strip of card across the two piles of books so that it covers the gap.

Step 2

Place the small weights onto the strip of card until your card falls into the gap. How much weight did it hold? Test your bridge by changing the amount of card used and the width of the gap, using the chart on the next page.

Build a bridge: Beam

	1 strip of card	4 strips of card	7 strips of card	10 strips of card
10cm gap	weight	weight	weight	weight
13cm gap	weight	weight	weight	weight
16cm gap	weight	weight	weight	weight
19cm gap	weight	weight	weight	weight

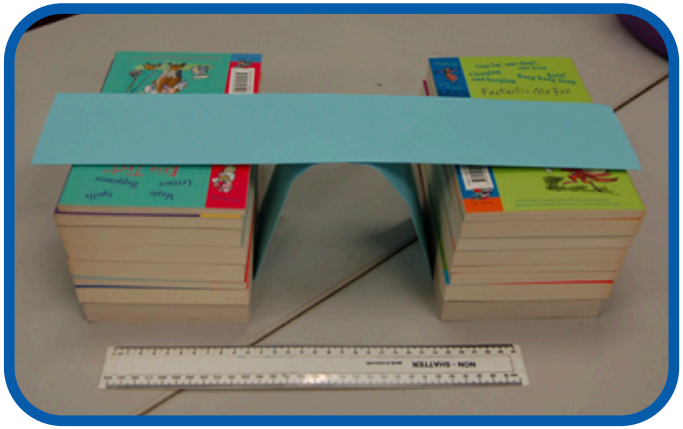


Build a bridge: Arch

Equipment

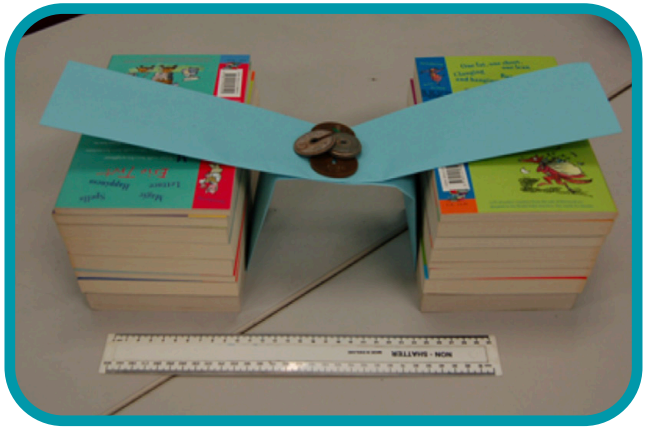
Per group - a selection of books, 10 strips of card, selection of small weights such as pennies or multilink (alternatively, replace the books with plastic cups).

Step 1



Place the books in two piles of equal height and ensure that there is a gap of 15cms between the two piles. Cover the gap between the two piles of books with one strip of card. Place another strip in an arch shape between the two piles of books. Make sure the top of the arch meets the underside of the cover.

Step 2

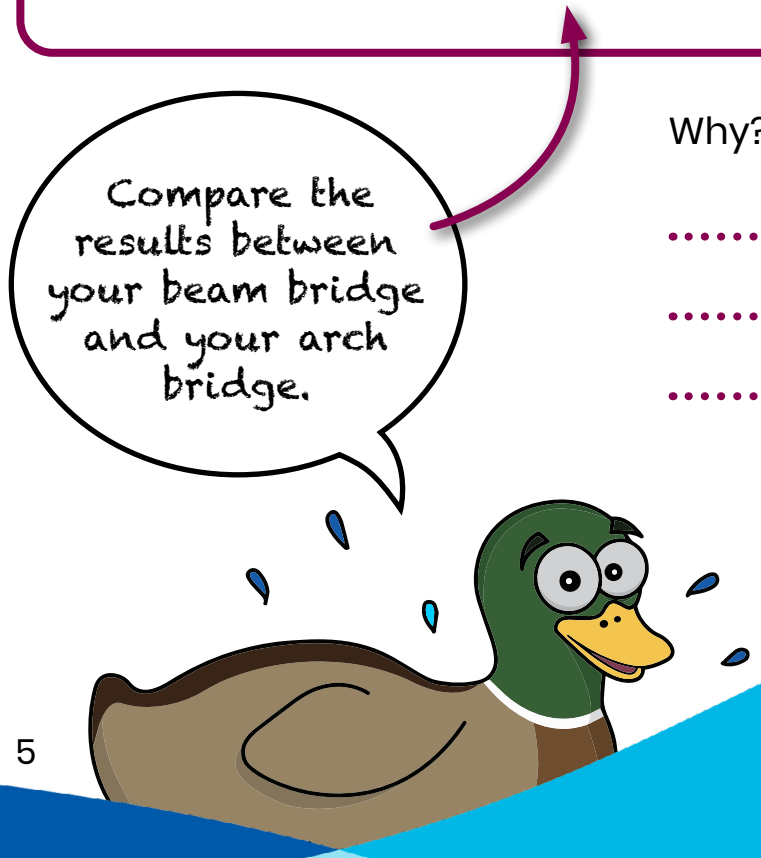


Place the small weights onto the strip of card until your card falls into the gap. How much weight did it hold?
Test your bridge by changing the amount of card used and the width of the gap, using the chart on the next page.

Build a bridge: Arch

	1 strip of card	4 strips of card	7 strips of card	10 strips of card
10cm gap	weight	weight	weight	weight
13cm gap	weight	weight	weight	weight
16cm gap	weight	weight	weight	weight
19cm gap	weight	weight	weight	weight

Build a bridge: Beam v Arch



Why?

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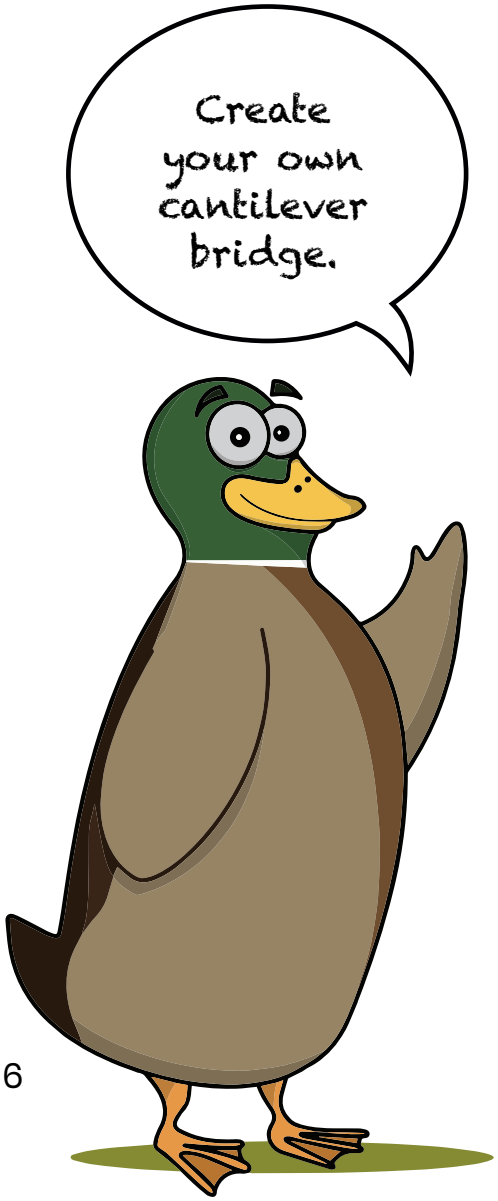
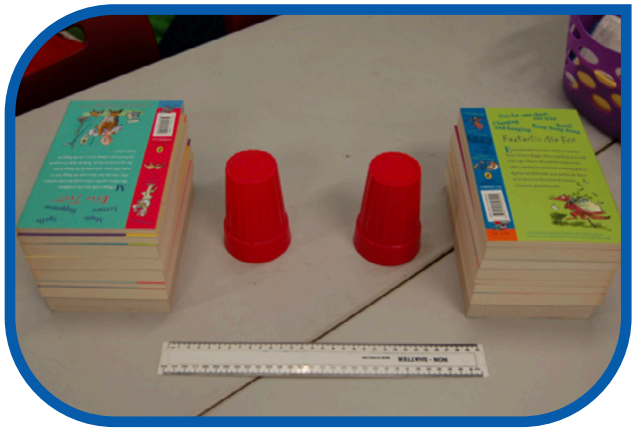
Build a bridge: Cantilever



Equipment

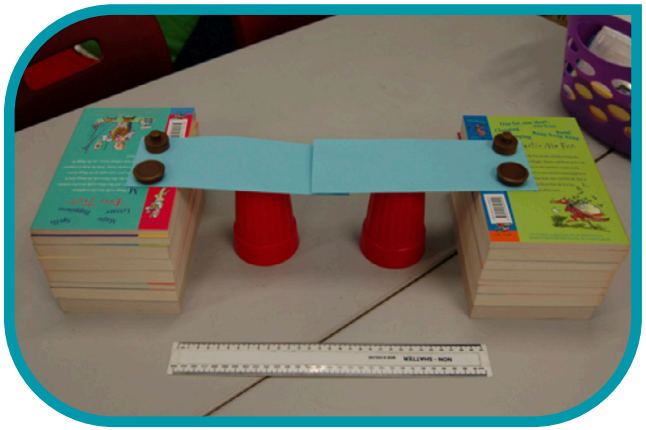
Per group - a selection of books, 2 plastic cups, strips of card or rulers, selection of small weights such as pennies or multilink.

Step 1



Place the books in two piles of equal height (and the same height as your plastic cup) and ensure that there is a gap of 30cms between the two piles. Place a plastic cup approximately 5cms away from each pile of books, inside the gap.

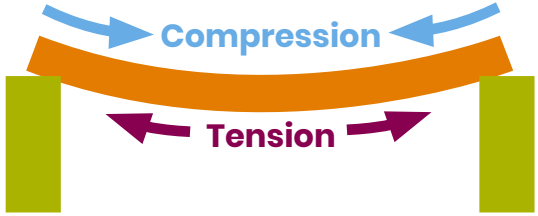
Step 2



Lay a strip of card or ruler on each pile of books, with 5cms of card resting on the pile, and the rest of the card laying over the plastic cup.
Place a small weight on top of the card which rests upon each pile of books. Make sure the weight is the same on each.

Build a bridge: Deflection

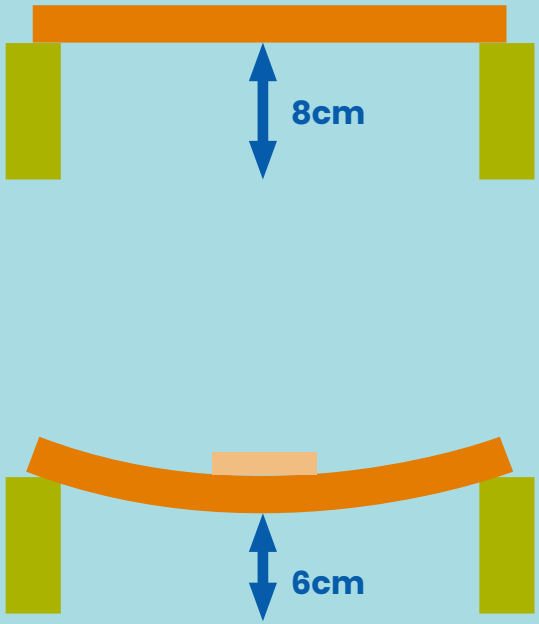
Key terms



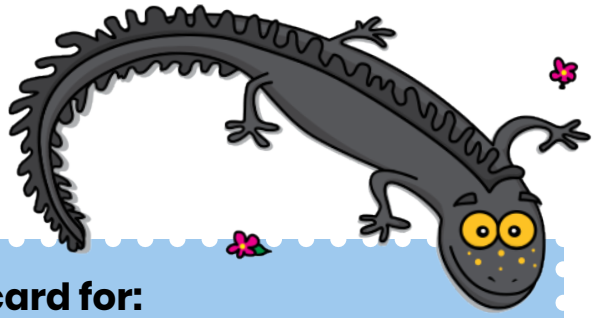
Tension: The process of stretching something tight.

Compression: The process of pushing something together.

Deflection: The amount of movement that occurs when an object is put under stress from a load.



Build a bridge: Extension



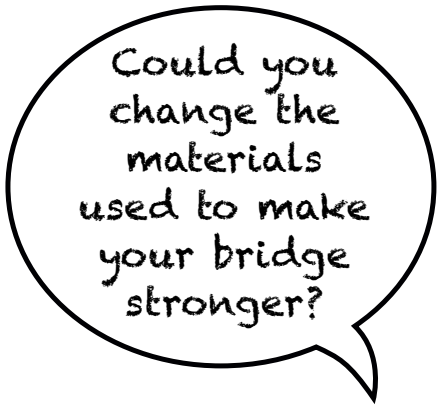
Experiment with the sheets of card. Can the sheets of card be folded in a different way to make it stronger? Try a cylindrical or concertina shape. Record your results in the same way as before so that you can easily compare.

Could you change the materials used?

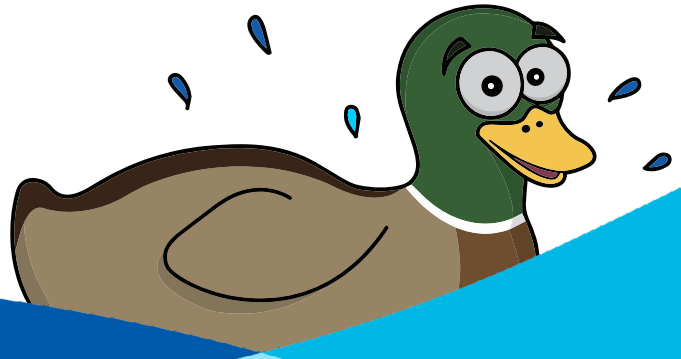
Exchange your strips of card for:
Plastic, sugar paper, straws, balsa wood, lollipop sticks

Exchange your small weights for:
A variety of coins, pencils

Exchange your pile of books for:
Plastic cups, wooden blocks, balsa wood, lollipop sticks, straws



Have you discovered which bridge building technique and which type of material forms the best bridge to span a waterway?
Draw your final design – Remember to label it and include all specifications.



Suspension Challenge

Is your class up to the challenge of creating a giant suspension bridge?

Materials you could use to create your suspension bridge:

Chairs String Masking tape Tables Wood Plastic Rope

Sticky tape Tubes Tin foil Cardboard Staples

Pipe cleaners Tins Small weights Corriflute Glue Straws

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Visit:
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for more learning resources, activities and games.