

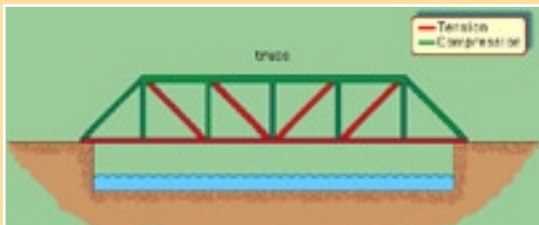
# DESIGN A BRIDGE

## MATHS: STRANDS AND STRAND UNITS

- Number:** Place value (ordering), operations  
**Shape and Space:** 2D shapes, 3D shapes, Lines and Angles  
**Measures:** Length, Area, Weight  
**Data:** Represent and interpret simple tables and charts

### 1) Lines, Shapes and Angles

(a) Have a look at these pictures of bridges and see what shapes you can see in them:



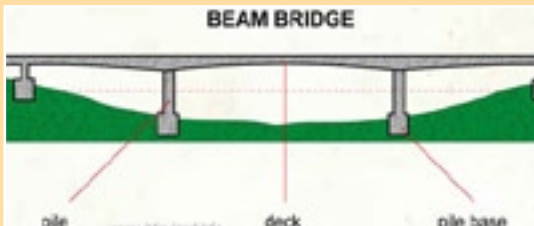
TRUSS BRIDGE



ARCH BRIDGE



SUSPENSION BRIDGE



BEAM BRIDGE

(b) Draw sketches of some of the bridges and colour in any parallel lines.

(c) Can you mark horizontal lines in one colour, and vertical lines in another colour?

(d) Can you mark in any acute angles? Right angles?

(e) Can you draw a bridge in your local area? What shapes are in it? Is it like any of the bridges in these pictures?

### 2) Weighing and Recording

What weight can the different bridges that you made with paper carry?

(This can be in standard units e.g. grams or non-standard units e.g. coins)

Make a chart recording the different types of bridge and the weights that they can carry.

(You can use coins, marbles - perhaps in a yogurt carton, or other suitable 'vehicles').

**The rest of the exercises are about 4 famous bridges:**

Golden Gate Bridge

Sydney Harbour Bridge

Le Pont de Normandie

Brooklyn Bridge

Can you find out what country each of them is in?

# DESIGN A BRIDGE

The following are some details about each of the bridges:

## Golden Gate Bridge

**Location:** San Francisco.  
**Date Completed:** May 27, 1937  
**Height:** 229 metres  
**Length:** 2743 metres  
**Width:** 27 metres



## Sydney Harbour Bridge

**Location:** Sydney  
**Date Completed:** 19 March 1932  
**Height:** 134 metres  
**Length:** 1149 metres  
**Width:** 49 metres



## Le Pont De Normandie

**Location:** Le Havre  
**Date Completed:** 1997  
**Height:** 134 metres  
**Length:** 853 metres  
**Width:** 24 metres



## Brooklyn Bridge

**Location:** joins Manhattan to Brooklyn  
**Date Completed:** 1883  
**Height:** 83 metres  
**Length:** 1834 metres  
**Width:** 26 metres



### 3) Ordering

List the bridges in order, with the shortest length first, using the symbol  $<$  .

List the bridges in order, with the widest first, using the symbol  $>$  .

# DESIGN A BRIDGE

## 4) Subtraction

The Golden Gate bridge in San Francisco opened in 1937. **Estimate** – about how many years it has been open. **Calculate** exactly how many years it has been open.

## 5) Area – estimate and calculate

Insert the length and width of each of the above 4 bridges in a chart:

NAME OF BRIDGE	LENGTH OF BRIDGE	WIDTH OF BRIDGE	AREA OF BRIDGE (ESTIMATE)	AREA OF BRIDGE (CALCULATED)

Now estimate and then calculate the area of each of the bridges. (Make sure you put the correct units after your calculation).  
(Area = Length x width)

If you know of any big bridge in Ireland (e.g. the Boyne Bridge, the Taney Luas Bridge) add it in, in another row, and see if you can find out its length and width also.

## 6) Ratio and Drawing to Scale

A ratio or proportion is a comparison of two quantities. There are many real-life applications for proportions. One of these is drawing to scale or making scale models.

Can you draw the Sydney Harbour Bridge to scale, so that it fits in your copy book? (2 suggested scales are given below).

Which one fits best into your copy book?

Name of Bridge	Actual Length of Arch Span	Actual Height (top of arch above sea level)	SCALE	Length of Bridge in your Scale Drawing	Height of Bridge (top of arch above sea level) in Scale Drawing
Sydney Harbour Bridge	503 metres	134 metres	100 m to 1 cm (Ratio 10,000:1)	5 cms (divide 503 by 100)	1.3 cms (divide 134 by 100)
			50 m to 1 cm (Ratio 5,000:1)	10 cms (divide 503 by 50)	2.6 cms (divide 134 by 50)

Can you find out the length and height of another bridge, maybe one in your local area, and draw it to scale?