

# The Royal Society of Edinburgh



## Thomas Telford 250th Anniversary Teaching Resource Materials for Schools

### Introduction

These *Thomas Telford Teaching Resource Materials* have been produced as part of the Royal Society of Edinburgh's (RSE) programme of events for young people and the wider public from across Scotland. The materials have been created for P6 and P7, S1 and S2 pupils. However, some teachers might want to use an activity outwith this age range for example with S3 and S4 technology students. The materials have also been produced to be used in schools, in order to celebrate Thomas Telford's 250th anniversary, Thomas Telford being one of the RSE's most eminent Fellows.

The contents of this resource are also intended to enable students and teachers to know more about Telford's achievements and how these benefit us today, as well as inspiring the next generation to take an interest in a possible future career in construction or engineering.

Thomas Telford was the greatest Scottish civil engineer, whose innovative achievements spanned bridge, canal, road, harbour, house and public health construction of unparalleled benefit to society, extending down to today. He was born into a humble shepherding family in the Scottish borders in 1757 but, after stonemasonry experience, became a self-taught practical engineer, applying then state-of-the-art technology to a myriad of transport-related projects across the UK and other parts of the world.

Please also note that the content of this resource contains individual views that do not necessarily represent the views of the RSE.

Written by Bob Kibble, University of Edinburgh  
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## **The Royal Society of Edinburgh**

The Royal Society of Edinburgh is Scotland's National Academy of Science & Letters. An independent body with charitable status, its multidisciplinary fellowship of 1400 men and women of international standing represents a knowledge resource for the people of Scotland. Committed to its Royal Charter of 1783 for the "advancement of learning and useful knowledge" the Society recognises the important role it can play in today's Scotland. Working as part of the UK and within a global context, the RSE seeks to contribute to Scotland's social, economic and cultural wellbeing by:

- organising conferences and lectures for the specialist and for the general public on topics of national and international importance;
- providing independent, expert advice to key decision-makers in Scotland;
- awarding over £1.7million annually to Scotland's top young academics to promote research in Scotland;
- enabling leading Scottish-based researchers to collaborate with the best of their international counterparts;
- inspiring school children in classrooms from the Borders to the Northern Isles and promoting their interest in science, society and culture;
- producing academic journals of international standing.

### **This resource contains**

- Information about the Royal Society of Edinburgh
- Four activities which have been produced for use in classrooms and include:
  - Background notes for teachers - [click here](#)
  - Activity notes explaining the four activities - [click here](#)
  - Thomas Telford brief biography notes - [click here](#)
  - Student activity sheets for each of the four activities, together with additional worksheets where appropriate, as follows : ([click here](#))
    - ❖ The Incomplete Sketchbook
    - ❖ Telford and Co., Kitchen Designers
    - ❖ The Telford Property Sale
    - ❖ The Bridge-span Challenge
  - Suggested links to the Scottish Curriculum for Excellence - [click here](#).

## **Background Notes for Teachers**

These materials have been created for use in schools across a wide range of ages and subject areas. They will offer an historical context to creative work and help learners to appreciate the legacy of one of Scotland's great historical figures. Each activity is presented with a page of some simple introductory student notes. Notes for teachers are included below in this section. You will want to present the activities to suit your class and curriculum, but we would hope that you would place these activities in a Telford context.

A short overview of the life and achievements of Thomas Telford has been included as background information and also for student research information should you want to make use of it.

## **Activity Notes for Teachers**

The activities are outlined below with an indication of their curriculum value. To find the student materials click [here](#).

### **Activity 1 - The Incomplete Sketchbook**

This is a creative design activity set in the context of a design challenge. The student design sheets are best enlarged to A3 size. The idea is that students will consider the context of the design challenge and engage in a series of small sketches to explore aspects of the design. This activity has strong links with art, design, technology and perhaps history. Three different unfinished sketches are presented.

### **Activity 2 - Telford and Co., Kitchen Designers**

This activity is set in modern times and involves a kitchen design and costing task. The activity will engage learners in collaborative, research, evaluation and calculation tasks. The prices of kitchen appliances and fixtures are not given but are readily available in high street stores or via websites of the main manufacturers. Although not directly related to Thomas Telford in an historical sense, tasks such as this are part of the real work of modern builders.

### **Activity 3 - The Telford Property Sale**

This activity involves the creation of a property sales brochure. The context is that of an old Telford-built house which is about to be sold. The challenge is to design and present a brochure which will present the property as attractive to buyers. The task will involve research into styles of presentation, particularly the language and phrases used to describe properties. Therefore this becomes a task which combines design and functional writing.

### **Activity 4 - The Bridge-span Challenge**

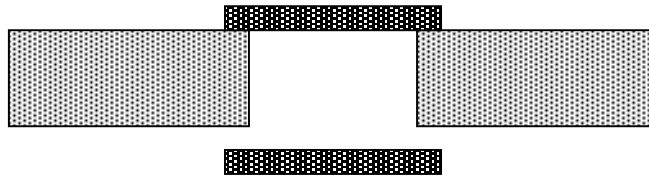
This is an investigative practical activity which links design, dexterity and mathematics. It encourages skills of negotiation, observation and analysis as well as offering an open-ended creative task. Simple materials are all that is required, perhaps lollipop sticks or playing cards. Each group, preferably a pair, of pupils will need perhaps up to thirty identical building 'blocks' for their

group. You could use hard-backed books or wooden blocks but our trials have shown that lollypop sticks are readily available and cheap.

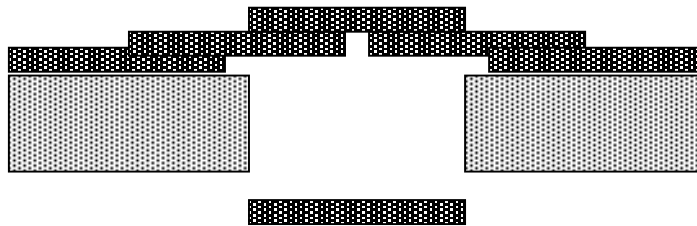
The challenge is simply to explore how the building blocks might be used to create a bridge to span a gap between two supports. For supports you could use telephone directories, house bricks etc.

The activity might be offered in three stages:

**Stage 1** - Let's start with the trivial case of the gap being less than the length of a span member. In such a case a single span can bridge the gap.



**Stage 2** - The gap is equal to the length of a span member. This requires at least four span members, possibly five to bridge the gap. A load of 2p pieces could be used to test the bridge strength.



You could limit the groups to six or ten span members and challenge them to create the strongest span, tested by loading 2p pieces in the centre.

**Stage 3** - The gap is 1.5 times the length of a span member. In this case there are several possible strategies, some resulting in a weak bridge, others in a far stronger bridge. Try offering 12 span pieces to each group in the first instance.



Note: there must be no adhesion mechanism in this activity. Gravity alone provides the force to hold the bridge members down. Consider the suggestion above for stage 2 and that will offer a clue to a good design strategy.

## **Thomas Telford**

### **Biographical Background Notes for Teachers and Learners**

2007 is the 250<sup>th</sup> anniversary of the birth of the famous Scottish engineer, Thomas Telford. Telford, the son of a shepherd, was born on August 9, 1757 in Westerkirk, Scotland and lived to the ripe old age of 77. He is buried in Westminster Abbey.

In 1787 he became surveyor of public works for Shropshire. By this time Telford had established a good reputation as an engineer and in 1790 was given the task of building a bridge over the River Severn at Montford. This was followed by a canal that linked the ironworks and collieries of Wrexham with Chester and Shrewsbury. This involved building an aqueduct over the River Dee. On the Pontcysyllte Aqueduct, Telford used a new method of construction consisting of troughs made from cast-iron plates and fixed in masonry.

Thomas Telford was responsible for a great deal of engineering work throughout the UK, and was consulted on many more projects, including the rebuilding of London Bridge around the year 1800. He was particularly famous for the construction of a great number of bridges, including the Menai Suspension Bridge across the Menai Strait (1826) and for the St. Katherine's Docks in London (1828).

One of his more famous constructions was the Galton Bridge. Built in 1829, this 46-metre bridge was the longest single span in the world at the time. Telford was also an important road builder. He was responsible for rebuilding the Shrewsbury to Holyhead road, now the A5, and the North Wales coast road between Chester and Bangor.

During his life Telford built more than 1,000 miles of road. He died in 1834.