



## Navvies

### Introduction

This lesson explores how the canals were built, the people who built them and the techniques involved in keeping them watertight.

### Learning Objectives

- To understand the principle of a fair scientific test
- To understand the meaning of the word 'permeability'
- To design a fair test to investigate the water permeability of different materials
- To draw conclusions about which materials would have been best for lining the bottom and sides of a canal to make it watertight

### National Curriculum

#### Science

- The pupils will give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

#### History

- The pupils will carry out a local study
- The pupils will study a significant turning point in British history

### Differentiation

- All children will learn that some materials are more permeable than others.
- Most children will learn the principles of a fair test, and which material was most watertight.
- Some children will learn that the most watertight material was the most suitable for lining canals, and why it was chosen by the navigators for this purpose

### Resources

1. Sieves
2. Measuring container
3. Water
4. Dry and wet clay
5. Gravel
6. Sand
7. Soil
8. Drip bowls or buckets
9. Navvies information sheets
10. Recording materials



## Navvies

### Key Vocabulary

industrial revolution  
navigation  
navvies  
puddle  
watertight  
permeability

### Teaching Activities

1. Introduction  
Ask the children what they already know about canals and what they are used for. Distribute sheet one and read through it together, discussing any unfamiliar terms. Explain that for the next section, they are going to think like canal engineers and investigate a range of materials to establish their permeability to water.
2. Show the class the equipment that is available, & discuss with the class how they will design a fair test to investigate the relative permeabilities of the different materials. What will they keep the same, what they will vary, and what would they measure? (Ensure that they think about pouring the same amount of water through each substance, and also timing the speed with which it passes through). From this write their suggestions on the board.
3. Ask the children to carry out their investigation making note of their findings as they progress. They can now write their own results chart showing which material they have tested and how they made it a fair test.
4. Plenary  
Ask the children to report back their findings and note these on the board. What conclusions can they draw? Some materials were more permeable than others. Air bubbles between materials means greater permeability. Which material would best line a canal? How do their findings relate to what they read on the sheet about navvies, and how they worked?