

the outdoor classroom

the duke of northumberland's river



Curriculum focus:

History

Keywords:

Local History, Land Use, Literacy, Design and Technology, Role Play, Maps, Industry, Water, Power, Science

Skills learnt in this worksheet include:

Investigating the local area
Undertaking field work
Observing and questioning
Collecting and recording evidence
Using primary sources
Historical research
Developing an argument
Role play

Resources required for this activity:

Base map
Newspaper layout sheet.
Historic map 1896 of Mereway

Further information:

www.learn-energy.net/kidscorner/en/u11/water.html
www.alternative-energy-news.info/technology/hydro/
www.eia.doe.gov/kids/energy.cfm?page=hydropower_home-basics
www.british-history.ac.uk/report.aspx?compid=22290

Further information about mills in the Twickenham area:

www.richmond.gov.uk/local_history_river_crane.pdf



Historic Background

Syon Abbey was suppressed in 1539 during the Dissolution of the Monestaries by Henry VIII. John Gates, was the trusted enforcer for this process at Sion and acted as steward of the estate on the King's behalf. He held an important position in Katherine Parr's household, and then held high office under Edward VI. He came to an unfortunate end when he lost his head as a supporter of Lady Jane Grey in Northumberland's plot to put her on the throne instead of Mary Tudor. John Gates was instrumental in developing the Duke of Northumberland's River.

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The Duke of Northumberland's River is not a natural river, but was constructed in the early 1500s to transfer water for industrial purposes to power mills.

The River was dug following the Reformation when the mills along the River Crane were deteriorating due to a failing water supply. In 1543, John Gates, keeper at Syon and Bailiff of the manor, was granted money to draw water from the River Crane to power two new watermills at Isleworth. In order to maintain the flow of the Crane, water was brought six miles from the River Colne, channelled across Hounslow Heath to join the Crane just north of Baber's Bridge. It followed the Crane to Twickenham. From Kneller Gardens a new 2 1/2 mile stretch of river was cut. The River joins the Thames at Isleworth.

Work began in 1544/5 with eighty of the country's best 'ditchers' and conscripted local tenants under the direction of John Pylkyngton. It was a complex engineering operation and relied on gravity to allow the water to flow, carefully following the contours of the terrain.

The river came into the possession of the Earl of Northumberland in 1604 and remained in his possession until the 1930s. Little is known about construction techniques. The river is shown on many historic maps often named the New River or the Duke's River.

Mills

Water power is a source of energy, and was used to turn waterwheels, that turned machinery to grind grain to make flour. A waterwheel is a wheel with paddles around the edge. When the water pushes against the wheel it turns the wheel and the axles in the centre. The axle was fixed to a millstone that ground the grain. Mills were also used to manufacture other products.

Further information about water wheels can be found at:

www.technologystudent.com/energy1/wtrwhl1.htm

Includes moving illustrations of different types of water wheel.

www.energy.soton.ac.uk/hydro/waterwheels.html

A detailed description containing diagrams and photographs.

www.electricscotland.com/kids/stories/chinese12.htm

A chinese story about waterwheels.

www.ehow.com/how_7726801_make-wheel-model-school-project.html

Includes instructions and a template for a cardboard model of a waterwheel.

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The River Crane and the Duke of Northumberland's River had several mills along their courses. They manufactured a number of products.

1. The Bedfont Powder Mill was north-west of Baber Bridge on the River Crane. It was in operation as a sword-mill in 1635, and was later converted to a gunpowder mill.
2. A paper-mill was built above Baber Bridge just below the junction with the rivers in about 1620. It had gone by 1675.
3. On the River Crane below Baber Bridge there was a sword-mill in 1675.
4. A powder-mill on the south of Baber Bridge was replaced by a brazil-wood mill in 1752 and was converted into a flax mill. In 1834 it made snuff, and between 1865 and 1894 became a cartridge factory. In 1871 the Duke of Northumberland sold it to Messrs. Curtis & Harvey, who also bought the Bedfont and Hounslow Gunpowder Mills.
5. Hounslow Gunpowder Mills was in what is now Crane Park. The Hounslow Mills opened in 1766, finally closing in 1926.
The Gunpowder Mills were well placed because of their distance from any large populations, and proximity to good transport links to London using the River Thames.
6. Fulwell Mill, known in 1753 as New Mill, stood where Mill Road crosses the south stream of the River Crane. It may originally have been used as a copper mill, but by 1767 the mill was being used to crush linseed to be made into linseed oil cake for cattle. In 1845 the mill was converted to make paper until it burnt down in 1878. The site is now part of Crane Park in Twickenham.
7. Kidd's Mill on DNR had two mill-stones in 1553, and five in 1633. Four ground corn and the fifth ground wood for dyes. By 1845 there were two steam-engines to assist the water-power and the mill was said to be one of the largest for flour in England. Samuel Kidd & Co. Ltd. were the owners when the mill stopped work a little while before it was demolished in 1941.
8. Brazil Mill on the DNR was originally a copper and brass-mill. This mill stood on the Duke's River in St. John's Road. The mill was probably built between 1581 and 1587. A map of 1635 describes it as a copper-mill, by 1607 it was a paper-mill. It may have been the Isleworth paper-mill which was stopped from working in 1636 because of danger from plague-infected rags. In 1671 it made paper and ground brazil wood for dyes. By 1721 it was only a brazil-mill and was called the Brazil Mill. The mill became a corn-mill in the 19th century and by 1862 had been burned down. The site was bought by the owners of the adjoining brewery.

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Suggested activities on site:

1. Discussion

- Discuss how you would go about building a new river without any machinery.
- What tools would you have in the 16th Century?
- Who did the building?
- Why did John Pilkington use conscripted labour?

Look at the map of Mereway and compare the old River Crane with the Duke of Northumberland's River. While the Duke's River is straight and looks man-made, the Crane has a natural course. (This has since been altered.)

- Discuss natural sources of energy.
- Why was it necessary to build a new river?
- What would the benefits be?
- Who would benefit?
- How did a water mill work? (The weir gives an indication of the potential energy of water.)

Suggested activities in the classroom:

1. Role Play

Several characters could be cast. The Duke, John Gates keeper at Syon and Bailiff of the manor, the engineer John Pylkyngton, mill workers, conscripted labour, 8 "ditchers".

2. Hot seat

Alternatively the leader of the activity could take on the role of John Pilkington and answer questions about the construction of the river.

3. Job advert

Write an advert to be placed in the market place for an experienced "ditcher". Explain what the project is, who is involved, the role of the ditcher, how much the pay will be etc.

4. Waterwheel model

In class a working waterwheel could be constructed. This can be used in experiments to investigate potential and kinetic energy.

- Cut 4 evenly spaced slits along the length of a cork.
- Cut 4 pieces of plastic to the same length as the cork and fit these blades into the slits of the cork.
- Make 2 holes on the opposite sides of a water bottle.
- Cut the base off the water bottle.
- Attach a toothpick into one side of the cork and put it in the bottle.
- Push the toothpick through one of the holes and then the other.
- Sit the bottle in a dish or bowl.
- Pour water into the neck of the bottle.
- The wheel should rotate.
- If a plastic tube and funnel is used you can alter the speed of the falling water.

5. Explanatory text

Write an explanation of how a waterwheel works and include illustrations.

6. Information leaflet

Write an information leaflet that could be given to visitors to explain the history of the Duke of Northumberland's River and the importance of the mills.

7. Hydro electric power

This topic could be linked to an investigation of alternative power sources including hydro electric power.

8. Water

This topic could also be linked to a more general topic of water and could be used in conjunction with Water Week teaching resources.

www.oxfam.org.uk/Waterweek/TeachersResources/Learn

This includes a water diary, water games and other teaching resources.