Historic England

Education

Teacher's Kit

Industrial Heritage - The Ceramics Industry

Background

In order to meet increased demand, pottery manufacture in Britain underwent significant development from the late-seventeenth century onwards. One change was the introduction of new pottery types including **tin-glazed earthenware**, **salt-glazed stoneware, creamware** and **porcelain**. These new types of pottery used different raw materials to make the finished product appear white, either by covering the pot with a white **tin-glaze** or by using pale-coloured clay and other additives that had to be specially sourced from different parts of the country. Ground flint was added to the clay body for the production of **creamware** and ground bone was an essential ingredient for **bone china** (a type of **porcelain**). Both the flint and bone had to be heated at high temperature to break down the structure and then ground before being added to the clay.

Josiah Wedgewood and the integrated pottery factory

The eighteenth and nineteenth centuries saw the development of new purpose-built pottery factories. The pioneer of the integrated pottery works was Josiah Wedgwood whose Etruria factory (opened in 1769) divided the processes of pottery manufacture into distinct stages. Etruria was designed to make the process as efficient and profitable as possible. Stages such as turning, moulding, pressing and decorating operated in distinct areas of the factory, each process following on from the next. The products would travel in a logical direction from the intake of raw materials to the **slip** house, clay making workshop, **biscuit** kilns and warehouse, **glost** placing and firing, sorting and selection warehouse and then to the decorating departments and kiln.

Eturia was demolished in the mid-twentieth century but it provided a blueprint for later pottery factories or potbanks. The lighter jobs (casting, dish pressing, plate making and decorating) were generally housed on the upper floors with the heavier tasks (throwing, turning and **saggar** making) located on the ground floor.

Many potbanks such as the works now housing the Gladstone Pottery Museum in Longton, Stoke-on-Trent, grew organically as additional workshops and a kiln were added. Other pottery manufacturies were purpose-built. Many small, isolated potteries existed in rural areas where there was a good supply of clay. The concentration of manufacture around Stoke-on-Trent led to the area becoming known as the 'Potteries'.

Decorative process

Wedgwood greatly improved the quality of ordinary ceramics. His cream coloured **earthenware** proved extremely successful and earned him some prestigious patrons. Queen Charlotte appointed Wedgewood the Queen's Potter in 1762 and Empress Catherine II of Russia ordered 952 pieces of **creamware** in 1774.

Wedgwood's experiments with barium sulphate (caulk), led to the development of jasperware in 1773. Jasperware combines clay that has been coloured with metallic oxides, often blue, with separately moulded reliefs, generally white, and was publicised by Wedgwood's famous copies of the Roman Portland Vase. Other wares included black basalt, frequently enhanced with red designs, to imitate ancient Greek vases.

Blue printed ware was first developed in the 1770s in the Staffordshire Potteries and was produced in large quantities throughout the nineteenth century. Taking advantage of new affordable white **earthenware** and china clays, Staffordshire potters developed a technique of decorating their products with **underglaze** printing.

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The technique of **transfer printing** arrived in the Potteries at the end of the eighteenth century. The first local manufacturers to market **underglaze** blue printed wares are thought to have been Adams, Wood and Spode.

Kilns

- Bottle Kilns were widespread throughout the eighteenth century. Inside, there was a centrally placed oven, which was heated by a series of low-set fires positioned at intervals around the perimeter, with flues that fed into the oven. The circular oven was often reinforced by iron bands. The distinctive bottle shaped cover building (or hovel) around the oven acted as a chimney and provided a covered working area for the operators.

- Muffle Kilns were designed to protect decorated wares during firing. This was an updraught kiln with an internal chamber to hold the pottery. Fires beneath the chamber produced hot gases that passed through surrounding flues, heating the pottery but without exposing it to the fumes. These kilns had chimneys but no outer hovel. Very similar kilns were used for firing clay pipes. Glazed wares were also protected from hot gasses during firing by being placed in **saggars**, clay containers sealed with damp clay and stacked inside the chamber of the kiln.

- Tunnel Kilns are long rectangular structures lined with refactory bricks, they were introduced into Britain in the early-twentieth century. Tunnel kilns allowed the continuous firing of pottery which passed on trolleys through areas of increasing and decreasing temperature.

Warehouses

Warehouses (for the storage of finished pottery) and packing houses were generally built close to transportation routes, frequently a canal. Decorative retail showrooms were generally placed on street frontages in front of the works to attract buyers.

Further information on the pottery industry including case studies from the Coalport China Works in the Ironbridge Gorge can be found in the main Investigating Industrial Sites Teacher's Kit, which can be found here: content.historicengland.org.uk/content/docs/education/explorer/teachers-kit-investigating-industrial-sites.pdf

Surviving sites

From the mid-twentieth century onwards the remaining potteries were modernised with electric kilns, and many have subsequently closed in the difficult economic circumstances of the last thirty years. As a result, the distinctive landscape of bottle kilns and potbanks has now almost completely disappeared in Stoke-on-Trent and elsewhere.

Today, most large scale pottery manufacture takes place in Asia. Nevertheless, some smaller firms still operate on their original sites, using historic buildings and equipment, these include:

Moorcroft Pottery (established in the early twentieth century) and **Middleport Pottery**, both in Stoke-on-Trent. Middleport is now the last nineteenth century potbank still operating on a commercial basis and is currently being sensitively conserved as a going concern with the help of the Prince's Regeneration Trust middleportpottery.co.uk/

Other well preserved eighteenth and nineteenth century potteries - such as **Coalport** in the Ironbridge Gorge, Shropshire (ironbridge.org.uk/our-attractions/coalport-china-museum/) and the **Gladstone Pottery** in Stoke-on-Trent (stokemuseums.org.uk/visit/gpm/) – are operated as museums, and survive complete with their original bottle kilns to give a good impression of how these sites once looked.

Elsewhere, many old potteries have been converted for residential, office or commercial use, and the sites of former potteries are often preserved in street and place names.

A number of other historic pottery sites that are open to the public include:

The **Etruria Industrial Museum and Heritage Centre**, home to Jesse Shirley's 1857 Bone and Flint Mill, the only remaining operational Steam Driven Potters' Mill in the world. (etruriamuseum.org.uk) which is in Etruria, Stoke-on-Trent (limited opening) and The **Cheddleton Flint Mill** (cheddletonflintmill.com/education.htm) also in Stoke-on-Trent, which demonstrate the preparation of the ingredients for white china.

The Ironbridge Gorge Museum Trust also maintains the **Broseley Clay Tobacco Pipeworks** (ironbridge.org.uk/our-attractions/broseley-pipeworks/) and the **Jackfield Tile Museum** which incorporates the **Craven Dunhill Works** (ironbridge.org.uk/our-attractions/jackfield-tile-museum/).

Sharpe's Pottery Museum, Swadlincote, Derbyshire which operated from 1821 until 1967 and later specialised in the manufacture of water closets and wash basins (sharpespotterymuseum.org.uk/).

Sources

Sekers, D. (1981) *The Potteries* (Shire Publications)

Palmer, M, Nevell, M, Sissons, M. (2012) *Industrial Archaeology: A Handbook*, Council for British Archaeology Practical Handbooks.

bbc.co.uk/history/historic_figures/wedgwood_josiah.shtml

stokemuseums.org.uk/collections/ceramics/ (This website includes tabs for Resources and Links)

wedgwoodmuseum.org.uk/learning

Potteries are also considered in the *Designation Listing Selection Guide: Industrial Structures* (2011). (historicengland.org.uk/images-books/publications/dlsg-industrial/)

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Ceramic Industry - Glossary

Tin-glaze	A white, glossy, opaque glaze applied to **earthenware**.
Salt-glaze	Thin glaze produced by throwing salt into the kiln, which reacts with the clay to produce a fine glaze with an 'orange peel' texture on the surface of the pot.
Earthenware	Pottery fired at lower temperatures.
Stoneware	Pottery fired at higher temperatures, which is inherently non-porous.
Porcelain	Hard, fine, high-fired material made from pale-coloured clay and other additives. It is white and translucent.
Creamware	Popular **earthenware** pottery made using pale-coloured clay from south west England covered by a transparent glaze.
Bone china	Vitreous, white, translucent pottery made from pale-coloured clay, calcined bone and other additives.
Calcination	Breaking down and purifying substances by subjecting them to high temperatures.
Slip	Fluid clay in a creamy texture used for decorating, joining and as a material for casting.
Biscuit	Pottery which has been fired but is unglazed.
Glost firing	The firing process during which the glaze is formed on the ware.
Saggar	A lidded or covered box used to protect wares from direct flame, smoke, fuel-ash or cinders during firing.
Transfer-printing	Method of decoration where a pattern or picture is printed onto paper and then, when wet, is slid onto the surface of a pot.
Underglaze	The process of applying decoration to **biscuit** pottery before covering it with a transparent glaze.

Activities – The Ceramics Industry

Curriculum Links.

History: Chronological understanding – understanding progression and change in the development of the ceramics industry. Knowledge and understanding of key events, people and changes in the past – a study of the key innovators and inventions in the ceramics industry. Historical interpretation and enquiry – examining primary and secondary source materials, investigating past events, understanding change and continuity.

Science: Investigating materials and their properties. Sorting and classifying materials and investigate their origins, uses and how they respond to change.

Design & Technology: Exploring how products have been designed and made in the past. Identifying how products contribute to lifestyles and consumer choices. Exploring the impact of ideas, design decisions and technological advances.

Art & Design: Using first-hand observation to explore and develop ideas. Trying out tools and techniques and applying these to materials and processes.

English: Through role play and examining a range of historical sources pupils will demonstrate the core skills of reading, writing and speaking and listening

ICT: Gathering, analysing and presenting information about the development of the ceramics industry using a variety of media.

Activities – The Ceramics Industry

Activities – use the images in the pack to assist you with the following activities:

- Use cards or electronic notes to write a short description of each of the processes of pottery manufacture, then, using the interactive whiteboard ask pupils to order the processes. Estimate which would be the heaviest, most physical jobs to perform and which would be the lightest. Compare the roles and identify which required the greatest levels of skill, concentration, natural light, raw materials? Ask pupils to state where they would house each process in a factory building and explain their reasoning. Compare pupils' findings to the layout of Josiah Wedgwood's Etruria factory.

- Ask pupils to write a brief job description for each role, listing the nature of the work and the skills and attributes needed to perform the task. Use ICT to investigate wages and conditions in a Victorian pottery factory and add detail to the job descriptions. Divide the class into interviewers and prospective workers and role play interviews.

- Investigate the decorative techniques pioneered by Josiah Wedgwood. Design and make a Jasperware plaque using modelling clay or plasticine. Investigate transfer printing techniques and create a design for a plate or teacup.

- Examine the materials needed to make ceramics and explain how these materials respond to heat. Investigate the properties of ceramics and discuss some of their uses. Compare ceramics to other materials such as wood and metal and discuss similarities and differences. Research early innovations in pottery additives to change the colour and appearance of the clay. Examine the compounds used today which can be added to clay to change its colour. Use Word processing, Excel, Power Point for presenting your findings.

- Use ICT, books, photographs, census returns and Ordnance Survey maps to identify evidence of the ceramics industry locally.

- Investigate the key historical figures associated with the pottery industry – Josiah Wedgwood, the Spode family.

Visit wedgwoodmuseum.org.uk/learning to download a selection of excellent learning resources and to arrange a visit. wedgwoodmuseum.org.uk/learning/virtual-etruria contains a visual tour of the Eturia factory together with historic film of workers undertaking different processes.

Images – The Ceramics Industry

Bottle Kiln, Newcastle Street, Longport, Stoke on Trent

Bottle kiln at the former Price and Kensington Teapot Works. Many pottery works were located on or close to canals as this provided the cheapest and easiest means of transporting raw materials in and finished goods out of the factory.

Images – The Ceramics Industry

Bottle Kiln, Farnham Pottery, Pottery Lane Farnham, Surrey

This bottle kiln dates from before 1913 and it was last used in c1970. All of the material used to build the kiln was made at the Farnham Pottery. This is the only remaining kiln of five kilns originally at the Farnham Pottery. It is thought to be the best preserved example of a traditional wood fired pottery kiln remaining in England. The Pottery was founded by Absalom Harris in 1872.

Images – The Ceramics Industry

Walker's Pottery, Corbridge, Northumberland

Walker's Pottery operated from the early nineteenth century until c1914. It made pipes, tiles and low-grade pottery for agricultural use, as well as bricks. It is one of the few remaining examples of a Tyne Valley rural pottery.

Images – The Ceramics Industry

Inside a pottery kiln, Stoke on Trent

The view inside a traditional Staffordshire bottle kiln or oven showing men setting saggars containing pottery-wares in preparation for firing. Saggars were special pottery cases made to protect more delicate pieces of clay (pottery) from being marked by flames or smoke when they were being fired. The exact location of the photograph is not known, but is thought to be in Stoke on Trent. It was taken sometime between 1960-1974.

Images – The Ceramics Industry

Removing flaws, Pottery Works, Stoke on Trent

Inside view of an unidentified pottery works in Stoke on Trent showing a woman removing flaws from newly made pots. It was taken sometime between 1960-1974.

Images – The Ceramics Industry

Workshop, Jackfield Tile Museum, Ironbridge, Shropshire

This workshop was built for the Craven Dunnill Tile Company in the 1870s. It housed an early, gas-fired tunnel kiln. The first floor housed the Mosaic Rooms where women chopped strips of tile into "tesserae" and pasted them onto sheets of paper to form mosaic floor patterns. Although disused at the time of this photograph the Craven Dunnill company has since returned to the site and now operate out of the Jackfield Tile Museum (2013).

Images – The Ceramics Industry

Etruscan Bone Mill, Stoke on Trent

This complete range of buildings includes a calcining kiln, bone crushing workshops and an engine house. These all made products that were needed to make pottery. They were built in 1857. All of the working equipment within them survives. It has been restored as a working museum.

Images – The Ceramics Industry

Trent and Mersey Canal Tunnel portals, Tunstall, Stoke on Trent

This is one of a pair of canal tunnel portals. It was built by Thomas Telford. The whole canal was built by James Brindley and also supported by the potter and industrialist Josiah Wedgwood. Both men could see the benefits of being able to move raw materials and finished goods cheaply and easily along the water.