



*Bringing the People of Manchester together to celebrate the Histories of Manchester*

## **Welcome Pack For Schools: Projects on the History of Science, Technology and Medicine**



### **Welcome to Manchester Histories Festival**

Wellcome Trust pack for schools. This booklet is designed to provide additional help for school projects that focus on the history of science, technology and medicine. The project ideas that follow are just the start – this is a chance to get creative with projects that span different themes and curriculum areas.

We hope that projects created in partnership with the festival will provide fresh opportunities to:

- Enrich the curriculum
- Develop key thinking and learning skills
- Enhance the Gifted and Talented curriculum
- Demonstrate how local history connects with wider social change



We are based at the University of Manchester and are able to provide:

- Access to expert knowledge in relevant fields
- Links with the Centre for the History of Science, Technology and Medicine
- Access to cultural institutions
- Access to cultural resources
- Hands-on help through student volunteer programmes

If you would like to discuss your involvement in Manchester Histories Festival, or the projects outlined in the following pages, please contact:

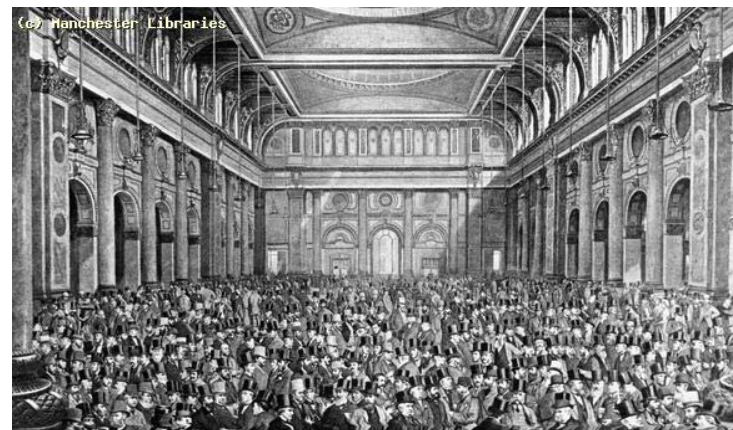
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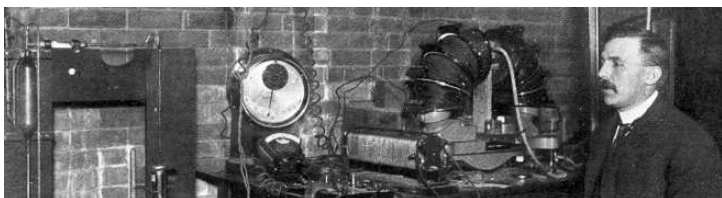
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The Cotton Exchange, Manchester. Manchester Libraries.

## (A) Local scientists and engineers



Portrait of Ernest Rutherford at McGill, 1905. Wellcome Library, London. Wellcome Images.

The stories of local scientists and engineers can be used as paths into key concepts in both History and Science.

Manchester is *the* prime example of an industrial city and this could be explored with students studying the history of Victorian Britain (**KS 2**). This could be expanded by looking at the effects of industrialisation and technological change on working people in Britain and overseas, and could also encompass studies on imperialism (**KS 3**).

*Examples include:*

**1** Investigate the work of **John Dalton**, who created the modern **atomic theory of matter**. He did so at the Manchester Literary and Philosophical Society, around 200 years ago. He is celebrated as

a hero of Manchester both at the Town Hall, and in the *Manchester Science* gallery at the **Museum Of Science and Industry (MOSI)**.



Portrait of John Dalton. Wellcome Library, London. Wellcome Images

**2** Research the history of a former local **cotton mill**, or a mill worked at by relatives of students.

- When was it built?
- Who worked there?
- What machines were used?
- Where did cotton come from?
- Where did the final product go?

This could be combined with a trip to **MOSI** to see examples of old mill machines. The **Whitworth Art Gallery** also has excellent displays and education resources based around textiles. This could be combined with pupils' own textile work involving, weaving, dyeing, or printing, and creating clothing from the results, in Design and Technology lessons.



The University of Manchester

**3** Investigate the local brewer **James Joule**, made famous by having a unit of energy named after him. His investigations of temperature led him to the first demonstration that **energy** can be transformed from one form to another.

Joule is also celebrated in **MOSI's** *Manchester Science* gallery, but his work in brewing is less well known. There is scope here to look at the local history of beer production, and a project sure to catch the imaginations of secondary age students, and a crafty way to make chemistry interesting. We can offer practical sessions in which students can learn how to 'put a head on a pint' (using water).



*Did you Know...* that Sir Charles Holt of Holt's Brewery financed the pioneering Radium Institute at Christie's hospital in memory of his wife.

**4** Investigate the world-famous scientist **Ernest Rutherford**, whose work on **splitting the atom** took place in Manchester. His work is demonstrated at **MOSI** and there are commemorative plaques at the University of Manchester. Other studies involving Rutherford may include:

- Who worked with Rutherford?
- What did the papers say about his work?
- How did Manchester become the world's first 'nuclear-free city' in 1980?
- What is the ongoing nuclear power debate?



Jodrell Bank. University of Manchester.

**5** Investigate the work of **Bernard Lovell**, feted radio astronomer and the first director of **Jodrell Bank**. The telescope there has been used by hundreds of scientists to study quasars, pulsars, and meteors.

Research on Lovell (still active) could be combined with a trip to **Jodrell Bank**, which houses displays about astronomy and the solar system, as well as a trip to **MOSI's Manchester Science** gallery.

Lovell had a passion for trees and there is an arboretum at **Jodrell Bank**. Lovell's tree collection could also act as a starting point for a project.



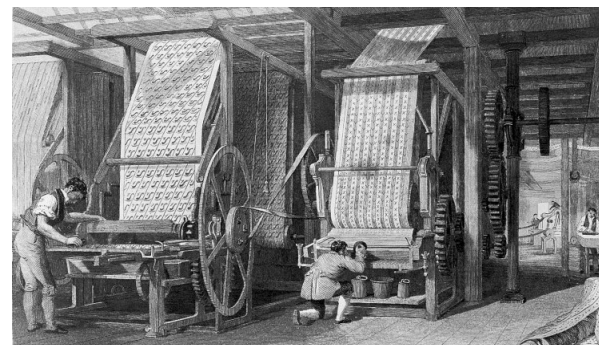
Did you know...No one believed the ? claim to have put..Jodrell Bank cracked the signal.

**6** What did people wear to work in the factories of Manchester over the last 200 years? Consider the warmth, hygiene and safety qualities of clothing, and how this compares to a new generation of materials. Online catalogues of costume, such as **The Costume Gallery (Manchester)**, can be explored for images of historic work clothing. This could be related to occupations in a local historic workplace.

For **Key Stage 1** and **Key Stage 2** samples of materials could be gathered to create a handling box. Materials could be gathered at **Quarry Bank Mill** or at the **University of Manchester**.

**7** **Adam Parkinson** of Manchester made improvements to Bell's copperplate roller-printing technology, allowing six colour designs, and greatly affecting the 18<sup>th</sup> century textile market. Why did this technology supersede hand-block printing? An understanding of this technology can be achieved through designing patterns, considering the pattern's repeat, and how to transfer to cloth.

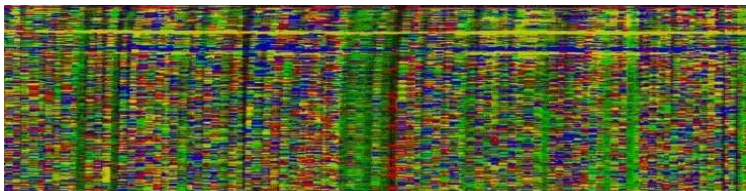
Simple printing techniques could be used, pattern templates could be designed on PCs, or designs could be printed onto transfer paper. The shapes and colours of machines at **Quarry Bank Mill** or **MOSI** could provide inspiration for pupils' designs.



Calico Printing. Wellcome Library, London. Wellcome Images.



## (B) The development of computing



Automated DNA sequencing output – HGP. The Sanger Institute, Wellcome Images.

Many places claim to be the site of the ‘first computer in the world,’ including Manchester. The world’s first digital stored-programme computer was built here 60 years ago, and was known as ‘**The Baby**’. It was a huge machine, yet much less powerful than today’s home computers.

Manchester became a centre for work in computing and information theory after the Second World War. **Alan Turing**, famous for his code-breaking work at Bletchley Park, moved to the city to work on computing machines in 1948. There is enormous scope to research the history of code breaking and computing in the city, from the key work of the 1940s, right up to the present day.

*Examples include:*

**1** Investigate the history of the Manchester ‘**Baby**’, the world’s first digital stored-programme computer. In 1948 the ‘Baby’ ran for the first time at the University of Manchester. At the time this was the only working computer in the country but today we have millions of them in our homes, and at work.

Students could investigate people, such as **Tom Kilburn** and **Freddie Williams**, who were responsible for the development of Baby. They could look at the differences between Baby and computers of today. This could be combined with a trip to **MOSI** to see the Baby replica. Volunteers who run Baby explain how it works, and students would gain a basic idea of how computers function, as well as seeing how much they have changed.

**2** Investigate the work of **Alan Turing**, a famous mathematician who helped crack codes in the **Second World War** and later worked on some of the first computers in Manchester. Off-site visits could include the statue of Turing at Sackville Street Gardens and associated University buildings. Students could research more about the man, as well as his colleagues and assistants.

Alan Turing was fascinated by ideas of artificial intelligence and, amongst other things, wrote one of

the earliest chess playing programs to see if a human could beat the machine. He was also responsible for the '**Turing Test**' which compared human and artificial intelligence.

### 3 Explore the **history of computing**:

- How have computers developed?
- Why are they so much smaller today?

Students could view the archive **BBC** film footage of 'Baby' and discuss what people used to think computers were (e.g. 'Electronic Brains' for doing very complicated maths). Students could then compare this with what they think about computers and how they fit into our lives today.

The working Baby replica at **MOSI** would provide a complementary fieldtrip. Pupils could investigate why Baby was different to earlier 'computing machines', developing an understanding of its importance. **MOSI**'s computer gallery and collections centre could provide further fieldtrips.

Manchester is also home to the **National Archive for the History of Computing**, and one of the festival outreach team available is an expert in the development of home computing.

### (C) Public health and hospitals

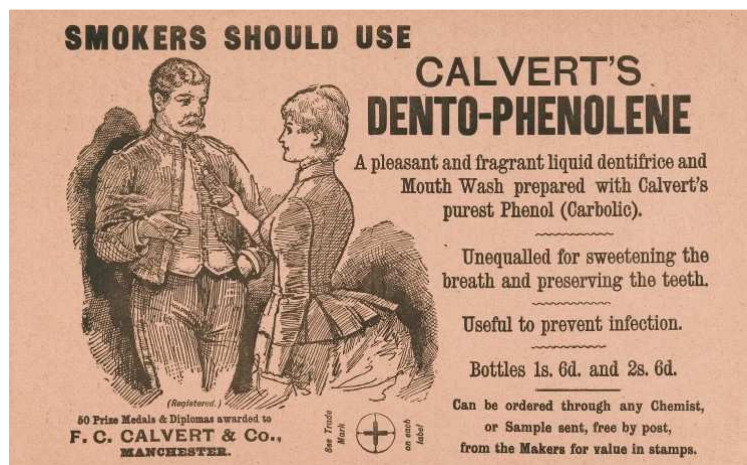


*Mills. Manchester Libraries.*

In the 19<sup>th</sup> century Manchester was notorious for its public health, but also for the city's energetic strategies to remedy them. Local doctors and engineers developed ideas for sewage removal, water supply, and the use of disinfectants to control disease in wounds. While Pasteur was honing his vaccine therapy for people infected with rabies in 1880s Paris, scientists in our own city were working on the same disease, partly because the North West was the rabies capital of England.

Hospitals were founded from the mid 1700s to give treatment to the poor; the *very* poor went to 'workhouses' that developed hospital wards from the 1860s. From then, until the mid-twentieth century, many children were sent to isolation hospitals when they had infectious diseases.

There are curriculum links at all key stages to work in this field, in **history**, **science**, and **citizenship**. There are opportunities for visits to museums, to interview older people, or current scientists, about their own experiences of health and hospitals.



Calvert's Dento-Phenolene. Wellcome Library, London. Wellcome Images.

*Examples include:*

**1** Take on a local study of one part of the city, to look at mortality figures and local responses to epidemics and chronic ill health; for example the **cholera epidemic of 1832** or the **influenza outbreak in 1918**, or **polio in the 1950s**, or look at how the standards of housing and health changed over time.

**2** Explore one disease that hit the city, and local responses to it. We already have resources fully developed to help students understand **rabies**, and to imagine the full range of nineteenth century remedies – these work well at **Key Stage 3**, and also in **Key Stage 4 (GCSE SHP History, or GCSE Science)** and at **A-level (Science in Society)**.

**3** Explore the records of a **local hospital** for a period eg.50 years, and see how the patterns of disease and treatments have changed.

**?** *Did you know...*Wythenshawe hospital started as Baguley Sanatorium for tuberculosis patients.



**4** Survey some of the treasures in the **Manchester Medical School Museum**, an extensive collection of surgical and medical equipment and images covering the whole period, including a handling collection. There are objects and illustrations which relate to the foundation and development of medical training, for example, the admission of women as trainee doctors.

The collections also illustrate major breakthroughs in surgery in Manchester, such as **Harry Platt's** work in orthopaedics, or **Catherine Chisholm's** introduction of the use of UV light to treat children with rickets. Examples go right up to the present day – please contact us for more information or see: <http://www.medicine.manchester.ac.uk/museum/>

**5** The new **Children's Hospital** in Manchester will see the centralisation of many children's medical services in a state of the art complex. But what was life like for sick children in the past? Both textual and visual resources can help us to understand what life may have been like for children suffering from TB, or life in a sanatorium. What would life have been like without everyday access to parents, and how does this compare to being in hospital today?

**Key Stage 1 and Key Stage 2** pupils could use this to think about the experience of children in the past. **Key Stage 3 or Key Stage 4** could engage with broader issues in public healthcare. There are opportunities here for cross-generational oral history work such as interviewing grandparents.

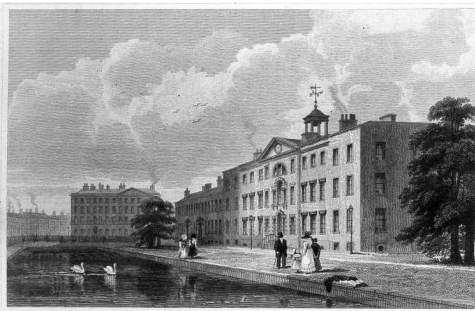
**6** Explore the history of a local sports ground, or sports team. The history of a chosen sport could be combined with investigations into body mechanics and health implications. Pupils could consider the difference that the availability of such sports may have made to people's lives over time.

This could be combined with **sports activities** in school, or fieldtrips. For example, both **Old Trafford** and the **City of Manchester Stadium** have tours and museums available for school groups. Alternatively, pupils could explore the history of other teams, such as those of the **Working Men's Clubs**, to combine elements of social history.

**7** In light of recent concerns over the availability of cancer treatment through the **NHS**, pupils could debate wider issues concerning the availability of medical services. This would work well within the **Citizenship** curriculum, but would also be relevant to the history of the NHS in Manchester. The basis

for discussion could be the analysis of press coverage on the topic. Some news archives are available online in the public domain, while special arrangement could be made to access the **University of Manchester's** electronic resources.

**8** Research the history of Manchester University's prominent medical school. The University's **John Rylands** library houses the **Manchester Medical Collection**, papers relating to important medics, as well as regional medical societies. Using archive material, pupils could build up biographies of individuals in the medical **profession** in Manchester. This may also provide an opportunity to look at some of the earliest doctors to move to Manchester from overseas, and explore their experiences.



*The Infirmary, Dispensary and Lunatic Asylum, Manchester, England. Line engraving by J. Davies after S. Austin. Wellcome Library, London. Wellcome Images.*

## (D) Recent biomedicine



This area of the city's history concerns aspects of our lives that are very familiar and often literally vitally important, yet at present the stories are not at all well known:

- Who is aware of the local story behind the development of tamoxifen?
- Who would guess that hip replacement surgery as we now know it was pioneered just outside the city's boundaries?
- Who notices the conjunction of research and advocacy within Manchester for both birth control (Marie Stopes) and increased (IVF) fertility?

In each case, history projects have the potential to engage students across the curriculum, exploring the ethical issues raised by each of these innovations, regarding experimentation on human subjects and access to treatment.

*Examples include:*

**1** Research the history of the design and testing of tamoxifen, a contraceptive put to rather different use by a brave team at **Christie's Hospital** who revolutionised breast cancer treatment by approaching it through a new chemical pathway.

**2** Investigate the work of **Sir John Charnley**, an orthopaedic surgeon born, educated, and employed locally who worked with a local engineer and local industrial companies to perfect a design for artificial hip joints. There is a visitor centre at 'his' hospital in Wrightington, and we have a collection of objects and personal stories that would bring this medical innovation to life for students. A study of the design and testing process would allow students to cover a diverse selection of topics from the science curriculum at all key stages, as well as feeding into design technology lessons.

**3** Follow up on the recent development of 'artificial parts' and the engineering of **tissues**, for example by coming to a session where you can quiz scientists about how their work has developed and the problems they face.

**4** Discover who helped **Louise Brown's** parents to conceive her, the world's first test-tube baby, and what made this breakthrough so exciting and yet controversial.

**5** Find out about the development at the children's hospital of 'screening' to detect **biochemical disorders** in babies, and how these were then controlled by special diets; or about other local aspects of medical genetics.

**6** Issues in biomedicine could be developed by pupils into an activity for families. As part of the **Citizenship** curriculum this would give pupils an opportunity to reflect on who might constitute a family, as well as researching current affairs. This activity could contribute directly to a festival display.

**There are many more stories to be investigated and told at Manchester Histories Festival...**

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## **(D) National Curriculum links**

**These are just a few links to the curriculum, but we are confident that you will make many more.**

### **Key Stage 1:**

- **History:** Identify the differences between ways of life at different times. Use images and words to explore the lives of children in hospital in the past.
- **Art and Design:** Use visual and tactile elements when exploring materials used in medicine or safety clothing. Pupils develop an understanding of materials and process.

### **Key Stage 2:**

- **Science:** Understand the human body and movement in sport and the difference it makes to people's health and their lives.
- **History:** Explore the ideas, beliefs, attitudes and experiences of men, women and children through exploring past urban living conditions in Manchester.

### **Key Stage 3:**

- **Citizenship:** Use critical thinking to weigh up 'fair' and 'unfair' in public healthcare. Create discussion, debates and voting.
- **Geography:** How do major events such as epidemics change populations and towns?
- **Science:** Research developments in contemporary scientific technology in medicine, for example the benefits and drawbacks of cancer treatments.
- **ICT:** Through the history of computing, discover how ICT has changed our lives.

### **GCSE**

- **History SHP:** Many topics will complement *Paper 1: Medicine and Public Health Through Time*, and *Paper 2: Britain 1815 – 1851*, and several coursework options eg. Styal Mill.

### **AS and A-Level**

- **Art and Design:** Design textiles using the history of science in Manchester as inspiration, or by using traditional techniques.