

Manchester Science

A gallery guide for group leaders

The Manchester Science Gallery

The “Manchester Science – Discoveries that Changed the World” gallery presents stories of achievement, endeavour and discovery by Manchester’s famous scientists, both past and present.

What’s in the gallery?

1. Timeline 1800 - 2010

New scientific advances are made every day. But how do we get to hear about them and how accurate is what we hear? How have people in Manchester encountered science in the media over the last two hundred years?

In this part of the gallery, you can find out about important scientific breakthroughs, starting in 2000 with a DNA Model and an article about the Human Genome Project, working back in time to 1790 and a barometer built by Baptist Ronchetti in Manchester. The Timeline includes some interesting objects, related to various scientific discoveries. For instance, you can have a closer look at a light bulb of 1882 - the year electric light was introduced in Blackpool - or at a model of ‘Rocket’ the first locomotive running between Liverpool and Manchester.

2. Manchester’s famous scientists

Four different rooms with objects, images and multimedia shows tell the life stories of four famous Manchester scientists and their discoveries which influence science today. Here you can find out more about:

John Dalton (1766–1844) – A new atomic theory

- Came to Manchester in 1796 to teach at the Manchester Academy.
- Never married, was a self-educated man who lived a simple life.
- Was a founder of modern chemistry.
- Formulated a new atomic theory to explain chemical reactions, based on the concept that all elements are composed of tiny, indestructible particles called atoms.
- Assigned atomic weights to the atoms of the twenty elements he knew of at the time.
- Set out the first table of atomic weights.
- Also pioneered the use of ball-and-stick models to illustrate the three-dimensional structure of molecules.
- Had an interest in the atmosphere and so in mixtures of gases in general.
- Kept a daily record of the local weather, from his childhood until his death. (This led to his work on gases.)
- Formulated the Law of Partial Pressures (Dalton’s Law), which explains why the gases in air are mixed up and not separated into layers.
- Fizzy Drinks: The fizz in our drinks is a daily reminder of Dalton’s pioneering work on the absorption of gases in water. The process forcing carbon dioxide gas into a drink to make bubbles would be very familiar to Dalton.

- Periodic Table: Our periodic table today is based on John Dalton's original idea that atoms of different elements will have different mass.

James Prescott Joule (1818-1889) - Converting work into heat

- Was the first person to prove that heat is a form of energy.
- The international unit of energy, the joule, is named after him.
- Was the son of a leading Salford brewer.
- began to study under John Dalton at the age of 16.
- soon began to conduct electrical and magnetic experiments at a laboratory built in the cellar of his father's home.
- Was fascinated by the way that energy changes from one form to another.
- Began to link together electricity, heat and mechanical power by observing the transformations they went through.
- Formulated a law (Joule's Law) stating that heat is produced in an electrical conductor.
- Worked in the brewery during the day and carried out research to improve the quality of beer in his laboratory.
- Modern day spacecraft re-entry: For space engineers it is vital to calculate how much heat will be produced by friction between a re-entering spacecraft and the Earth's atmosphere.
- Kilo Joules: Food is labelled with the energy it gives us in kilo joules and calories. One calorie equals 4.186 joules.

Ernest Rutherford (1871-1937) – Splitting the atom

- Was the leading nuclear physicist of the twentieth century.
- Explored the internal structure of atoms.
- Came to Manchester to head the Physics Laboratories at the Victoria University (now known as The University of Manchester).
- Proposed a new structure for the atom. He imagined the atom as a miniature solar system with a nucleus at its centre and electrons orbiting around.
- Managed to split the atom using alpha radiation.
- He showed that radioactivity was a process in which atoms of one element decayed spontaneously into atoms of another.
- He hoped that people would not learn to use the energy of the atom, if ever, until the world was at peace
- Nuclear Power: Today, nuclear sources provide around 17% of the world's electricity. As concerns grow over oil supplies and greenhouse gas emissions, what is the future for the atom as a source of power?
- Modern Nuclear Medicine: Rutherford was personally involved in the early use of radiotherapy to fight cancer.

Bernard Lovell (born 1913-)

- Was fascinated by radio as a boy, making several of his own sets.
- Came to Manchester as a lecturer in physics at the University of Manchester in 1936.
- Worked in radar aircraft detection and navigation during WW II.
- Obtained an ex-army mobile radar unit in order to study transient radar echoes – a phenomenon he had observed on radar screens during the War. He found that they came from the ionised trails of meteors.
- Developed the world's largest radio telescope at Jodrell Bank in Cheshire, which measures the radio signals coming from objects in space.

- In 1957, the telescope tracked the Soviet rocket - 'Sputnik' - the world's first artificial satellite. In 1959, the telescope recorded the first photographs of the hidden side of the Moon and in 1966, it recorded the first photographs from the Moon's surface.
- Telescopes: The world's largest telescope today is Arecibo in Puerto Rico.
- SETI: The Search For Extra Terrestrial Intelligence Project uses the power of radio telescopes to scan the universe for any radio signals suggesting life outside Earth.

Manchester Science today and tomorrow

For over 200 years Manchester has been at the leading edge of scientific research and discovery This section of the gallery addresses the following questions: -

- Who are Manchester Scientists today?
- What ideas are they working on?
- How could they change the way we live?

In this multimedia-based exhibit, you can find ten rotating objects each connected to another Manchester science project. The scientists and developments behind the objects are explained in short films and interviews.

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