

These notes outline a sequence that teachers (or adult helpers) could use to guide a group of children around the rail transport section of the Power Hall. The notes suggest how you can focus the children's observations and structure discussion but you are of course free to adapt the guidance to meet the specific needs of your children.

The notes for each exhibit include:

- learning objectives;
- suggestions for questions and explanations;
- specialised vocabulary;
- background information on the exhibits.

You should allow between 30 to 45 minutes, depending on how the discussion develops, to follow the sequence described. You will find it easier to manage the discussion with children by dividing the class into smaller groups.

How does this guidance relate to the National Curriculum?

It is principally intended to support KS1 and 2 teachers working on a transport theme in the history curriculum. The questions provide opportunities for pupils to:

- identify differences between ways of life at different times;
- to find out about the past using artefacts.

They could also be used to support activities in English by encouraging pupils to develop and communicate their knowledge and understanding through speaking and listening, and reading and writing activities.

What else is there at MoSI that is relevant?

Engineer Eric's Difficult Day: A 25-minute presentation on the operation of Pender, one of the steam locomotives in the Power Hall. Contact the Learning Centre to book this for your class. (See our website for more details.)

The Liverpool and Manchester Railway Exhibition: An exhibition about rail travel in the 1830s, on the ground floor of the Station Building.

Air and Space Hall: Road transport and air transport displays.

What could I do to prepare the children?

You could discuss their experiences of modern rail transport. Who has been on a train (or tram)? Where did you go? What was it like?

The children could also look at sources of information about rail transport in the past such as pictures, photographs, books and television programmes.

How can I enhance the children's experience of the gallery visit?

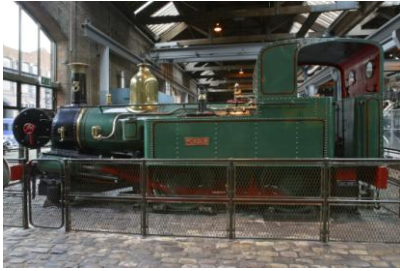
Activity Sheets for use in this section of the Power Hall can be downloaded from the education section of the Museum's website. You will also find relevant material in the activity sheets for the Pender demonstration, Engineer Eric's Difficult Day.

While visiting the Power Hall you could ask the children to:

- sketch parts of the locomotives;
- take photographs;
- make notes from the discussion and text panels.

You could follow up on the visit once back at school by:

- sequencing pictures the locomotives in chronological order;
- labelling pictures of the locomotives;
- writing an information text in the style of a museum text panel about the exhibits;
- reading non-fiction books about transport in the past and in the present;
- learning about famous people in the past associated with the railway (e.g. the Stephensons and Brunel);
- reading fiction and poetry with railway setting or themes.



Pender – 1873

Objectives:

- how a steam locomotive works
- that museum objects can provide answers about transport in the past

Explain that **Pender** is a “tank” engine. The tanks (visible on the non-sectioned side) hold water.

Ask the children what they think the water was for?

Explain that the water was heated up and boiled to make steam. The steam made the engine move.

How does it do this?

Look at the firebox. What made the fire? (Coal)

Where did the heat go? (The heat, fumes and smoke from fire entered the 96 brass tubes visible inside the boiler. The tubes were surrounded by water, which boiled and turned into steam.)

How did the steam make the engine move? (Some of the steam collected in the steam dome and was transferred under pressure to the cylinders where it pushed the pistons backwards and forwards and thus pushed the connecting rods which turned the wheels.)

Explain the term **locomotive**. Pender is a steam locomotive.

Background Information

The locomotive was restored by the Museum in 1980. One side has been sectioned, or cut away, to reveal the interior and thus illustrate how a steam locomotive works. The pistons, connecting rods and wheels can be made to move using electric power.

Pender was built in 1873 by the Beyer Peacock Company of Gorton, Manchester for the Isle of Man Railway and was in use until 1950. The locomotive was initially used on the very first railway on the Isle of Man, which ran from Douglas to Peel. Later, Pender had to be fitted with a bigger water tank and boiler so that it could have enough steam to power it up the hills and on the longer routes to Port Erin and Ramsey. It pulled 7 coaches containing 400 people at 30mph.

Pender exemplifies the essential elements present in steam locomotives from the development of Stephenson’s Rocket in the 1820s onwards. The key features are a multi-tubular boiler, a blast pipe to increase the combustion of coal in the firebox and near horizontal pistons directly driving the wheels. The other steam locomotives in the Power Hall (except Novelty) contain the same key features.



Pakistan Locomotive – 1911

- to identify some of the main features on a steam locomotive

Ask the children to look at the **Pakistan Locomotive**.

What features can they see that are the same as on Pender? (cab, steam dome, chimney, connecting rods etc)

How is the Pakistani locomotive different? (It is much larger, has more wheels, has a coal tender attached at the rear etc.)

Go up the steps and look into the cab. What can the children see? Explain that the driver would have used the wheels, levers and gauges to control the engine. (The largest lever – the regulator – controlled the speed. The large red wheel controlled the brakes.) The fireman would have had to shove coal from the tender into the firebox.

Ask the children what it would have been like to drive a locomotive? (Talk about the dirt, noise, heat and dangers.)

Background Information

The locomotive was built by the Vulcan Foundries at Newton-le-Willows for the North Western Railway of India in 1911. It is know as the Pakistan Loco because it was used by Pakistan Railways (serial number 3157) between 1947 and retirement in 1982.



Planet

- to recognise some of the similarities and differences between older and newer railway locomotives

Explain that this group of exhibits provides an idea of what rail transport was like in the 1830s.

Look at **Planet**. (It may be parked on the track outside.) Explain that Planet is older than Pender and the Pakistan Locomotive.

Ask the children to identify some of the differences between the newer and older locomotives. (Planet has no cab for the driver and fireman, wooden cladding around boiler, is smaller and has more brass work.)

Look at the railway carriages. Ask the children which they would have preferred to travel in? (The 1st class carriage has windows and soft seats. The 2nd class carriage has no windows and hard benches to sit on.)

Which would be the most expensive carriage to travel in?

Background Information

Planet is a working reproduction of a locomotive built for the Liverpool and Manchester Railway by George and Robert Stephenson. The locomotive is steamed and runs during peak holiday periods (offering rides to Museum visitors) and so may on occasion be parked outside the Power Hall.

The two 2nd Class Carriages are working reproductions built by the Museum. The c1840 Manchester-Birmingham Railway 1st Class Carriage has a restored original body fitted to a more modern chassis



Electric Locomotives

- to be aware of some of the features of electric locomotives
- to be aware of similarities and differences between different types of locomotives

Look at **Ariadne**. (1954 and named after a Greek Goddess.)

Tell the children that it is also a locomotive but did not use coal. Ask them if they can see how Ariadne was powered? (It is powered by electricity - the electrical pick-ups or pantographs are visible on the roof.) Explain that this is a more modern locomotive than the others. Although built in Manchester, it was used by Dutch railways until the mid-eighties.

Ask the children if they can see ways in which this locomotive is different from the steam locomotives in the Power Hall? (The shape, cab for the driver.) **Hector**, the driving cab of an EM1 electric locomotive is nearby.

Background Information

Ariadne was the second of seven EM2 locomotives manufactured by British Rail at Gorton, Manchester. All seven locomotives were named after Greek goddesses. They entered service in 1954 and were used until 1970 to pull passenger trains on the Manchester-Sheffield route. The first EM2 locomotives came out of service in 1968 and were placed in storage until they were sold to the Netherlands Railway in 1969. The EM2 was used in Holland until 1986. Ariadne was donated to the Museum 1986. As a condition of the donation, Ariadne is preserved in Netherlands Railway livery with the number 1505 and the Dutch style 'pantograph' electrical pick-ups.



Novelty – 1829

- to be aware of the early development of steam locomotives

Look at **Novelty**.

Ask the children what they think Novelty is? What job did it do? Do they know what the word Novelty means?

Explain that Novelty is a very early type of steam locomotive, older than all the others in the Power Hall. It was built before people (i.e. George and Robert Stephenson) had worked out what was the best design for steam locomotives. Novelty was built for the Liverpool to Manchester Railway line, the first inter-city railway line to be built.

Background Information

Novelty is a reproduction, incorporating the original wheels and one cylinder, of one of the entrants in the 1829 'Rainhill Trials' The competition held by the Liverpool and Manchester Railway Company to establish the best design of a locomotive to use on the newly built railway. Stephenson's Rocket won the competition though Novelty was a close contender.

The 1830 Warehouse and the Station Building were built as the terminus of the Liverpool and Manchester Railway.



Bayer-Garret – 1930

- to be aware of the size of railway locomotives

Look at the **Bayer-Garret**.

Tell the children that this was one of the largest locomotives ever built in Europe. They could measure the locomotive by pacing out the length and width. (It is approximately 26.5m long.) They could count or work out how many wheels the Bayer-Garret has. (28)

You could explain that it was an **articulated** locomotive (with a water tender at the front and a coal tender at the back). Ask them what kinds of vehicles we use today to move heavy loads? Have they ever seen or heard of articulated lorries?

Background Information

The Beyer Peacock Company at Gorton, Manchester built the Beyer-Garratt locomotive in 1930. The locomotive was used on the South African Railway Natal main line until 1968, initially for passenger and, subsequently, for coal trains. An articulated locomotive was necessary due to the sharp bends and steep gradients on the line.