

Title of Lesson Stephenson's Rocket (Primary Science, Design and Technology)

Background *(What museum artefact are you using for your lesson ? What curriculum areas does your lesson address, (eg History, Science, Language, etc.) ? What age range is your lesson suitable for ? What pre and post activities do you envisage? How will the work be assessed ?)*

Stephenson's Rocket (built in 1829), now in the National Railway Museum, York.

The Rocket, designed by Robert Stephenson (1803-1859), was the clear winner in the locomotive trials held at Rainhill in 1829 to decide the motive power for the Liverpool & Manchester Railway.

Five locomotives competed at the Rainhill trials – Cycloped, built by Thomas Shaw Brandreth; Novelty, built by John Ericsson and John Braithwaite; Perseverance, built by Timothy Burstall; Sans Pareil, built by Timothy Hackworth; and the Rocket.

The Rocket was the only locomotive to successfully complete the trials, averaging 12 miles per hour and achieving a top speed of 30 miles per hour. The Stephensons won the £500 prize and were awarded the contract to produce locomotives for the Liverpool & Manchester Railway.

<https://collection.sciencemuseumgroup.org.uk/objects/co8084947/stephensons-rocket-steam-locomotive>

Age : 9-11 years

Prior to the lesson students will have learnt about forces including friction forces such as air resistance. They will have a range of Design and Technology skills, including initial design work, cutting, sticking, etc. They will understand the process of trial and improvement.

After the lesson, pupils could research the construction of Stephenson's Rocket as a History cross-curricular link, they could write about their Science and D&T activity and suggest improvements. Further work on Science and D&T could include constructing parachutes to slow the descent of a toy figure, and boxes to prevent a falling egg from breaking (link to crash helmets).

These show the kind of outcomes possible :

<https://www.youtube.com/watch?v=RStgV8mA-gA>

https://www.youtube.com/watch?v=3Dw6N0Tn_sU

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Learning Objectives (*What are the learning objectives addressed referenced to your own national curriculum ?*)

Year 5 Forces :identify the effects of air resistance, water resistance and friction, that act between moving surfaces

<https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study>

Key Stage 2 Design and Technology :

<https://www.gov.uk/government/publications/national-curriculum-in-england-design-and-technology-programmes-of-study>

Lesson Starter (*First 10 minutes : How will you begin the lesson in an engaging way ?*)

Watch YouTube video about Stephenson's Rocket : (1 min 16 secs)

<https://www.youtube.com/watch?v=XR4OVtjE3JU>

The Rocket averaged 19 km/h and had a top speed of 48 km/h.

Explain how steam is produced and produces power. We are going to build our own Rocket today. Can we use steam ? Yes or no, with reasons.

Going to use balloon power for safety reasons.

Explain equipment : card, scissors, sellotape, balloons, pens, straws, wheels, dowels, lolly sticks, paper, plastic bottle, etc.

Main Activity (*30 minutes : What is the task children need to do ? How are the children organized -pairs, groups, etc.? How is the work differentiated? What extension activity is there ?*)

Pupils are arranged in teams of approximately two, three or four, depending on class composition.

Draw design ideas on paper first.

Then make an initial prototype.

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Plenary (10 minutes : How will the children share what they have learned ? How will you link back to the Learning Objectives ? How will you link to the next lesson ?)

Test prototypes to see which goes furthest.

Discussion :

Which designs worked best ?

What improvements could be made ?

Resources (What is needed to run this lesson (eg PowerPoints, Worksheets, Ipads, Internet access, Video Projection, Interactive whiteboard, etc.) ? Attach example documents and jpeg of artefact.)

Interactive whiteboard or other projection equipment.

Internet access.

Card, scissors, sellotape, balloons, pens, straws, wheels, dowels, lolly sticks, paper.

Measuring sticks to measure distance traveled.

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