

A young girl with long brown hair, wearing a red puffer jacket, is looking upwards with a smile. In the background, other children are visible, including one holding a yellow balloon. The overall scene is a group of children, likely at a museum or gallery event.

Breakwaters, Bridges, and Lighthouses

Pre-visit resource



Museum
Gallery
Archive

Bridges, Breakwaters and Lighthouses: STE[A]M

Key Stage 2

About this pre-visit resource

This pre-visit resource gives you detailed information about the session you are attending with your class, as well as some extra tips about our venue, so that you can be well prepared for your visit to The Box.

About this workshop

This workshop takes place in the **Simmons Learning Room** at The Box. It comprises a combination of engineering focused interactive activities and demonstrations based on the theme of lighthouses, breakwaters and bridges. It inspires students by exploring and celebrating three key engineering feats of Plymouth: The Eddystone lighthouse, Plymouth Breakwater and the Tamar bridges - the significance of the achievements and their profound impact on shaping Plymouth today and in future.

Curriculum links:

Science: Light; Sound; Materials; Earth and space; Rocks

Technology & Engineering (design): Generate, develop, model and communicate ideas; Use discussion, annotated sketches, cross-sectional diagrams and prototypes; Select and use a wide range of tools and equipment to perform practical tasks; Understand how key events and individuals in design and technology have helped shape the world.

Art: Use a range of materials creatively to design and make products; Use drawing, painting and sculpture to develop and share ideas, experiences

Maths: Number and place value; Measurement; Geometry

Geography: Location knowledge: name and locate geographical regions; Describe identifying human and physical characteristics; Describe land-use patterns; and understand how some of these aspects have changed over time; Place knowledge; Physical geography; Human geography: types of settlement and land use, economic activity including trade links. Using maps, using a compass.

History: A significant turning point in British history.

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Detailed Workshop Outline

The session begins with the Learning Facilitator introducing three key feats of engineering in Plymouth – the Tamar Bridge, the Breakwater, and Smeaton's Tower. The students will undertake a range of STEAM experiments and activities, to explore the science, technology, engineering art (design) and maths behind each of these structures.

1. The students first look at a chart (map) of Plymouth and locate the three structures on it. They then focus on each structure in turn, undertaking different activities for each structure.
2. Breakwater experiments: The students play a 'Tide Game' to find out how the moon and sun impact the tide, thinking about how this impacts the shoreline of Plymouth. Students then undertake a range of experiments with a small wave tank to discover how the breakwater protects Plymouth from the forces of the sea. They will be led through discussions about wave energy, wave direction, and forces.
3. Lighthouses experiments: The students undertake a 'Lighter by far' activity and 'Sound the alarm' activity, to find out how lighthouses keep ships safe at sea. They find out through hands-on experiments about how light travels, light dispersion, and compare this to how sound travels.
4. Bridges experiments: The students discover the impact of the Tamar Bridge in Plymouth, how it was designed and built, and how it continues to be maintained today. They undertake a 'Nuts and Bolts' challenge – seeing how quickly they can put nuts and bolts together whilst blindfolded to replicate real working conditions on the Tamar Bridge.
5. The session concludes with a summary of the skills the students have learnt during the session, with signposting towards additional engineering activities in the galleries.

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Key themes

Key themes of the workshop include:

- STEM/STEAM
- Forces
- The Industrial Revolution

Key vocabulary

Key and new vocabulary covered in the workshop includes:

- Tide
- Forces
- Energy
- Construction

Preparing for your session

Visit and climb Smeaton's Tower with your class, for a first-hand experience of a lighthouse and to get the best view of the Breakwater.

Visit or drive across the Tamar Bridge.

Plan a pre-visit to The Box before you come with your class, so you are familiar with the environment and spaces before your visit.

Visit the galleries

The galleries at The Box hold objects and archives about the topic you have explored in this session, as well as other fascinating subjects. To find out more about this topic, visit the **Port** gallery at The Box.

Risk assessment

To help you to write your risk assessment for your visit, we have created a Teachers Hazard Assessment which holds common risks and solutions that you might want to include. Visit this page <https://www.theboxplymouth.com/schools/school-visits> for the Hazard Identification Sheet.

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latest offers, news and
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