

BRIDGE INVESTIGATION PROJECT

A multi-media research and
presentation activity using
Expedition Workshed



think up

DEVELOPED IN ASSOCIATION WITH THE
INSTITUTION OF STRUCTURAL ENGINEERS
EDUCATIONAL TRUST

BRIDGE INVESTIGATION PROJECT

Facilitator notes

Introduction

The aim of this project is to give students the opportunity to research the work of engineers to find engaging ways to communicate engineering principles.

Students are asked to conduct a research project according to one of three themes, and then find a creative way to communicate their findings, for example by producing a video, photo montage or podcast.

The workshop combines developing research, independent working and communication skills. See the student briefing notes for more information on the project themes.

Once the students have presented their projects, there is the opportunity for their peers to provide feedback, and to vote for their preferred project.

This research project can be carried out by individuals or in groups, and over a timeframe that suits the time available.

Space and material requirements

Recording equipment, etc.
Space to show the final presentation.

Briefing the students

The student briefing sheets provide all the information they need to get started on the project. A good starting point may be to use the Bridges Fact File in order to access materials on the Workshed website.

Other activities

In addition to the basic requirements of the student brief, there are many ways to add to this activity to meet particular curriculum needs. Below are some suggestions.

Producing a drawing

Ask students to produce an accurate drawing of their final bridge structure, showing the dimensions at full scale in order to for students to practice converting from one scale to another.
Ask students to produce an artist's impression of the bridge that could be used as part of the planning approval process with the local council.

Experiment

Ask students to predict how their bridge will fail, and then to design and run an experiment to monitor the failure of their bridge. They could for example measure the vertical displacement of the central span or the horizontal displacement of any supporting towers as they add weight to the structure. Students can plot their results and try to explain their findings.

Design and test

Given more time, teams of students would have the opportunity to test a number of different bridge designs before deciding on and building their final model. As part of this process, students could set themselves a design specification and evaluate each design according to this specification, and then evaluate how their final design performed under final testing.

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Student brief

Intro

Bridge building is one of the clearest and most eye-catching examples of the work that engineers do. The development of bridge design maps closely to technological, economic and social development and the development of interconnected societies; yet even as long ago as Roman times, engineers have been capable of building bridges at awe-inspiring scales.

The aim of this project is to give you the opportunity to research the work of engineers to find engaging ways to communicate engineering principles.

Brief

Your brief is to carry out a research project about a particular bridge you have chosen, using a range of different source materials, and to present the findings of your research as either a photo slideshow, a short movie, or podcast.

You must select one of the following three possible research themes:

1. Choose one of the main types of bridge from the Bridges Fact File and tell the history of its design.
2. Choose one of the main types of bridge from the Bridges Fact File and describe how the structure transfers loads from the middle of the span to the supports.
3. Tell the story of a local bridge: when was it built; who built it and why; how is this bridge of benefit to the local community?

You must then find a creative way to present the findings of your project, for example by:

- Making a short film
- Producing a podcast
- Creating a photo montage
- Designing a poster

This activity can be completed either as individuals or in groups. You peers will give you feedback on your project, and the best project will be chosen by popular vote.

Starting points for your research

Once you have chosen your research theme, you can use the materials on Expedition Workshed to begin your research. In particular you will find the Bridges Fact File a good starting point.

If you are researching the behaviour of a particular type of bridge then you should consider building a scale model of that type of bridge. You could then use this model to conduct a series of experiments on your bridge.

Starting points for presenting your work

Telling a story

A good story needs to have a beginning, middle and end, and it needs focus. You need to think of your audience: what will interest them? If you plan on visiting a local bridge you should start thinking about your story before you leave.

Ask yourself what it is you're most interested in finding out about the bridge you have chosen.

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Taking photographs

The camera sees differently to the eye so always check the viewfinder or screen. Good photos are about looking, so keep your eyes open and keep recording what you see.

- *Framing* – look at the subject in the frame and make it interesting. Don't leave loads of space above the head or put something right in the middle of the picture. Think about shapes and angles.
- *Take lots of pictures* – then delete the rubbish ones later.
- *Background* – check the background is relevant or make it neutral.
- *Get up early* – the light is always best first thing. Sunset is good too but tends to be more hazy.
- *Contrast* – dark items against a light background will not look good. If possible use flash to fill, particularly on a bright sunny day.
- *Focus* – check the camera is focusing on what you want it to focus on.
- *Avoid using flash at night* – it usually looks awful. Slow shutter speed shots may be blurry but can be very atmospheric.
- *Keep it steady* – use a tripod or a stable surface to lean against or hold your breath whenever you can. This will also help you frame better.
- *Crop and edit pictures before presenting them* – choose the pictures you present carefully.



Tips for shooting video

When recording video, all the same rules apply as for still photography – except now, you also have to think about movement and the edit.

Audio is the biggest problem with small cameras, so pay careful attention to what the camera is recording. If you can't see the source of a sound in the picture it shouldn't be there. In particular, watch out for planes police sirens or a noisy vehicle passing. Short sharp sounds are easy to get rid of but gradual build up of noise is impossible, particularly when you start to edit. If something does come up, stop and start again once it's gone.

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Here's a checklist for good recording:

- *Keep the mic close* – too far and it will be off-mic and inaudible.
- *Switch off mobile phones* – it's not just the sound of ringing, even on silent, the signal creates interference (a clicking) on the sound track
- *Get more material than you think you need* – particularly of the environment. Use the camera to set the scene (wide shot), show the detail (close ups) and tell a story (following the action). The more of these purely visual shots you get the easier it will be edit together an entertaining piece later.
- *Keep it still or move with a purpose* – moving the camera is fine just be aware of what the destination is and stop there for several seconds before moving on.
- *Framing* – allow a subject to enter or leave the frame rather than following them around. This gives you a natural editing point later.
- *Shoot lots of varied material* – the more images you have the more flexibility you'll have when editing.

Combining photos with video

Mixing photographs with audio usually works very well. Don't be afraid to mix media: mixing photographs with audio works very well. Use written titles or create graphics over photos and video so the audience knows what they're looking at.

Editing your material

Begin with the end. Think first about what you want to leave your audience with and work back from that. Create smaller stories or sequences first. Put those together as stand-alone pieces, then link them up in an order that works and leads into the final thought.

Do the beginning last – as this is the hardest thing to do well. Set the scene for the story you now know you're going to tell.