



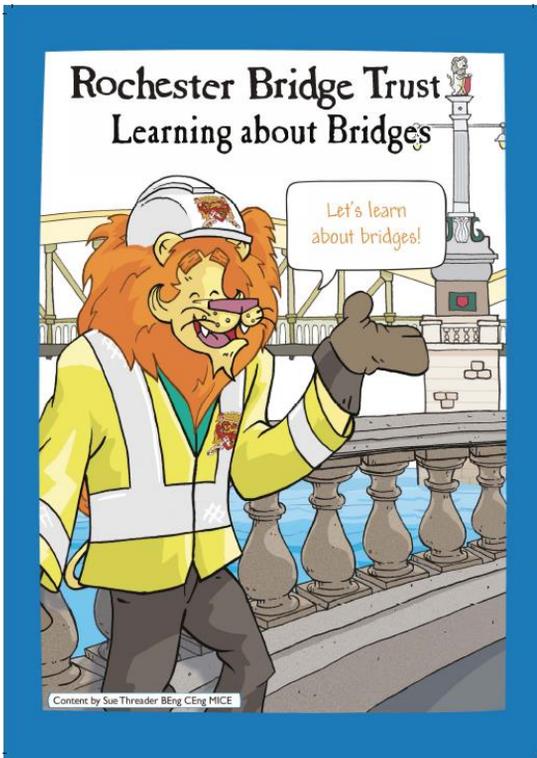
ROCHESTER
BRIDGE TRUST

STEM Resources

Useful links, resources and websites to support STEM learning in school and out, and inspiration for links to other subjects

Key Stage 2/3

Our resources are great for learning about Science, Technology, Engineering and Maths (STEM).



Our Learning about Bridges resource can be found here:

<http://www.rochesterbridgetrust.org.uk/exploring-engineering/lesson-plans/>

All of the following sessions require materials that can be found around the home or downloaded from the website.

Session 1 – Introduction to Bridges

In this session you will learn why bridges are so important to our lives, how the first bridges were built, and begin to learn the language of bridges.



@exploringengineeringRBT

education@rbt.org.uk

www.rochesterbridgetrust.org.uk



ROCHESTER
BRIDGE TRUST

STEM Resources

Session 2 - Beam Bridges, Simple but Strong

In this session you will learn about the different types of load on bridges and will work in a team to find out more about what makes Beam Bridges strong.

NB: this requires some large masses. If you don't have 'dumbbells' or exercise weights at home, food tins may work well.

Session 3 - Loads and Forces

In this session you will learn about the main forces which act on bridges – tension and compression – and understand why it is important for the forces to be balanced.

NB: A slinky is handy for this activity, but not essential.

Session 4 – Beam Bridges Challenge

In this session you will take part in a challenge to build the strongest bridge you can using just ordinary paper and sticky tape.

NB: this also requires some masses. If you don't have 'dumbbells' or exercise weights at home, food tins may work well, or even lots and lots of chocolate bars.

Session 5 - Truss Bridges (Part 1)

In this session you will learn about the strongest shape for building bridges and other structures and will be introduced to a new kind of bridge.

NB: this requires K'Nex kits to demonstrate a Truss bridge easily. Some craft materials, such as paper straws, might work well to demonstrate the fact that triangles mean a long bridge can be made stronger, but it might require more guidance to achieve this.



@exploringengineeringRBT

education@rbt.org.uk

www.rochesterbridgetrust.org.uk



ROCHESTER
BRIDGE TRUST

STEM Resources

Session 6 - Truss Bridges (Part 2)

In this session you will explore the truss bridge in more detail and learn some more of the language of bridges.

NB: one suggested activity is to get out and about to take some photos of Truss bridges. Obviously this may not always be possible: if you have access to Google Earth, you can explore your local, and not so local, surroundings to find some interesting bridges.



Session 7 – Arch Bridges (Part 1)

In this session you will be introduced to the arch bridge and learn some more new words in the language of bridges.

NB: One activity requires more than one child – it's fun if you have sufficient people, but isn't essential. You can find examples of arch bridges all around, using Google Earth again or simply searching for arch bridges online.

Session 8 - Arch Bridges (Part 2)

In this session you will learn more about how the Romans built arch bridges and have the chance to try building one yourself.

NB: one activity is building a Roman arch using a crisps tube (such as Pringles® tube) as the centring, some modelling clay or plasticine and some stones from the garden, so should be relatively accessible at home.



@exploringengineeringRBT

education@rbt.org.uk

www.rochesterbridgetrust.org.uk



STEM Resources

Session 9 - Materials

In this session you will find out about the main materials used to build bridges and try making some concrete.

NB: a great activity in this session is making concrete. This can easily be done at home, of course taking safety precautions as concrete can cause burns. If you don't have the equipment or ability to do this, you could research the history of cement and what Romans used that was both waterproof, look at this website and make a fun fact sheet about concrete and it's uses:

<https://sciencewithkids.com/science-facts/facts-about-concrete.html> or perhaps try making a non-Newtonian liquid, like Oobleck

<https://www.livescience.com/21536-oobleck-recipe.html> and thinking about why building on clay-based soil might be problem.

Session 10 - Suspension Bridges

In this session you will be introduced to the longest span bridges in the world, get the chance to build a human suspension bridge and learn some more of the language of bridges.

NB: all but one of the activities can be done at home, unless you have a very large family, as you will need 12 children to make a human suspension bridge.

Session 11 – Building Underwater

In this session you will learn about some of the techniques civil engineers use for building structures underwater, including how Romans built cofferdams, and will have a go at building one yourself.

NB: Building cofferdams require quite a few bits of, fairly easily obtainable, equipment, so should be possible to do at home. Alternatively, this is a decent video explaining how cofferdams work:

<https://www.youtube.com/watch?v=URC125wpMS4>

Session 12 - Cable-stayed Bridges

In this session you will learn about another type of bridge and understand how it is different from a suspension bridge, as well as learning a few more words in the language of bridges.





ROCHESTER
BRIDGE TRUST

STEM Resources

Useful links, resources and websites to support STEM learning in school and out, and inspiration for links to other subjects

Key Stage 2/3

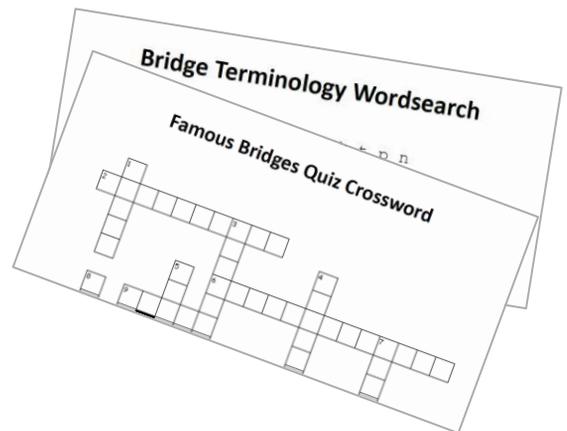
Some more fun bridge-themed activities can be found here:

<http://www.rochesterbridgetrust.org.uk/exploring-engineering/fun-quizzes/>

For example:

- Bridge Bingo
- Bridge Terminology Wordsearch
- Famous Bridge Crossword
- Famous Bridge Wordsearch

Pier	Tower	Steel	
Abutment	Tower Bridge	Dead load	Cast Iron
Span	Swing bridge	Immersed tube	Span
Keystone	Cable-stayed	Accumulator	Pearl Bridge



@exploringengineeringRBT

education@rbt.org.uk

www.rochesterbridgetrust.org.uk



ROCHESTER
BRIDGE TRUST

STEM Resources

Useful links, resources and websites to support STEM learning in school and out, and inspiration for links to other subjects

Key Stage 2/3

Some interesting websites to explore more STEM learning include:

- National Geographic Kids - Science

<https://www.natgeokids.com/uk/category/discover/science/>

This has lots of 'interesting facts' sections, so you can learn all about space or the human body in bite-size chunks.

- The School Run – Science

<https://www.theschoolrun.com/ks2/key-stage-2-science>

This website has lots of different worksheets:

<https://www.theschoolrun.com/refuting-hypothesis>

This one suggests some quick and easy activities that can be done at home, to explore whether sound travels through solids

<https://www.theschoolrun.com/understanding-friction-build-your-own-balloon-hovercraft>

This one has instructions on building a balloon hovercraft – if you have an old CD and a balloon laying around, it's a really simple and fun activity, and learning about friction all at the same time!

<https://www.theschoolrun.com/super-scientist-quiz>

This activity relates to the nature of science and how scientists work, getting older students to consider why scientists do the things they do.

<https://www.theschoolrun.com/reaching-conclusions>

Older children can look at the results and try to draw conclusions from the data.

- Building Big Forces Lab – PBS

<http://www.pbs.org/wgbh/buildingbig/lab/forces.html>

- Khan Academy

<https://www.khanacademy.org/parent>

This site is suitable for older children, as it covers a great deal of detail about topics such as forces, for example, using video lectures and quizzes.

<https://www.khanacademy.org/science/physics/forces-newtons-laws>



@exploringengineeringRBT

education@rbt.org.uk

www.rochesterbridgetrust.org.uk



STEM Resources

Useful links, resources and websites to support STEM learning in school and out, and inspiration for links to other subjects

Key Stage 2/3

Some interesting websites to explore more STEM learning include:

- 123Homeschool [_](https://www.123homeschool4me.com/home-school-free-printables/) Free downloadable worksheets
<https://www.123homeschool4me.com/home-school-free-printables/>
Lots of resources to download, but you must sign up for an account before you can access any.
https://www.123homeschool4me.com/solar-system-worksheets_83/ Solar System worksheets
https://www.123homeschool4me.com/free-printable-blank-maps_56/ Blank maps
- Math Score
<http://www.mathscore.com/>
Lots of online maths tests to build key maths skills. Based on the American grade system, so will need to some exploring to find the right areas for each different year in the England system.
- Accessibyte
<https://www.accessibyte.com/stay-safe>
Accessibyte Online is offering free access to its entire cloud platform of apps for blind, low vision, deaf and reading impaired students. Highly visual and fully audible typing tutor, games, flash cards and study apps.
- BBC Bitesize
<https://www.bbc.co.uk/bitesize/levels/zbr9wmn>
All subjects, including STEM.
- TED Ed
<https://ed.ted.com/>
Lots of different videos on a variety of topics, including STEM
- The Kid Should See This
<https://thekidshouldseethis.com/>
A variety of videos on a range of topics.





ROCHESTER
BRIDGE TRUST

STEM Resources

Useful links, resources and websites to support STEM learning in school and out, and inspiration for links to other subjects

Key Stage 2/3

Some interesting websites to explore more STEM learning include:

- Crest Awards

<https://www.crestawards.org/>

Some science activities that can be done at home.

<https://primarylibrary.crestawards.org/> Most of the Superstar Challenges from the pack in the Resource Library (here: <https://primarylibrary.crestawards.org/all-superstar-challenges/61747644>) can be completed at home.

- Paw Print Badge Challenges

<https://www.pawprintbadges.co.uk/>

A huge range of activity packs to support Scouts or Guides, these can largely be completed at home, including the STEM challenge badge.

<https://www.pawprintbadges.co.uk//ekmps/shops/9507f2/resources/Other/stem-challenge-badge-activity-pack.pdf>

The packs themselves are free, but badges need to be purchased.

- Tinkercad

<https://www.tinkercad.com/>

3D design, electronics and coding tool, just needing to register to use.

- Oxford Owl for Home

<https://www.oxfordowl.co.uk/for-home>

Lots of help on English, Reading and Maths at home,

<https://www.oxfordowl.co.uk/welcome-back/for-home/reading-owl/maths>

including 'how to' videos and book selections for boys and girls.

- BP Educational Resources

<https://bpes.bp.com/>

Lots of free STEM resources for Primary and Secondary, including online investigations and profiles of individuals, such as Ada Lovelace, with a series of activities linked to it.



@exploringengineeringRBT

education@rbt.org.uk

www.rochesterbridgetrust.org.uk