Buildtastic

Driving innovation as part of National Construction Week

WEST SUFFOLK COLLEGE

wsc.ac.uk/buildtastic

CONSTRUCTION CHALLENGE

NASCENT

PLACE 21
Connections, Qualifications and Character Strengths

Can you build a bridge… from paper?

European Union
European Social Fund

a blended learning challenge, for Key Stage 3 and up, at home or in school, developed by

WEST SUFFOLK COLLEGE

Contents:

WHAT ARE YOU GOING TO DO?

You are going to be building a bridge, entirely from newspaper, that will support the weight of a brick. You'll need to think about which shapes are the strongest and how to make them with the newspaper. Having achieved that, try increasing the span of your bridge.

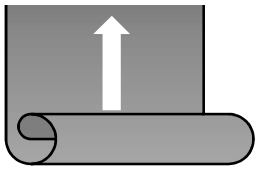
YOU WILL NEED:

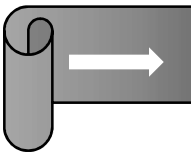
- **A newspaper**
- **A house brick**
- **5cm lengths of sticky tape:** you may use sticky tape but only in short lengths of around 5cm.
- **Scissors:** to cut the paper and sticky tape.
- **Tape measure:** if you are competing to create the longest span, you'll need to be able to measure it.

NOW YOU'RE READY TO GET BUILDING!

There are literally hundreds of ideas for this challenge online. and our Find Out More: Useful Links section gives some examples.

We are going to start simple:

1) Roll up a sheet of newspaper from top to bottom: 

2) Next roll a sheet from side to side: 

Compare the two rolls you have created. Which do you think is the strongest? Why? Can you think how these rolls might be used to support the weight of a brick?

3) Once you have decided which roll is most suitable, fix the ends of the roll with a short piece of tape to prevent unravelling.

4) Create about 10 more rolls like this.

5) Arrange the rolls between two surfaces (a pile of books works well) and see if you can position them to make a bridge (don't make this a high bridge in case the brick falls).

6) When you have made the bridge try resting your brick on your bridge. You may need more rolls of newspaper.

Once you have created a bridge that will support your brick, think about how you might increase the span of your paper bridge, for example:

- rolling the newspaper sheets on the diagonal to create length
- making one roll with a smaller diameter to insert between two rolls, creating a join.

CROSS-CURRICULAR LINKS:

You might think that construction is not part of the curriculum you are studying, well you'd be wrong, your curriculum topics are embedded in construction and in carrying out this activity you will be using your skills in the following topics

English: you've read and understood this challenge, you'll have written a plan and notes on what you intend to do

Maths: can you figure out what mathematical considerations would be involved in real life bridge design, what forces are acting on your bridge and how are they described in maths and physics.

Science: is everywhere, you'll be using your unconscious knowledge of science and engineering throughout this challenge, you'll also be working scientifically and planning a fair test if you are carrying out the activity as a classroom competition.

History: when were bridges first used? And why?

Geography: where is the tallest bridge in Suffolk / UK / World?

Modern Foreign Languages: could you write a guide to your construction in a language other than your own or English

Art, Design and Technology: you have designed your bridge, have you considered the aesthetics of it? in the real world a bridge design would need to meet certain criteria, what might they be?

Citizenship: if you have worked as a group to create your structure you will have been practicing your citizenship skills, you will have thought about the different strengths and weaknesses of each team member and recognised that everyone has a meaningful role to play.

Computing: can you investigate what a CAD programme would add to this activity? What are the latest programmes used to aid bridge design? could you create a replica of your finished bridge using Minecraft, do you know the software the construction industry work with to manage projects

FIND OUT MORE: USEFUL LINKS

These links of short videos and written resources should help you understand more about this construction challenge

WEB RESOURCE: The national curriculum in England
The entire national curriculum is available to all as a PDF or Word Document
https://www.gov.uk/government/publications/national-curriculum-in-england-primary-curriculum

WEB RESOURCE: Scientific American – Paper Bridge
An example of how to complete a similar challenge can be found at
https://www.scientificamerican.com/article/paper-bridges/

WEB RESOURCE: How to make a strong paper bridge without glue?
Follow this link from the Guinness World Records to find out what they had to consider to break this record https://www.guinnessworldrecords.com/world-records/578085-tallest-packaged-food-tower

WEB RESOURCE: Teaching Bridges: The Rochester Bridge Trust
This trust has an excellent range of resources and lesson plans for primary schools on the topic of bridges, this is a great place to start as pupils are guided around the website by Langdon, a friendly lion who loves to learn about bridges and wants to share what he knows with the pupils. http://www.rochesterbridgetrust.org.uk/

WEB RESOURCE: Institute of Civil Engineers (ICE) Do-at-home activities for all ages
These activities have been designed to be done in the home using house-hold items for ages 4 upwards, with add-on challenges for 11-16s and 16-18s, the best one is the Chocolate Bar Bridge! https://www.ice.org.uk/what-is-civil-engineering/inspire-the-next-generation/educational-resources#primary

WEB RESOURCE: The History of Bridges

We've come a long way since the Romans figured out how to cross a wide river using timber and this online timeline from ICE contains some of the most spectacular examples. Starting in 1826 with the Menai Suspension Bridge and culminating with some of the most stunning bridges currently under construction. https://www.ice.org.uk/events/exhibitions/ice-bridge-engineering-exhibition/the-history-of-bridges

WEB RESOURCE: Bridge Engineering Exhibition

Virtually visit the ICE Bridge Engineering Exhibition using a 3D video to walk around. It uses the same approach as Google Earth, simply click on the arrows to move yourself around the exhibition. https://www.ice.org.uk/events/exhibitions/ice-bridge-engineering-exhibition/walk-around-the-exhibition-online

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