Bridge over troubled water

EAE Learning objectives for this lesson

Reading and comprehension. Expressions and technical vocabulary connected to bridges

Activity 1: With your teacher or partner, ask and answer the following questions
(have a look for some interesting facts about bridges at home to share in the lesson)

1 Which countries have you travelled to around the world?
2 Which of these countries had large rivers and places where you needed to cross over water?
3 Have you ever crossed a famous bridge?
4 How many different famous bridges can you think of?
5 What materials can be used to make a bridge?
6 Can you think of a world disaster or an event that has happened involving a bridge?
{Interesting fact: Did you know that the Runcorn bridge and Sydney Harbour bridge are practically identical!}
7 Do you know any other interesting facts about bridges?
8 What is the name of the city where the bridge in this image can be found?



Activity 2: Expressions - Find the definitions for these expressions (before the lesson)

- Water under the bridge

- Burn bridges

- Cross that bridge when you come to it

Complete the sentences using the correct expression:

1 I have _____ with my previous employer because I had an awful argument with the Chief Executive before I left. I can never go back there again.

2 My colleague and I had a big disagreement about our new project last week, but we reached a compromise and now it's all _____

3 I have so many things to think about, if a problem arises, I will just have to _____

Ask and answer the following questions

1. Have you burnt any bridges that you now have regrets about?
2. Is it easy for you to forgive a wrongdoing and call it water under the bridge? Or do you stay angry for a long time?
3. Do you cross a bridge only when you come to it? Or do you often worry before a problem actually happens?

Activity 3: Bridge over troubled water – Listen to the song and fill in the gaps with the missing words

When you're _____, feeling _____,
When tears are in your eyes, I will dry them all;
I'm on your side. When times get _____
And friends just can't be _____,
Like a _____ over troubled water
I will lay me _____.
Like a bridge over troubled water
I will lay me down.

When you're down and out,
When you're on the _____,
When evening _____ so hard
I will comfort you.
I'll take your part.
When _____ comes
And pain is all around,
Like a bridge over troubled water
I will lay me down.
Like a bridge over troubled water
I will lay me down.

Sail on silvergirl,
_____ on by.
Your time has come to _____.
All your _____ are on their way.
See how they shine.
If you need a _____
I'm _____ right behind.
Like a bridge over troubled water
I will ease your mind.
Like a bridge over troubled water
I will ease your mind.

Activity 4: Vocabulary - match the word with the definition

Abutments
Spandrels
Anchorages
Span
Compression
Tension
Buckling
Snapping
Dissipate
Transfer
Truss
Torsion
Deck-stiffening trusses
Resonance
Dampeners

- supports the ends of a bridge. (Built to support the lateral pressure)
- a technique used to interrupt the resonant waves
- a supporting truss system beneath the bridge deck
- to move force from an area of weakness to an area of strength
- a framework, typically consisting of rafters, posts, and struts, supporting a roof, bridge or other structure
- a fatal force to a bridge that is a vibration caused by an extended force that is in harmony with the natural vibration of the original thing. These vibrations travel through a bridge in waves
- to spread force over a greater area so that no one spot has to take a concentrated force
- a rotational or twisting force
- a force that acts to expand or lengthen the thing it is acting on
- Devices that are put into solid rock or concrete blocks to secure and evenly spread cables over a large area. This evenly distributes the weight and prevents cables from breaking free
- the distance between two bridge supports
- The bending of a material when it cannot handle the force or weight of something. Bend and give way under pressure.
- a force that acts to compress or shorten the thing it is acting on
- what happens when tension becomes too much.
- vertical supports of an arch bridge used to distribute the weight of the roadway to the arch below

Activity 5: Read the text and answer the questions. Have a look at the words in *italics* and see if you understand all of them.

http://science.howstuffworks.com/engineering/civil/bridge.htm

We are a species of bridge builders. Since time out of mind, humans have engineered structures to *surmount* obstacles, such as, say, Jiaozhou Bay. The body of water is now home to a 26.4-mile (42.5-kilometer) bridge that links the busy Chinese port city of Quingdao to the Chinese suburb of Huangdou.

We've tamed *steel*, *stone*, *lumber* and even living vegetation, all in an effort to reach the places, people and things we desire.

Although the *concept* itself is as simple as *felling* a tree across a *creek*, bridge design and construction entails serious *ingenuity*. Artists, architects and engineers pour *vast* resources into bridge construction and, in doing so, reshape the very environment in which we live. As a result, we *inhabit* a planet of bridges, some as ancient as Greece's 3,000-year-old Arkadiko bridge or as unchanged as India's 500-year-old Meghalaya living bridges, which are *coaxed* into existence from growing tree roots (more on that later). Countless others have fallen into the *ravines* and rivers they span, as humans continue to tackle ever more *ambitious* bridges and construction.

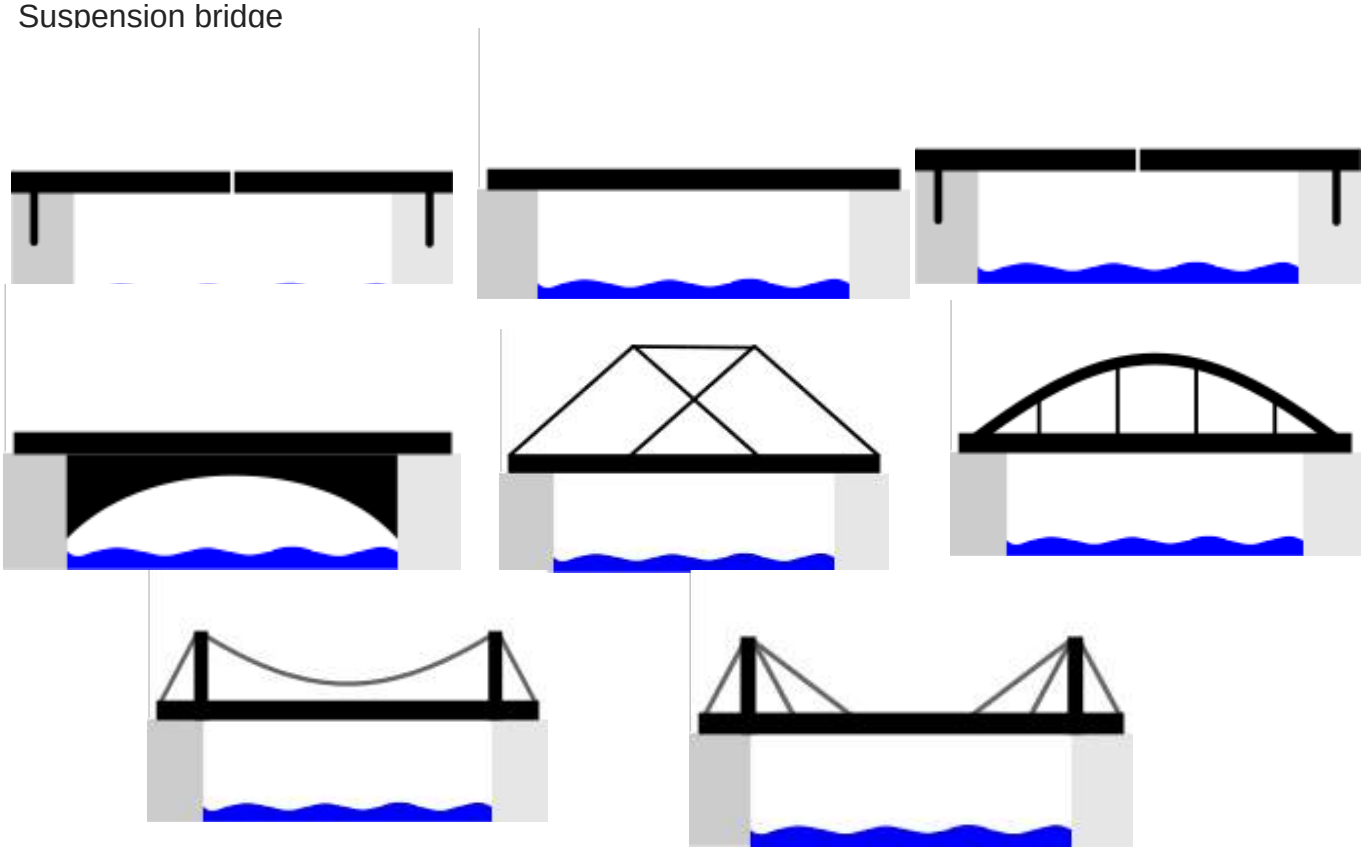
In this article, we'll get to know the bridges we so often take for granted (we literally walk and drive all over them), as well as the designs that make them possible. We'll look at the *fundamental* principles of bridge engineering, the different types and how we attempt to thwart the physical forces and natural phenomena that perpetually threaten to destroy the world's bridges.

Questions:

1. What materials can bridges be made from?
2. What does “take for granted” mean in this text?
3. Try to summarise what has been said in the text
4. Do you understand all of the words in *italics*?

Activity 6: Match the type of bridge with the image

Beam bridge / Truss bridge / Cantilever bridge / Arch bridge / Tied arch bridge / Suspension bridge



Activity 7: Think of and explain some reasons why bridges may fail or collapse
For example: Earthquake

Activity 8: Read the article and answer the questions below
Article 24 September 2015 - http://www.bridgeweb.com/MemberPages/article.aspx?id=3763
Initial engineering reports indicate there was a manufacturing defect in a link of heavy duty chain that failed suddenly on the Hopuruahine Bridge in New Zealand earlier this month.
Four hikers fell some 8.5m into the river when the cable failed, causing the bridge to tip
Department of Conservation (DOC) deputy director general operations Mike Slater said that laboratory analysis conducted at the University of Canterbury School of Engineering has revealed quench cracks and embrittlement in a section of 24mm-diameter high tensile chain used on the bridge.
DOC is now seeking confirmation of the defects through a second round of specialist testing.
Slater added that the specific batch of chain found on the Hopurahine Bridge was not used in the construction of the other nine smaller bridges on the Lake Waikaremoana Great Walk and they have all passed detailed engineering inspections. Checks have not revealed any sections of this batch being used in DOC's other suspension bridges around the country.
DOC will be installing new cable strops on the Hopuruahine Bridge over the coming weeks and will be working to recommission the structure after fresh load testing is completed
Questions

1. Can you explain what happened to the bridge?
2. Can you explain why this happened?
3. What are they doing to confirm what the defects are?
4. Do other bridges in the area have the same problems?
5. What will they do to prevent it happening again?

Activity 9: Role plays. Act out the following situations with your teacher or partner

1. You are driving along the Golden Gate bridge in California with a friend when a very strong wind makes you lose control of your car
2. You want to walk to the top of the Sydney Harbour bridge, but your friend is too scared, you have to persuade her/him to come with you and make sure they get to the top safely
3. You and a friend want to bungee jump off the Kawarau bridge in Queensland, but when you get to the top, one of you freezes and cannot move

Last Activity: Can you think of some sentences with the new vocabulary or expressions learnt in the lesson?

