

Bridge Design



In this presentation you will:

- identify different styles of bridges

Bridges

The function of a bridge is to span a gap...



...and carry a load from one side to the other.

Beam Bridge



The simplest bridge is a wooden plank long enough to cross a gap.

To be effective, beam bridges must be built from materials that can withstand tension, such as steel and reinforced concrete.



Truss Bridge

Another method of strengthening beam bridges is to make them from a framework of thin structural members called a truss.



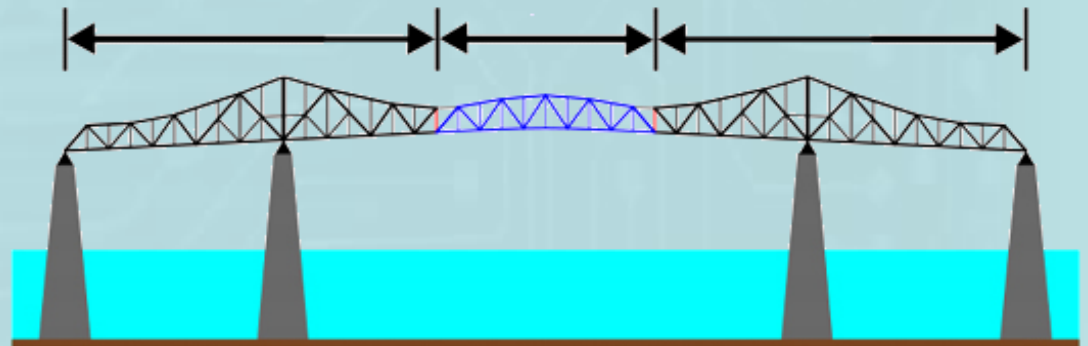
They are commonly built from steel or iron, but may also be built from timber or reinforced concrete.

Cantilever Bridges

These can cover longer distances.



The middle span may be supported by a pier.

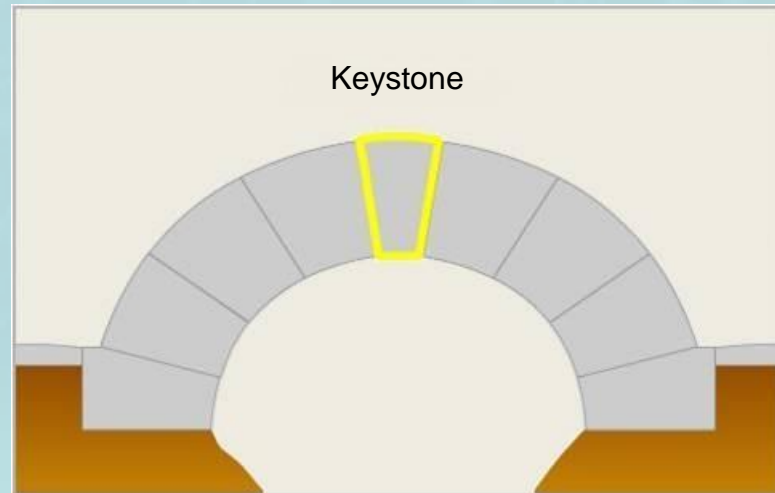


Arch Bridges

An arch bridge is made from a number of small, wedge shaped pieces which stay in place because their own weight causes them to press evenly against one another.



The keystone locks the wedges into place throughout the arch.



Modern Arch Bridges

Modern arch bridges are usually made from concrete or steel.



Question 1

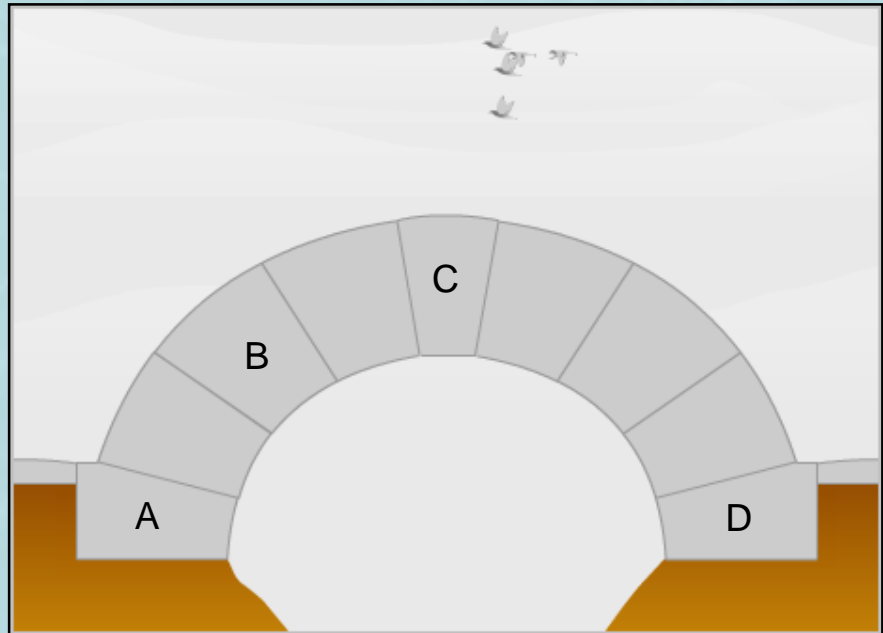
Which of the following is the keystone of the bridge shown?

A) Stone A

B) Stone B

C) Stone C

D) Stone D



Question 1

Which of the following is the keystone of the bridge shown?

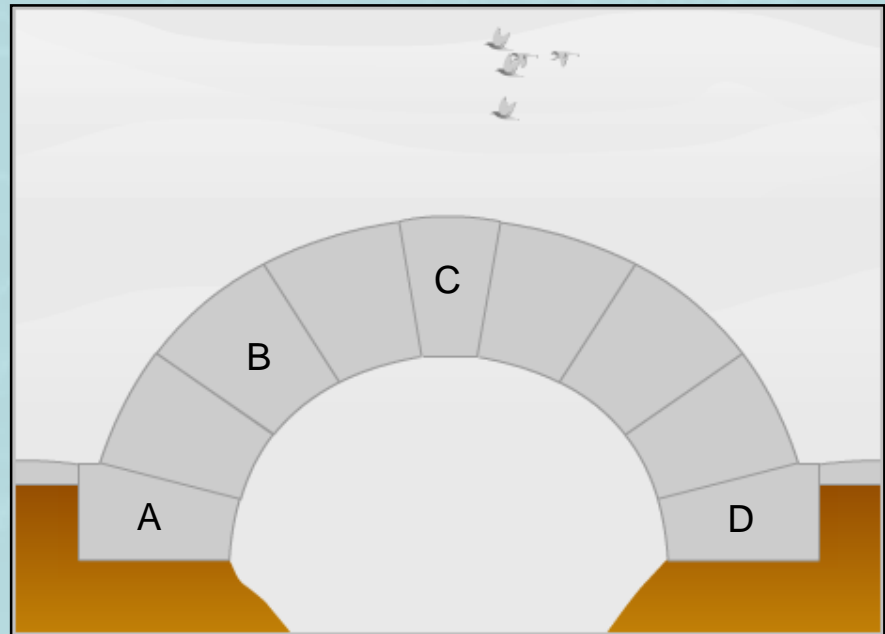
A) Stone A

B) Stone B



C) Stone C

D) Stone D



Stone C is the keystone; it holds the structure of the arch in place.

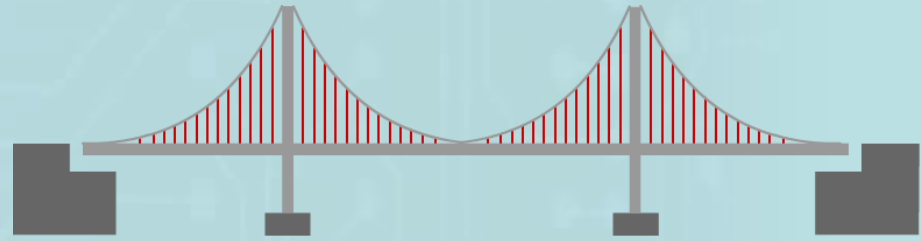
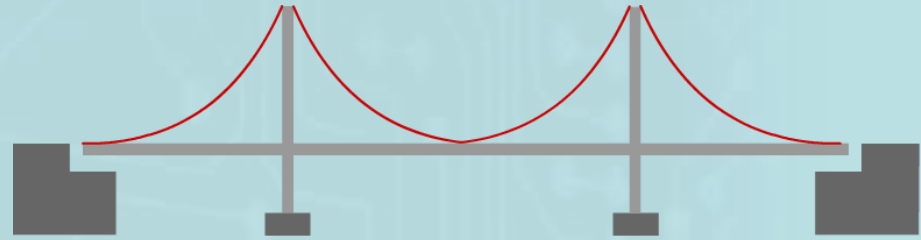
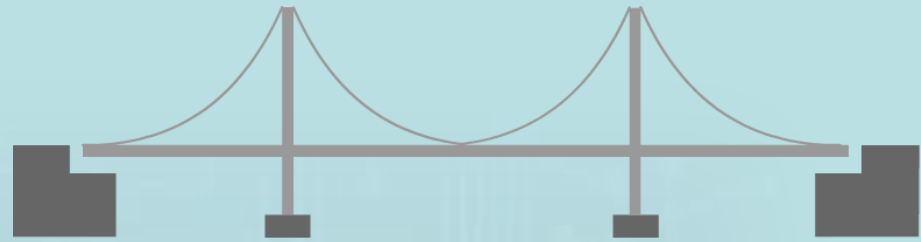
Suspension Bridge

Two large cables are hung between towers at either end of the bridge.

The cables sag across the gap between the towers.

Smaller cables, attached vertically from the main cables to the deck, provide the required support.

The smaller cables are under tension.



Suspension Bridge

The towers on a suspension bridge are under compression.



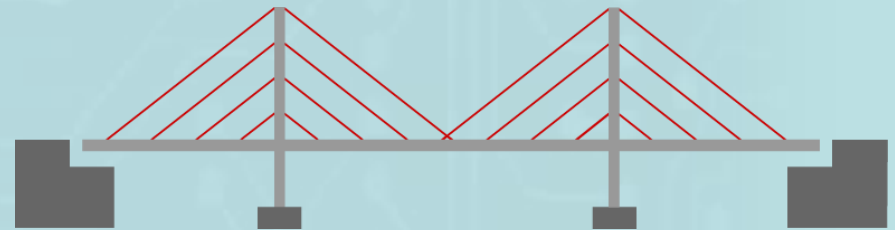
Cable Stay Bridge



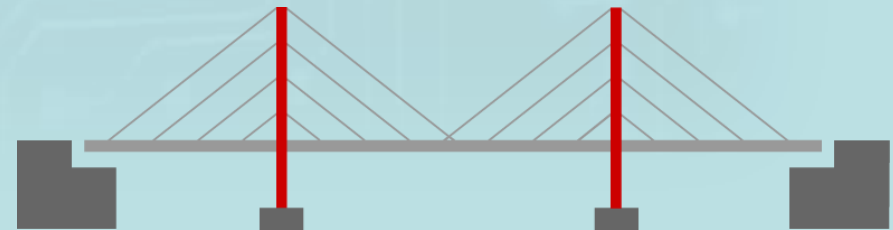
All of the deck support cables lead directly back to the supporting columns.



The cables need to be made from material that has a high tensile strength, for example steel.



The supporting columns need to be made from a material that can withstand a high compressive load, for example concrete.



Question 2

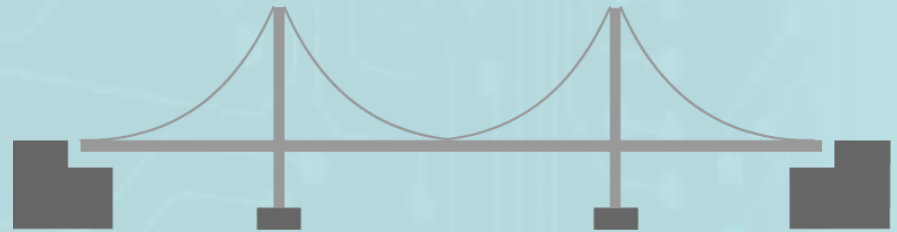
This bridge will collapse if certain materials are not used to finish off the construction. What is required to complete this structure?

A) Support pier

B) Cables

C) Concrete bank foundations

D) None of the above



Question 2

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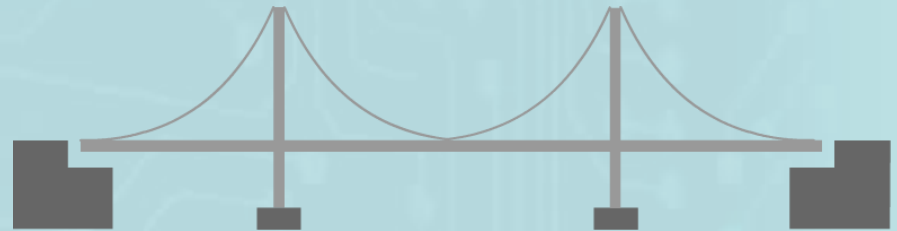
A) Support pier



B) Cables

C) Concrete bank foundations

D) None of the above



Vertical cables will be required from the deck of the bridge to the support cables, or there will be nothing to support the bridge deck.

Question 3

What part of the bridge carries the weight of the construction, traffic, and pedestrians?

A) A and D

B) B and C

C) E only

D) A, E, and D



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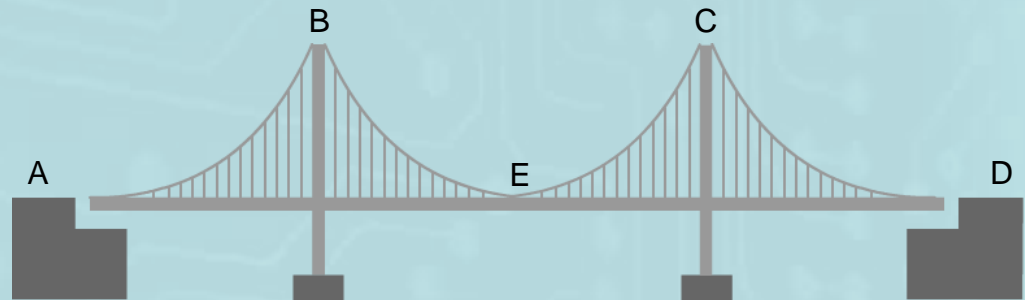
A) A and D



B) B and C

C) E only

D) A, E, and D



The weight of traffic passing over the deck of the bridge is supported by the columns.

Summary

In this presentation you have seen:

- beam bridges
- truss bridges
- cantilever bridges
- arch bridges
- suspension bridges